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Predictors of sleep quality: Depression, anxiety, and sleep self-efficacy

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Abstract

The objective of the current study was to examine the relationship between depression, anxiety, sleep self-efficacy and sleep quality in college students by using both objective measures and self-report data. Participants included undergraduate students from a small liberal arts college who wore an ActiGraph wGT3X-BT wristband for a period of seven nights. At the end of the seven nights, participants also completed the Beck Anxiety Inventory, Center for Epidemiologic Studies Depression Scale, the Sleep Self-Efficacy Scale, and Pittsburgh Sleep Quality Index. Results indicated that higher sleep self-efficacy scores were associated with lower anxiety and depression scores. Higher self-reported sleep quality, based on the Pittsburgh Sleep Quality Index, was also associated with higher sleep self-efficacy scores as well as lower depression and anxiety scores. Results were potentially limited due to the small sample size ($n = 20$) of the study, as well as participant bias and various environmental factors that will be discussed.

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Introduction

Poor sleep and sleep disorders pose a significant problem in the United States. In 2014 the National Sleep Foundation reported that almost half of Americans are impacted by poor sleep at least once a week, and the impact of sleep deprivation on cognition and daily functioning has been studied extensively across countless populations (Pilcher, & Huffcutt, 1996). For many college students, sleep deprivation just seems par for the course. Up to 60% of college students report sleeping poorly (Lund, Reider, Whiting, & Prichard, 2010), which can have a negative impact on students' academic endeavors (Chiang, Arendt, Zheng, & Hanisch, 2014). Academic pursuits are further hindered by the issue of mental health in college students. In 2003, roughly 50% of college students qualified for at least one disorder according to the DSM-IV (Blanco et al., 2008). The purpose of the current study was to focus on anxiety, depression, and sleep self-efficacy in order to better understand the impact of these variables on sleep quality in college students.

Lund et al. (2010) demonstrated the prevalence of poor sleep in college students aged between 17 and 24 years. The study consisted of 1,175 participants who completed the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), Ostberg Morningness-Eveningness Scale (Horne, & Ostberg, 1976), Subjective Units of Distress Scale (Wolpe, 1970), Epworth Sleepiness Scale (Johns, 1992), Profile of Mood States (Curran, Andrykowski, & Studts, 1995), and academic performance questions. Physical and psychological health problems were more common in students with poorer sleep quality, who accounted for over 60% of the participants. Poor sleepers also scored worse negative moods, including higher scores for fatigue, tension, confusion, anger, and depression. Lund et al. (2010) also indicated

that poor sleep was best explained by perceived stress, versus other variables (ex: regularity of sleep schedule). This is consistent with findings by Buboltz, Jenkins, Soper, Woller, Johnson, and Faes (2009). Buboltz et al. (2009) collected data from 742 undergraduate students at public universities who completed the Sleep Quality Index (Urponen, Partinen, Vuori, & Hasan, 1991). Occasional sleep problems were reported by 65.9% of participants, and over half reported morning tiredness.

Cognitive functioning is known to be markedly different in poor sleepers (Harvey, 2000; Suh et al., 2012), which is particularly relevant for college students. Harvey (2000) hypothesized that pre-sleep worries and concerns would be more prevalent in insomniacs versus their good-sleeping counterparts. Participants included 30 people who met the diagnostic criteria for insomnia as stated in the DSM-IV, and an additional 30 to serve as controls. The primary sleep complaint for the experimental group were delays in sleep-onset; participants with other primary sleep concerns were excluded. The Sleep Disturbance Questionnaire (Espie, Brookes, & Lindsay, 1989), Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988), Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990), and the Why Worry? And Intolerance of Uncertainty (Freeston, Rheaume, Letarte, Dugas, & Ladouceur, 1994) questionnaires were administered. Researchers found that compared to good sleepers, insomniacs had a higher propensity for worrying. Insomniacs experienced worrying thoughts for longer and found the thoughts to be more preoccupying than did the good sleepers. Of the insomniac group, 77% indicated cognitive interference as a primary factor in poorer sleep quality on the Sleep Disturbance Questionnaire (Espie et al., 1989), supporting the notion that cognitive processes have some impact on sleep.

Suh et al. (2012) expanded on the relationship between cognition and sleep disturbance by exploring cognitive predictors of multiple symptoms of insomnia: difficulty with sleep initiation, maintenance, and early morning awakenings. The study's sample consisted of 146 clinical patients with insomnia seeking cognitive-behavior therapy at the Stanford Sleep Disorders Clinic. Potential predictors of insomnia symptoms were depression symptoms, self-reported sleep, academic performance, physical health, psychoactive drug use, and circadian preferences. The study involved two groups: a multiple symptom group and a single symptom group. Variable measures included the Insomnia Severity Index (Bastien, Vallières, & Morin, 2001), Glasgow Content of Thoughts Inventory (Harvey, & Epsie, 2004), Dysfunctional Beliefs and Attitudes about Sleep (Morin, Vallières, & Ivers, 2007), Sleep Self-Efficacy Scale (Lacks, 1987), Beck Depression Inventory (Beck et al., 1961), and Morning-Eveningness Composite Scale (Smith, Reilly, & Midkiff, 1989). Severity of pain while trying to sleep was also recorded, in addition to daily sleep diaries. The Sleep Self-Efficacy Scale served as a significant predictor of multiple insomnia symptoms (Lacks, 1987). Of the patients that scored low on the Sleep Self-Efficacy Scale (Lacks, 1987), 73.4% were a part of the combined multiple symptom subgroup. These participants also had longer sleep onset latency and showed worse depression symptoms as indicated on the Beck Depression Inventory (Beck et al., 1961).

Self-efficacy plays a significant role in an individual's ability to successfully tackle a problem and is considerably relevant to sleep – a daily task that can present significant difficulty to a large population of people. Bandura's theory of self-efficacy (1977) suggests that an individual's expectations and perceptions of a task significantly influence the quality of a person's effort at a task, and therefore impacts their ability to perform that task. Bandura's (1977) study utilized behavioral tasks of varying difficulty to demonstrate the impact of self-

efficacy, where tasks were ordered according to the amount of effort required to complete them. Higher self-efficacy was correlated with greater perseverance at tasks, and therefore greater success at those tasks.

The potential implications of self-efficacy on mental health was depicted in Bandura, Pastorelli, Barbaranelli, and Caprara's (1999) research on self-efficacy and childhood depression. Perceived self-efficacy was self-reported for academic achievement, extracurricular activities, and social behaviors. Students (mean age of 11.5 years) also completed the Children's Depression Inventory (Kovacs, 1985) and Child Behavior Checklist (Achenbach, & Edelbock, 1978). Academic achievement was collected from the children's teachers, and classmates additionally rated each other for prosocial behaviors. Results indicated that children were more negatively impacted by their beliefs about their academic performance, versus their actual academic performance. Perceptions on their social inefficiency was also linked to depression. Children were re-evaluated for depression one and two years after the initial study, and a relationship was established between the children's perceptions of social inefficiency and long-term depressive symptomology.

While Bandura et al. (1999) studied self-efficacy in general, Rutledge, Guardia, and Bluestein (2013) specifically depicted the relationship between sleep self-efficacy and overall sleep quality. Rutledge et al. (2013) included 236 participants from primary care facilities; all participants had clinically significant insomnia as measured by the Insomnia Severity Index (Bastien et al., 2001). Participants completed the Self-Efficacy for Sleep Scale (Lacks, 1987), Insomnia Treatment Acceptability Scale (Morin, 1993), the SF-8 (Ware, & Sherbourne, 1992), the Dysfunctional Beliefs about Sleep Scale (Morin et al., 2007), and The Center for Epidemiological Studies Depression Scale (Radloff, 1977). Results indicated that insomnia

severity, dysfunctional beliefs, and depressive symptoms all negatively correlated with sleep self-efficacy. These outcomes support Bandura's theory (1977) and suggest that patients must believe that they can be effective in treating their insomnia in order for the treatment to work. Furthermore, Rutledge et al. (2013) provided support for the link between low sleep self-efficacy and depression–depression sufferers are more likely to have lower self-efficacy, inhibiting improvement of sleep quality.

Similarly, Nyer et al. (2013) depicted the relationship between depressive symptomology, intense anxiety and sleep disturbance. The study's sample consisted of 287 students that indicated significant depression symptoms as determined by a score of 13 or greater on the Beck Depression Inventory (Beck et al., 1961), with 220 of them also indicating disturbed sleep. Participants then completed the Anxiety Symptom Questionnaire (Clark, & Watson, 1991), Quality of Life Enjoyment and Satisfaction Questionnaire (Endicott, Nee, Harrison, & Blumenthal, 1993), Beck Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974), Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire (Fava, Iosifescu, Pedrelli, & Baer, 2009), and Beck Anxiety Inventory (Beck et al., 1988). Results showed that the group with both depressive symptoms and sleep disturbance experienced a higher level of impairment (both physical and cognitive) as well as increased anxiety.

Bluestein, Rutledge, and Healey (2010) also indicated a correlation between insomnia severity and depression, as well as with dysfunctional beliefs and sleep self-efficacy. The study consisted of 236 adult participants with insomnia according to the Insomnia Severity Index (Bastien et al., 2001), recruited from three clinical facilities. Participants completed the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), SF-8 (Ware et al., 1992), Self-Efficacy for Sleep Scale (Lacks, 1987), and Dysfunctional Beliefs about Sleep Scale (Morin et

al., 2007). Health, depression, dysfunctional beliefs, and self-efficacy correlated significantly with insomnia severity–low self-efficacy and higher depressive scores best predicted insomnia severity.

Depression and sleep disturbance have a well-researched association, but there has been a failure to narrow down a directional causal relationship. Complaints about sleep impairment have been reported by over 90% of patients experiencing depression (Mendelson, Gillin, & Wyatt, 2012), and insomnia is a common symptom of depression. On the other hand, severe insomnia causes patients to be much more likely to develop depression (Riemann, Berger, & Voderholzer, 2001). Riemann et al. (2001) reviewed EEG recordings from several different subtypes of depression and sleep disturbances across various research studies and failed to find causal explanations for the relationship between depression and sleep deprivation–however, the culmination of data further supports the bi-directional relationship between depression and sleep disturbance.

Studies about sleep, anxiety, and depressive symptomatology consistently make use of self-report data. Although many studies utilize EEG to collect information (e.g. Riemann et al., 2001), the bulk of research on the topic relies on self-report questionnaires. Self-report data can be easily impacted by factors outside of the researchers' control, such as the honesty of participants, subjective understandings about a question, or the reliability of a participant's memory. Furthermore, mere expectations about an event or situation can alter a participant's self-report data. For example, O'Donnell, Silva, Münch, Ronda, Wang, and Duffy (2009) compared the objective and subjective sleep measures of older adults. Data from 24 older adult subjects (ages ranged from 55-74 years old) was collected over the course of 32-days of inpatient participation. During this time participants had no access to time-telling devices, and there were

no windows in the patients' rooms. Sleep was monitored using an EEG every night during the participation period, including three days to determine baseline sleeping habits. After every sleeping period, the participant was given a post-sleep questionnaire that asked participants to self-report sleep quality in addition to the EEG's readings. The questionnaire included inquiries regarding latency, duration, awakenings, and time awake before the scheduled waking time. O'Donnell et al. (2009) indicated that the association between subjective and objective sleep measures are modest. O'Donnell et al. (2009) found that participants rated their baseline sleep as "good", despite the fact that their objective measures indicated low sleep quality. This is consistent with research by Buysse, Reynolds, Monk, Hoch, Yeager, and Kupfer (1991) who theorized the perception of sleep by older adults may be altered by gradual sleep quality changes associated with aging. Similarly, self-report data collected from college students may be impacted by general expectations about being in college–poor sleep is considered commonplace and may therefore be misinterpreted as "good" sleep. The current study will seek to explore this potential problem by utilizing both objective and subjective sleep quality measures.

The aforementioned studies have demonstrated the effects of anxiety, depression, and sleep self-efficacy (an individual's confidence that they can sleep well) on overall sleep quality. However, most of these studies are similar in that they utilized questionnaires to measure these variables. The present study sought to rectify this gap in the research between objective and subjective data by not only utilizing a questionnaire, but by also using a sleep monitor that objectively measured each participant's quality of sleep. The device used in this study–the Actigraph wGT3X-BT–has been shown to be similar in accuracy to the polysomnography (PSG; a well-established measure of sleep) for measuring the sleep quality of non-clinical patients (Sadeh, Hauri, Kripke, & Lavie, 1995). Utilizing both a questionnaire and objective sleeping

measure may indicate which method is more closely related to sleep self-efficacy.

The current study also sought to expand on previous research by using a sample of non-clinical college students versus a sample of patients in primary care, or with clinically diagnosed insomnia; this potentially increased generalizability. It was hypothesized that the results of this study would be consistent with previous studies: as anxiety and depressive symptomatology increase and sleep self-efficacy will decrease, both the subjective and objective measures of overall sleep quality will also decrease. It was also hypothesized that sleep self-efficacy will be negatively correlated with depression and anxiety symptoms, and that sleep self-efficacy, anxiety, and depression scores will significantly predict sleep quality.

Method

Participants

Participants were all undergraduate students over the age of 18 from a liberal arts college. Students were asked to participate through emails sent to undergraduate students through professors, as well as the researchers. The study consisted of 20 participants (85% female). The mean age was 20.05 years (SD = 1.73), and 70% were freshmen. Caucasians accounted for 75% of the sample. Demographic information collected also included gender, age, expected college graduation year (to indicate their class), and ethnicity. Participants were also asked to indicate napping habits as well as caffeine, tobacco and alcohol use, and use of over-the-counter sleep aids (see Appendix A). Participants diagnosed with a sleeping disorder were excluded on the basis of separating out the clinical population.

Materials

Sleep quality. Sleep quality was measured with both objective and subjective measures. Participants were asked to wear the ActiGraph wGT3X-BT for a period of seven consecutive

nights (ActiGraph, n.d.). The ActiGraph is a medical grade wristband that provides an objective measure for total sleep time, sleep latency and efficiency, as well as wake after sleep onset. Self-reported sleep was recorded using the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989; see Appendix B). The PSQI (Buysse et al., 1989) is a 9-question survey that measures 7 areas of sleep including sleep quality, latency, duration, efficiency, disturbances, daytime dysfunction, and use of sleeping medication. Answers were recorded using both a Likert scale (0-3) as well as filling in blanks. Scoring was determined by combining the component scores. Poorer sleep was indicated by a score of 5 or greater. The PSQI (Buysse et al., 1989) has a Cronbach's alpha of 0.83, indicating good reliability.

Anxiety. The Beck Anxiety Inventory (BAI; Beck et al., 1988; see Appendix C) is a 21-question inventory with a Cronbach's alpha of .92 that indicates how severe a symptom of anxiety has been for a participant during the past month. Each question can have a score of 0 to 3, with 0 indicating that the participant has not been bothered at all by the symptom, and 3 indicating that the participant has been severely bothered by the symptom. Total scores can range from 0 to 63, with 21 and lower indicating very low anxiety, and scores exceeding 36 indicating potentially severe anxiety.

Depression. Self-reported depressive symptomatology was measured with the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977; see Appendix D), a 20-item questionnaire that asks participants how often during the past week they have experienced depression symptoms. The CES-D (Radloff, 1977) scores on a Likert Scale from 0-3, with 0 indicating no symptomatology and 3 indicating severe symptomatology. Total scores can range from 0 to 60 – more symptomology is indicated by higher score. The CES-D (Radloff, 1977) has good reliability, with a Cronbach's alpha of .84 to .90 over four samples.

Self-Efficacy. Self-efficacy for sleep was measured using the Sleep Self-Efficacy Scale (SES; Lacks, 1987; see Appendix E). The scale consists of 9-items that measure the participants sleep self-efficacy by asking participants to indicate how confident they feel about accomplishing sleep-related behaviors. Higher scores indicate higher self-efficacy and can range from 9 to 45. The SES (Lacks, 1987) has a Cronbach's alpha of .71.

Procedure

The study took place over the course of seven days with two in-person sessions at the beginning and end of the week-long time period. During the first session, participants completed an informed consent form and demographic questionnaire. Participants also received an ActiGraph wGT3X-BT wristband with instructions to wear the wristband for the next seven consecutive nights. The second session took place after the seven nights of wearing the ActiGraph was completed. Participants returned the ActiGraph and completed four questionnaires: the CES-D (Radloff, 1977), BAI (Beck et al., 1988), SES (Lacks, 1987), and PSQI (Buysse et al., 1989). The order of questionnaires was counterbalanced by reversing the order for half of the participants. Each session took approximately 10 minutes to complete.

Design

Correlations were run to determine the relationship between sleep self-efficacy scores, and anxiety and depression, as well as any associations between anxiety, depression, sleep self-efficacy, and both objective and subjective sleep scores. An independent sample t test was conducted to examine the difference between Freshmen and non-Freshmen on their objective sleep time. A multiple regression was also performed to potentially determine depression, anxiety, and sleep self-efficacy as predictors for objective and subjective sleep quality.

Results

Using correlations, sleep self-efficacy scores were negatively correlated with both anxiety scores ($r(18) = -0.60, p = 0.002$; see Figure 1) and depression scores ($r(18) = -0.54, p = 0.007$; see Figure 2). Objective sleep scores obtained through the ActiGraph wGT3X-BT did not correlate with anxiety, depression, or sleep self-efficacy scores. Subjective sleep quality was negatively correlated with sleep self-efficacy scores, $r(18) = -0.77, p < 0.001$ (see Figure 3). Subjective sleep scores were also positively correlated with depression scores ($r(18) = 0.61, p = 0.004$) and anxiety scores ($r(18) = 0.62, p = 0.003$). A multiple regression was conducted using depression, anxiety, and sleep self-efficacy scores as predictor variables to predict subjective sleep quality. Lower depression and anxiety scores, and higher sleep self-efficacy predicted better subjective sleep quality, $R = 0.81$, $Adj\ R^2 = 0.58$, $F(3.14) = 8.66, p = 0.002$; subjective sleep quality was best predicted by sleep self-efficacy (see Table 1). An independent samples t test indicated a significant difference between the average sleep of freshmen ($n = 7$) and non-freshmen ($n = 10$), $t(15) = 2.61, p = 0.02$. Freshmen ($M = 482.04$, $SD = 80.75$) slept more than non-freshmen ($M = 393.48$, $SD = 59.85$) on average. Descriptive statistics of all variables are provided in Table 2.

Discussion

The purpose of the current study was to focus on anxiety, depression, and sleep self-efficacy in order to better understand the impact of these variables on sleep quality in college students. Participants wore an ActiGraph wGT3X-BT for a period of seven nights before taking four questionnaires: the CES-D (Radloff, 1977), BAI (Beck et al., 1988), SES (Lacks, 1987), and PSQI (Buysse et al., 1989). Correlations were run to determine the relationship between sleep self-efficacy scores, anxiety, depression, and both objective and subjective sleep scores. It was hypothesized that as anxiety and depressive symptomatology increased and sleep self-efficacy

decreased, both the objective and subjective measures of overall sleep quality would also decrease. It was also hypothesized that sleep self-efficacy would be negatively correlated with depression and anxiety symptoms, and that sleep self-efficacy, anxiety, and depression scores would significantly predict sleep quality. Results supported all hypotheses except the hypothesis that objective sleep measures would be associated with anxiety, depression, and sleep self-efficacy.

Sleep Self-Efficacy

Sleep self-efficacy scores were negatively correlated with both anxiety and depression scores, indicating that lower sleep self-efficacy was associated with more anxiety and depression symptoms. The hypothesis was supported. Previous research by Suh et al. (2012), Rutledge et al. (2013), and Nyer et al. (2013) showed similar findings, wherein participants who scored low on sleep self-efficacy showed worse depression symptoms. These results suggest that individuals experiencing anxiety and depression symptoms may benefit from evaluating their perceptions about sleep. In the same way, individuals experiencing poor sleep may benefit from evaluating potential anxiety and depression symptoms. Future research should be done to determine methods of improving sleep self-efficacy, as well as the impact of improving sleep self-efficacy on anxiety and depression symptoms.

Sleep Quality

The hypothesis that worse sleep self-efficacy, anxiety, and depression symptoms would cause worse objective and subjective sleep quality was only partially supported. Subjective sleep quality was negatively correlated with sleep self-efficacy scores, and positively correlated with depression and anxiety scores. This suggests that according to subjective sleep quality measures, worse sleep is related to less sleep self-efficacy, and more depression and anxiety symptoms. The

hypothesis that depression, anxiety, and sleep self-efficacy would predict sleep quality was also supported for subjective sleep. These results were not found using objective sleep measures.

These findings are consistent with previous research: Suh et al. (2012) and Nyer et al. (2013) utilized subjective measures of sleep quality and found similar results when correlated with sleep self-efficacy, anxiety, and depression. Additionally, O'Donnell et al. (2009) found a similar discrepancy between objective and subjective measures in older adults, who were likely to report "good" sleep despite EEG readings that indicated that their sleep was poor. Buysse et al. (1991) theorized that the perception of older adults may be altered by gradual sleep quality changes associated with aging that alter their expectations about what good sleep is. The results of the current study indicate that a similar phenomenon may be occurring in college students. Because college students may expect to get less sleep, they may be more willing to describe poor sleep as good sleep, so long as it is less poor than what they are used to.

These results also suggest that an individual's perception of sleep is more relevant to anxiety and depression symptoms, versus how much sleep an individual is actually getting. Depression and anxiety were measured using self-report data, which measures an individual's *perception* of anxiety and depression. If an individual does not *feel* as though they have gotten enough sleep, they may exhibit irritability, depression, and anxiety symptoms regardless of whether they actually received an adequate amount of sleep. These results reiterate the need to examine treatments for poor sleep, which should include methods of improving an individual's perceptions of sleep, and not just the overall time a person is sleeping. Research conducted in the future should look at the possibility of other objective measures that may correlate more closely with subjective sleep quality (ex: circadian rhythm indicators; Buysse et al., 1991; Campbell, Gillin, Kripke, Erikson, & Clopton, 1989).

Limitations

The current study has several limitations. One is the small sample size of only twenty participants, which may not be enough to glean accurate findings about the rest of the population. Typical self-report limitations (such as dishonesty, level of understanding, memory, and bias) are also applicable to the current study, which may have accounted for the disparity between objective and subjective results. Because participants were not restricted to a sleep lab while wearing the ActiGraph wGT3X-BT, it is not possible to know the exact conditions under which the wristband was worn–such as being forgotten on some nights or being stored in extremely variable conditions that may have influenced the ActiGraph wGT3X-BT's readings. Additionally, the current study could have been improved with the use of electronic self-scoring versions of the questionnaires, which would have eliminated any potential errors from manual scoring.

Conclusion

This study demonstrated the importance of an individual's perceptions of sleep. Although objective sleep data may be useful in other contexts, subjective data is more relevant when it comes to anxiety and depression symptoms–symptoms that comprise two common mental health problems in both teens and adults ("World Health", 2017). While the health centers of colleges and universities may provide a plethora of information regarding anxiety and depression, more emphasis should be placed on the importance of sleep when dealing with these symptoms, as well as how our perceptions of sleep can impact other cognitive functioning.

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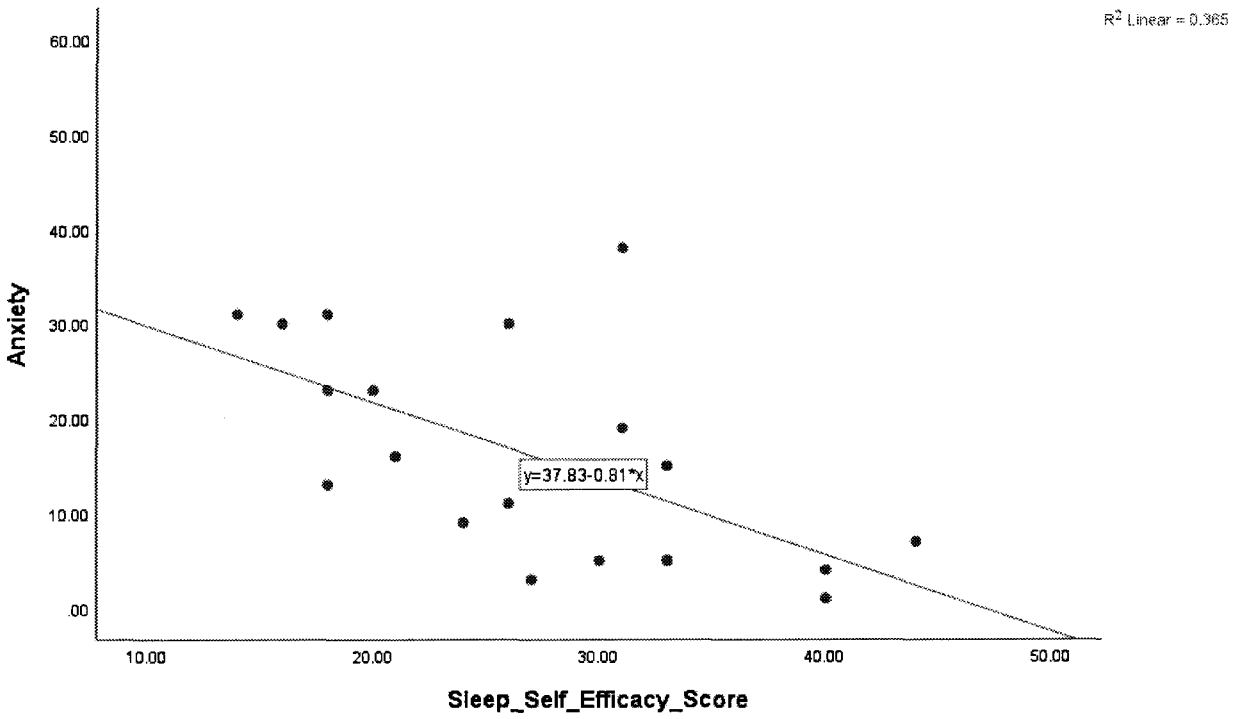

Figure 1

Association between sleep self-efficacy score and anxiety

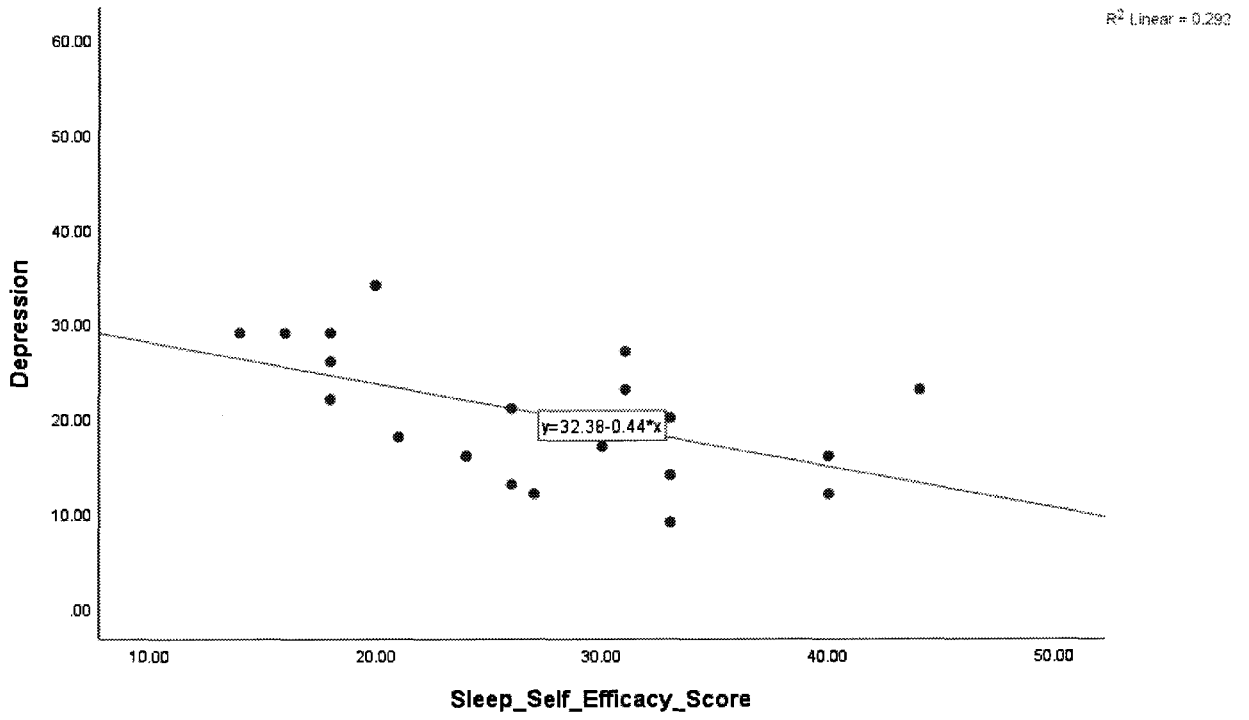

Figure 2

Association between sleep self-efficacy score and depression

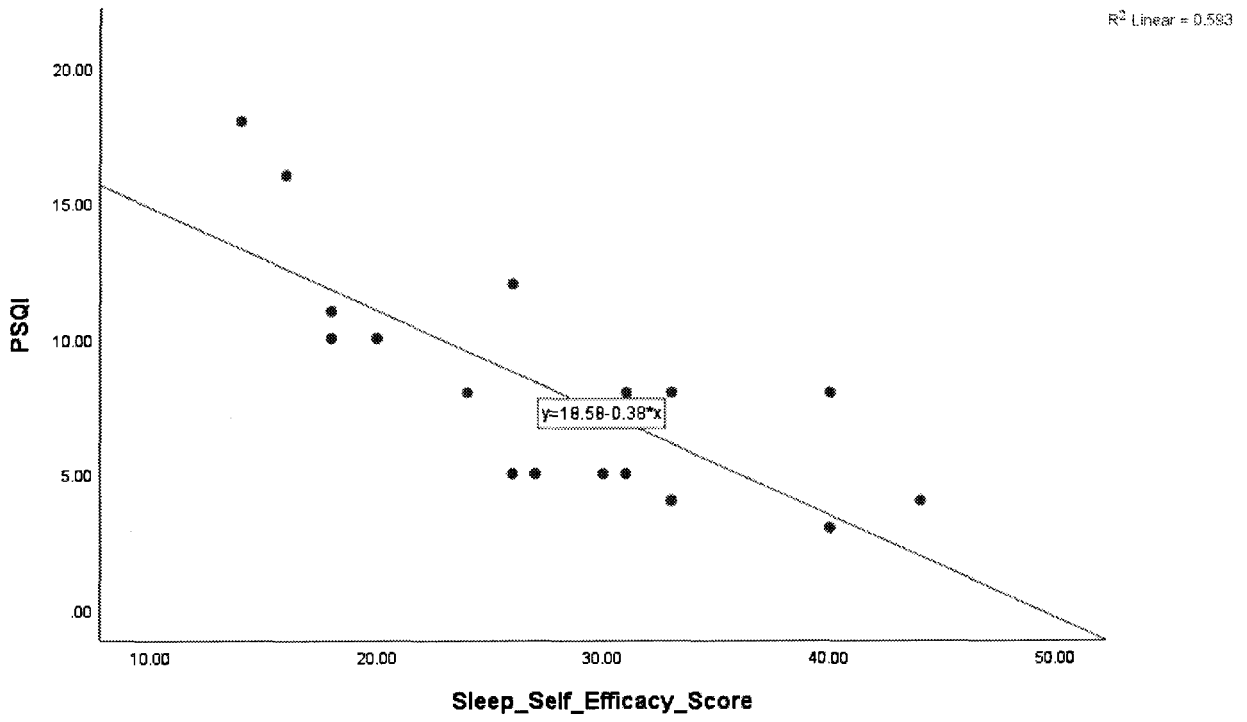

Figure 3

Association between sleep self-efficacy score and Pittsburgh Sleep Quality Index (PSQI; subjective sleep) score

Higher PSQI scores indicates worse sleep quality

Table 1

Regression slopes of predictor variables

	Beta	**P-value**
Sleep Self-Efficacy	-0.58	0.01
Depression	0.20	0.38
Anxiety	0.13	0.59

Table 2

Descriptive statistics of variables

	N	Mean	Standard Deviation
Pittsburgh Sleep Quality Index (PSQI)	18	8.00	4.24
Objective Average Sleep	17	7.16 hr	1.34 hr
Sleep Self-Efficacy	20	27.15	8.60
Depression Score	20	20.50	6.96
Anxiety Score	20	15.95	11.47

Higher PSQI scores indicates worse sleep quality

Appendix A

Demographic Questionnaire

Gender: Male Female Other

2. Age: _____

3. Ethnicity (Circle One):

White Hispanic/Latino Black or African American Native American or American Indian

Asian/Pacific Islander Other Mixed Race

4. Expected Graduation Year: _____

5. How many days a week do you nap? _____

6. Average duration of each nap in minutes: _____

7. How many days a week do you drink caffeine? _____

8. On the days you do drink caffeine, on average how many caffeinated beverages do you drink? _____

9. Please rate how dependent you feel on caffeine to get through the day:

(Least dependent) 1 2 3 4 5 (Very dependent)

10. Do you use tobacco products? Yes No Other

a. If yes to #10, how many days a week? _____

b. If other, please explain (including average number of days weekly):

11. On average, how often do you drink alcoholic beverages (Circle one)?

a. Never

b. Monthly or less

c. 2-4 times a month

d. 2-3 times a week

e. 4 or more times a week

12. On the days that you do drink alcoholic beverages, how many drinks do you typically have (Circle one)?

a. 1 or 2

b. 3 or 4

c. 5 or 6

d. 7 to 9

e. 10 or more

13. How many times a week do you use over the counter sleep aids (ex: Advil PM, Melatonin supplements, etc.)? _____

14. Please indicate, on average, how many hours you spend doing the following activities each week:

Class: _____

Homework: _____

Work: _____

Extracurricular Activities: _____

15. Current living situation (Circle one):

Dorm (Double) Dorm (Single) Dorm (Other) On-Campus Apartment

Off-Campus Apartment On-Campus House (With Roommate)

On-Campus House (Without Roommate) Off-Campus House (With Roommate)

Off-Campus House (Without Roommate) Other

16. Indicate how noisy it is when you try and sleep at night:

(Least Noisy) 1 2 3 4 5 (Very Noisy)

Appendix B

Name_____ Date_____

Sleep Quality Assessment (PSQI)

What is PSQI, and what is it measuring?

The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates "poor" from "good" sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month.

INSTRUCTIONS:

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

During the past month,

1. When have you usually gone to bed? _____
2. How long (in minutes) has it taken you to fall asleep each night? _____
3. What time have you usually gotten up in the morning? _____
4. A. How many hours of actual sleep did you get at night? _____
   B. How many hours were you in bed? _____

5. During the past month, how often have you had trouble sleeping because you	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
A. Cannot get to sleep within 30 minutes				
B. Wake up in the middle of the night or early morning				
C. Have to get up to use the bathroom				
D. Cannot breathe comfortably				
E. Cough or snore loudly				
F. Feel too cold				
G. Feel too hot				
H. Have bad dreams				
I. Have pain				
J. Other reason (s), please describe, including how often you have had trouble sleeping because of this reason (s):				
6. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
9. During the past month, how would you rate your sleep quality overall?	Very good (0)	Fairly good (1)	Fairly bad (2)	Very bad (3)

Scoring

Component 1	#9 Score	C1 _____
Component 2	#2 Score (<15min (0), 16-30min (1), 31-60 min (2), >60min (3)) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)	C2 _____
Component 3	#4 Score (>7(0), 6-7 (1), 5-6 (2), <5 (3)	C3 _____
Component 4	(total # of hours asleep) / (total # of hours in bed) x 100 >85%=0, 75%-84%=!, 65%-74%=2, <65%=3	C4 _____
Component 5	# sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3)	C5 _____
Component 6	#6 Score	C6 _____
Component 7	#7 Score + #8 score (0=0; 1-2=1; 3-4=2; 5-6=3)	C7 _____

Add the seven component scores together _____ *Global PSQI* _____

A total score of "5" or greater is indicative of poor sleep quality.
If you scored "5" or more it is suggested that you discuss your sleep habits with a healthcare provider

Appendix C

Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____ .

Interpretation

A grand sum between **0 – 21** indicates very low anxiety. That is usually a good thing. However, it is possible that you might be unrealistic in either your assessment which would be denial or that you have learned to "mask" the symptoms commonly associated with anxiety. Too little "anxiety" could indicate that you are detached from yourself, others, or your environment.

A grand sum between **22 – 35** indicates moderate anxiety. Your body is trying to tell you something. Look for patterns as to when and why you experience the symptoms described above. For example, if it occurs prior to public speaking and your job requires a lot of presentations you may want to find ways to calm yourself before speaking or let others do some of the presentations. You may have some conflict issues that need to be resolved. Clearly, it is not "panic" time but you want to find ways to manage the stress you feel.

A grand sum that **exceeds 36** is a potential cause for concern. Again, look for patterns or times when you tend to feel the symptoms you have circled. Persistent and high anxiety is not a sign of personal weakness or failure. It is, however, something that needs to be proactively treated or there could be significant impacts to you mentally and physically. You may want to consult a counselor if the feelings persist.

Appendix D

Center for Epidemiologic Studies Depression Scale (CES-D), NIMH

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	During the Past Week			
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues even with help from my family or friends.	☐	☐	☐	☐
4. I felt I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐
9. I thought my life had been a failure.	☐	☐	☐	☐
10. I felt fearful.	☐	☐	☐	☐
11. My sleep was restless.	☐	☐	☐	☐
12. I was happy.	☐	☐	☐	☐
13. I talked less than usual.	☐	☐	☐	☐
14. I felt lonely.	☐	☐	☐	☐
15. People were unfriendly.	☐	☐	☐	☐
16. I enjoyed life.	☐	☐	☐	☐
17. I had crying spells.	☐	☐	☐	☐
18. I felt sad.	☐	☐	☐	☐
19. I felt that people dislike me.	☐	☐	☐	☐
20. I could not get "going."	☐	☐	☐	☐

SCORING: zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items is reversed. Possible range of scores is zero to 60, with the higher scores indicating the presence of more symptomatology.

Appendix E

Sleep Self-Efficacy Scale

For the following 9 items, please rate (by circling a number from 1 to 5) your ability to carry out each behavior. If you feel able to accomplish a behavior some of the time but not always, you should indicate a lower level of confidence.

Indicate how confident you are that you can:

1. Lie in bed, feeling physically relaxed.

1	2	3	4	5
Not confident				Very confident

2. Lie in bed, feeling mentally relaxed.

1	2	3	4	5
Not confident				Very confident

3. Lie in bed with your thoughts "turned off".

1	2	3	4	5
Not confident				Very confident

4. Fall asleep at night in under 30 minutes.

1	2	3	4	5
Not confident				Very confident

5. Wake up at night fewer than 3 times.

1	2	3	4	5
Not confident				Very confident

6. Go back to sleep within 15 minutes of waking in the night.

1	2	3	4	5
Not confident				Very confident

7. Feel refreshed upon waking in the morning.

1	2	3	4	5
Not confident				Very confident

8. Wake after a poor night's sleep without feeling upset about it.

1	2	3	4	5
Not confident				Very confident

9. Not allow a poor night's sleep to interfere with daily activities.

1	2	3	4	5
Not confident				Very confident