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A Relationship between Sleep Quality and Academic Performance in First-Year University

Students

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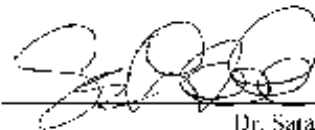
# SLEEP AND ACADEMIC PERFORMANCE

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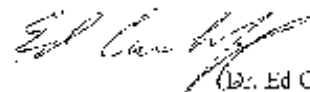
A THESIS

APPROVED BY THE DEPARTMENT OF KINESIOLOGY AND HEALTH STUDIES

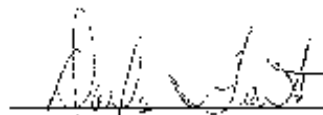
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## SLEEP AND ACADEMIC PERFORMANCE

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Finally, and most importantly, I thank God for blessing me and allowing me to endure.

## SLEEP AND ACADEMIC PERFORMANCE

### Dedication

I dedicate this work to my intelligent and beautiful mother, Cynthia Branham, who passed away from cancer just prior to the start of this project. My mother instilled the value of hard work, endurance, and the importance of education in all three of her daughters. It was these values and her spirit that carried me through this project, thus, it is lovingly dedicated in memory of her.

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**Abstract**

The purpose of this study was to determine whether a relationship existed between sleep quality and academic performance in freshman university students. This study was significant because it is the goal of most universities to assist their students in learning to be successful inside and outside of the classroom. Current research supports a relationship between sleep and academic performance; however few studies are performed utilizing only freshmen as participants. Additionally, this study removed the self-reported variable of grade point average since university registrar's records were accessed to determine the grade point averages for analyses. While it was very weak, a significant negative relationship existed ( $r=-.145$ ,  $p=.02$ ) between sleep quality and grade point averages for freshmen at the University of Central Oklahoma.

## Chapter One: Introduction

One of the most frequent complaints of college students was not getting enough sleep at night (Yang et al., 2003). The age old-rule of eight hours was not always accurate as other factors affect the amount of sleep that a person needs. Gender, age, and the amount of recent sleep determine how much sleep the body needs (Bonnet & Arand, 2010). Adequate sleep was explained by Bonnet and Arand (2010) as “a sleep duration that is followed by a spontaneous awakening and leaves one feeling refreshed and alert for the day” (p. 1). Multiple issues arise when a person does not get adequate sleep. Limited sleep has been shown to decrease performance, cognition and short-term memory, and attention span (Bonnet & Arand, 2010). Sleep disturbances have been found to have negative effects on general health, performance, mood, memory and cognition (Breus, 2004).

A student’s first semester at college can be a huge learning experience both in and out of the classroom. Most students go from living with their families during high school to transitioning to a residence of their own with little or no guardian supervision, and one of the first changes in daily routines was the loss of sleep (Gilbert & Weaver, 2010). It can be a difficult task to learn to balance classes, homework, work, and social activities all while finding time to eat and sleep.

Early class times coupled with late nights limit students’ night-time rest. Studying, social activities, roommates, and stress were among the many different things that kept college students awake long into the night (Gaultney, 2010). Technology was also guilty of keeping students from getting adequate sleep. Mesquita and Reimão (2010) found that 60% of their participants were poor sleepers due to evening computer and television use. There were significantly more

poor sleepers that used computers or watched television in the evening hours compared to the good sleep group (Mesquita & Reimão, 2010).

University of Central Oklahoma (UCO) officials have constantly looked for ways to assist students in academic and personal success. Success Central is a freshman orientation course that was created to aide students in the transition from high school to college. Nearly 70% of the 2,500 first-year students at UCO took UNIV 1012, Success Central, in order to attain skills necessary to traverse the college experience (W. McCormick, personal communication, February 8, 2010). In addition to the course Healthy Life Skills, Success Central served as a critical outlet to disperse information regarding the importance of sleep to a large population of first-year students. It would be beneficial to students to incorporate a wellness curriculum in this class to focus on the consequences of sleep deprivation on students' health and performance. Curricula adjustments would assist students in developing appropriate sleep hygiene and time management skills, and educate them on reasons why sleep is important to their overall health and academic performance. If students understand the importance and need for adequate sleep, they may adjust their lifestyles to increase the quality of their sleep. Since this research study focused on first-year students, information received could help shape curricula and interventions throughout a student's college career and beyond.

### **Significance of the Study**

The purpose of this study was to determine the relationship between sleep quality and academic performance in first-year college students. This was significant because it is the goal of most universities to educate their students and assist them in succeeding inside and outside the classroom. Current research supported a relationship between sleep and academics, however few studies performed on sleep quality and academic performance were targeted at first-year

students. Faculty and staff from any area could use this information to educate their students and use it to enhance their success.

### **Statement of the Problem**

College freshmen are in a state of transition where they must learn to manage their time wisely, balancing their academics with all other aspects of life. Usually students learn this balancing act through a process of trial and error, thus allowing for problems such as poor sleep quality to arise. Poor sleep quality has been shown to lead to a number of health and cognitive problems.

### **Hypothesis**

The hypothesis was that a correlation would exist between sleep quality and GPA in first-semester students at UCO. The statistical hypothesis was that there will be a very weak, negative correlation between sleep quality and academic performance. The null hypothesis was that there is no relationship between sleep quality and academic performance.

### **Limitations**

There were a few limitations of note within the methodology of this study. As with most studies utilizing surveys, there was the limitation of self-reported data in the variable of sleep quality. An additional limitation was that some students are required to take UNIV 1012 due to low scores on college acceptance tests or high school grade point average.

### **Delimitations**

Academic performance was delimited to grade point average on a traditional four point scale. This study eliminated the self-reported variable of grade point averages (GPA) by the researcher collecting GPA at the end of the semester in which the sleep data was collected. All

students that were considered first-time entering freshmen and enrolled in UNIV 1012 were allowed to participate in this study.

**Assumptions**

UNIV 1012 is offered exclusively to students who are in their first semester at UCO. While UCO is considered a commuter school, there are many “non-traditional” students that attend the university. These students are students outside of the 18-24 year age range that is considered “traditional,” however they were included in the study regardless of age since their admission status is considered first-time entering freshman.

## **Chapter Two: Review of Literature**

The purpose of this study was to determine whether academic performance in UCO freshmen was correlated to their sleep quality. Research was conducted in October of 2012 utilizing freshmen orientation courses. This chapter includes a review of previous studies that included sleep, academic performance, health habits, and college students utilizing the Pittsburgh Sleep Quality Index as well as other instruments. This chapter includes academic performance in college students, health issues and sleep habits, the Pittsburgh Sleep Quality Index, sleep quality in groups utilizing the PSQI, sleep quality in groups utilizing other instruments, habits affecting sleep, and sleep and academic performance.

### **Academic Performance in College Students**

Academic achievement is an important goal for most college students. For those students who work while pursuing a degree, it can be a balancing act to ensure plenty of time for sleep, studying, and leisure activities in addition to work. Studies have shown that alcohol use impacts academic performance. Miller et al. (2008) found that students working more than 20 hours per week were 1.56 times more likely to binge drink, and 1.45 times more likely to sleep less than seven hours a night. Binge drinking and low grade point average (GPA) were also correlated to working more than 20 hours a week, as was upperclassmen sleeping longer than seven hours per night. Aertgeerts and Buntinx (2002) found no significant correlation between abuse of alcohol and GPA ( $RR=.93, p=.69$ ), however, 12.5% more alcohol dependent students failed compared to those without drinking issues ( $RR=1.24, p=.01$ ).

### **Health Issues and Sleep Habits**

Numerous health variables, such as overall health, stress, and mental health status, have been found to have a relationship with sleep quality and GPA. Participants reporting poor sleep

quality had a significant increase in physical illness and missed classes than optimal- and borderline-sleepers ( $X^2=39.9, p < .05$ ), while perceived stress was responsible for most participants' sleep issues (Lund, Reider, Whiting, & Prichard, 2010). Researchers also determined that stress caused more sleep issues in females than in males ( $t=5.49, p<.001$ ; Lund et al., 2010). In addition to stress, depression has also been shown to affect sleep habits and quality. Regestein et al.'s (2008) results indicated that 33% of the pilot study participants and 34% of the main study participants had tendencies of depression, with 29% of the pilot study and 24% of the main study participants reporting that sleepiness was a major problem for them. In addition to potential sleep debt, students that chronically went to bed later also ran the risk of depression. Lund et al. (2010) also found that there was a small, significant correlation between depressive indicators and sleepiness ( $r=.24, p < .01$ ).

### **The Pittsburgh Sleep Quality Index**

Due to a lack of instruments measuring sleep quality, Buysse and colleagues (1989) created the Pittsburgh Sleep Quality Index (PSQI; Appendix B). This instrument was created after careful review of previous questionnaires, clinical experiences, and polysomnographic research methods (Buysse et al., 1989). Participants underwent polysomnographic tests at the time of completing the PSQI. The user-friendly, 19-item questionnaire requires about ten minutes to complete and includes self-reported information about the previous month's sleep quality. From the 19 items, seven separate component scores (subjective sleep quality, sleep latency, sleep interval, sleep efficiency, sleep interruptions, usage of sleep drugs, and daytime dysfunction) are created and summed to create one global score. Global scores range from zero to 21 with higher scores indicating poorer sleep quality; scores greater than five indicate moderate to severe sleep difficulties (Buysse et al., 1989).



Participants for Buysse et al.'s (1989) study were recruited from other sleep studies on depression, sleep, and other variables at the University of Pittsburgh, and occurred over an 18 month period of time. The control group ( $n=52$ ,  $M=50.9$  years) was considered healthy and without complaints of sleep issues with the other two groups consisting of "poor sleepers" diagnosed with depression ( $n=34$ ,  $M=44.8$  years) and "poor sleepers" referred to the study by physicians who were currently treating them for sleep problems ( $n=62$ ,  $M=42.2$  years). Nearly 75% of subjects completed the PSQI prior to their clinical studies, and 61% of subjects completed the PSQI again a month after the first completion. Researchers found a mean PSQI score of 7.4 ( $SD=5.1$ ) with strong reliability in the seven global scores (Cronbach's  $\alpha=.83$ ). Of the 91 patients completing the PSQI for a second time, all component scores were significantly correlated ( $r > .35$ ,  $p < .05$ ) and no significant differences were found between the two tests to indicate good test-retest reliability. The PSQI was found to have a specificity of 86.5% and sensitivity of 89.6% (Buysse et al., 1989). Polysomnographic results and PSQI scores were analyzed with  $t$  tests to determine if a difference in results existed, and PSQI scores for sleep duration ( $t=9.98$ ,  $p < .001$ ) and sleep efficiency ( $t=4.50$ ,  $p < .001$ ) were higher than scores of the polysomnographic tests. Strengths of the PSQI include being easy for participants to complete and understand, easy for researchers to score, and it has been proven reliable and valid against polysomnographic results. A weakness of the PSQI is that it does not diagnose participants sleep problems, but indicates if they are a "good" or "poor sleeper" (Buysse et al., 1989).

### **Sleep Quality in Groups Utilizing the PSQI**

A number of researchers have utilized sleep logs in addition to the PSQI to determine whether sleep quality and quantity are correlated to health, well-being, and campus involvement among college students. Pilcher and Ott (1998) performed a repeated measures multivariate

analysis of variance (MANOVA) that detected a decrease in PSQI scores over a ten-week period of time,  $F(2,73)=10.51, p < .0001$ ; a significant increase in sleep quantity over time,  $F(2,73)=3.30, p < .05$ ; and significantly fewer physical health issues over time,  $F(2,73)=42.40, p < .0001$ . Dependent  $t$  tests found a significant decrease in sleep quality between the fourth and tenth weeks ( $t=4.63, p < .01$ ). Pilcher, Ginter, and Sadowsky (1997b) found that physical health complaints ( $r=.60, p < .001$ ), anger/hostility ( $r= -.60, p < .001$ ), and fatigue ( $r=.55, p < .01$ ) had significant, moderately strong correlations to poor sleep quality. Sleep quantity, however, did not have a significant correlation to fatigue ( $r= -.19, p < .05$ ), physical health complaints ( $r=.16, p < .05$ ) or other non-sleep variables. Mesquita and Reimão (2010) found that 60% of participants were considered “poor sleepers” by the PSQI.

**Student time management effects on sleep.** Studies show that inadequate sleep patterns impact academic performance as well as social activities. Carney, Edinger, Meyer, Lindman, and Istre (2006) found 43% of their sample to be considered poor sleepers by PSQI standards and that they engaged in fewer than five social activities a week compared to good sleepers. Researchers analyzed variables using an analysis of variance (ANOVA) and showed that good sleepers had more consistency in the timing of morning rising, morning beverage intake, returning home in the evening, and bedtime compared to varied times in poor sleepers ( $F(12, 154)=2.15, p=.017$ ). Carney et al. (2006) concluded that the lack of consistent sleep habits led to poor sleep quality and quantity in “poor sleepers” when contrasted to those of “good sleepers”. These studies showed that maintaining a consistent schedule and sleep habits increase sleep quality, sleep quantity, and overall health (Carney et al, 2006).

### **Sleep Quality in Groups Utilizing Other Instruments**

While the PSQI is considered the gold standard for sleep quality instruments, sleep difficulties and disorders are measured by a number of instruments other than the PSQI. Buboltz, Brown, and Soper (2001) indicated that 11% of participants were considered to be “good sleepers” by the Sleep Quality Index (SQI), with 73% of students reporting minimal issues. Many subjects reported being “mostly tired” in the mornings, and over a fifth of participants stated that it took more than 30 minutes to fall asleep at night (Buboltz et al., 2001, Forquer, Camden, Gabriela, and Johnson, 2008). Similarly, Forquer et al. (2008) found that nearly 75% of students reported waking up nightly due to hearing noise from others (41%), needing to use the restroom (40%), or mental stress (33%).

In a repeated measures study, Engle-Friedman et al. (2003) found that participants slept on average 7.17 hours ( $SD=1.24$ ) and that it took an average of 33.04 minutes ( $SD=42.91$ ) for them to fall asleep. On average, subjects reported staying up all night 2.1 nights ( $SD=4.4$ ) a month and received less than adequate sleep a third of the time ( $M=10.3$ ,  $SD=8.21$ ). In contrast, more than a third of students reportedly stayed up past 3:00 a.m. on a weekly basis, and only 29.4% of students received the recommended eight hours of sleep a night (Lund et al., 2010, Regestien et al., 2008). Tsai and Li (2004) found that rise time, but not bedtime was significantly earlier on weekdays when compared to weekends ( $F=123.45$ ,  $df=1.229$ ,  $p<.001$ ).

After conducting two-tailed  $t$ -tests ( $\alpha=.05$ ), Eliasson and Lettieri (2010) determined that the bedtime and wake times for high academic achievers significantly differed from those of low achievers by 38 minutes ( $p=.05$ ) and 49 minutes ( $p=.008$ ) respectively. Researchers found that 42% of their participants were satisfied with their nighttime sleep and achieving 7.3 hours of sleep per night. Likewise, Johns, Dudley, and Masterson (1976) found that of high-achieving

students, 73% reported having very good sleep quality compared to 40% of low achieving participants. Analyses determined that high achieving students were found to wake up on average 42 minutes earlier than poor achievers, which was statistically significant ( $F=3.94, p < .02$ ).

**Nap-taking and its effect on sleep and academic performance.** In contrast to Vela-Bueno et al.'s (2008) findings, Eliasson and Lettieri (2010) found that students with a 3.5 or better GPA were 23% more likely to take naps than those achieving at 2.7 GPA or below. It was determined that taking evening naps was significantly correlated with poor sleep quality ( $r=-.28, p < .01$ ). Similarly, Vela-Bueno et al. (2008) found that 44% of participants took naps, and those taking naps received significantly less nighttime sleep than non-nappers. In regards to academic performance, nappers reportedly had poorer attendance and slept more in class than participants that did not take naps (Vela-Bueno et al., 2008). Based upon the findings of these studies, short afternoon naps may be helpful for students, however long naps or those occurring later in the day may interfere with nighttime sleep.

### **Habits Affecting Sleep**

Sleep habits, behaviors, and factors that predict low quality of sleep in college students have been the variables for a number of studies using the PSQI. There are many habits that can affect one's sleep. For instance, participants that ingested two or more caffeinated beverages were more likely to have a bedtime of 2:00 a.m. or later ( $X^2=23.1, p=.001$ ) and to nap more frequently ( $X^2=14.3, p=.001$ ; Regestein et al., 2008). Lack et al. (1986) found that estimated lights out time was significantly later on weekends than weekdays ( $p=.0001$ ) and total sleep time for weekends ( $t=2.78, p < .01$ ) and weeknights ( $t=7.14, p < .0001$ ) was significantly lower than the sleep need of eight hours and seven minutes. Digdon (2010) created their own survey

measuring what participants knew regarding sleep education and their napping patterns. They found that few students were aware that vigorous exercise just before bed (25.7%), studying or watching television in their beds (7.2%), and doing critical work near bedtime (37.6%) negatively affected their sleep. The number of “poor sleep” participants using technology between the hours of 7:00 p.m. and 12:00 a.m. was significantly higher than those that did not ( $p=.0001$ ; Moo-Estrella et al., 2005).

### **Sleep and Academic Performance**

Multiple studies have shown that there is a relationship between sleep and academic performance. Trockel, Barnes, and Egget (2000) and Gilbert and Weaver (2010) found sleep was significantly correlated to GPA. Spearman’s correlation analysis determined that late weekday wakings ( $r= -.350, p=.001$ ), and late weekend waking ( $r= -.321, p=.001$ ), late weekday bedtimes ( $r= -.292, p=.001$ ), late weekend bedtimes ( $r= -.211, p=.004$ ), and more hours of sleep on weekends compared with weekdays ( $r=-.169, p=.001$ ) were correlated with lower GPA’s (Trockel et al., 2000). Galambos, Dalton, and Maggs (2009) found that both sleep quantity and quality predicted time that was spent on academic work the following day ( $r=-.27, SE=.09$ ). Gilbert and Weaver (2010) used the PSQI to determine that there was a significant, negative correlation between sleep and academic performance ( $r=-.12, p=.01$ ). They also found that the mean hours of sleep per night was 7.2 hours ( $SD=1.2$ ). Additionally there was a significant, negative correlation between sleep quality and sleep quantity ( $r=-.37, p<.001$ ), and there was a small, significant correlation between sleep quantity and GPA ( $r=-.10, p<.05$ ). Academic performance was found to be significantly, although weakly, correlated with waking time on weekends ( $r= -.295, p < .01$ ), rise time on weekdays ( $r= -.209, p < .05$ ), as well as, subjective sleep quality ( $r= -.234, p < .05$ ; Johns et al., 1976).

Pilcher and Walters (1997a) found that those students that had not slept performed significantly lower on a cognitive performance test than those participants that had slept the night before ( $F(1,42)=5.03, p < .05$ ). The loss of sleep quantity and quality may be the reason Engle-Friedman et al. (2003) found a significant difference in sleepiness between participants that received sleep and those that did not ( $F(1,56)=6.995, p=.011$ ). Similarly, Moo-Estrella et al. (2005) noted that 80% of participants reported being sleepy in class, and 66% felt that their sleepiness affected their academic achievement.

**Sleep quality and academic performance in first-year students.** Many studies explore sleep as a variable in college students, however only a small number of them utilized only first-semester students. Lack (1986) studied 211 first-year psychology students using a self-constructed, 37-item questionnaire regarding their sleep habits, sleep times, sleep difficulties and daytime sleepiness. Eighteen percent (18%) of participants had delayed sleep onset ( $\chi^2=39.9, p=.0001$ ) whereas only 9% reported difficulties staying asleep. Half of Lack's (1986) participants reported that they did not get enough sleep on weekends or weeknights. Lack (1986) determined that there were no significant differences in grades among difficult, delayed, or control group sleepers ( $t=.074, p > .10$ ).

**Group differences in sleep and academic performance.** Women were shown to have lower sleep quality ( $X^2=3.52, df=1, p=.061$ ) and earlier bedtimes ( $F=5.35, df=1.229, p=.022$ ) than men (Tsai & Li, 2004, Lund et al., 2010, Buboltz et al., 2001, Engle-Friedman et al., 2003, Lund et al., 2010). ANOVA results indicated that women reported significantly more sleep disturbances in the areas of difficulty falling asleep ( $F(1,189)=4.95, p < .05$ ); disrupted nightly sleep ( $F(1,189)=5.61, p < .05$ ); frequent awakenings ( $F(1,189)=5.22, p < .05$ ); and poor sleep quality ( $F(1,188)=5.00, p < .05$ ) (Buboltz et al., 2001). Women's reaction time ( $M=.71$ ,

$SD=.048$ ) was significantly slower than that of men ( $M=.49$ ,  $SD=.064$ ,  $F(1,48)=7.533$ ,  $p=.008$ ; Engle-Friedman et al., 2003). Just as Lund et al. (2010) found that women suffered from more sleep issues than men, Moo-Estrella et al. (2005) determined that women exhibited depressed symptoms more than men ( $X^2=3.8$ ,  $p < .04$ ). Interestingly, Mesquita and Reimão (2010) found no gender or perceived sleep differences found among “poor sleeper” and “good sleeper” groups ( $X^2=.6169$ ). It was also found that freshmen students generally had more sleep difficulties than upperclassmen ( $X^2=16.84$ ,  $df=3$ ,  $p < .001$ ) as well as shorter sleep time due to early rising on weekdays (Tsai & Li, 2004). Lund et al. (2010) also found that freshmen had significantly later weekend bedtimes than upper classmen,  $F(3,994)=5.92$ ,  $7.06$ ,  $p < .001$ .

**Sleep disorders and academic performance.** Gaultney’s (2010) ANOVA results ( $F(1,1842)=15.17$ ,  $p < .01$ ) indicated that those subjects reporting no sleep disorders ( $M=2.82$ ,  $SD=.88$ ) had higher GPA than those reporting at least one sleep disorder ( $M=2.65$ ,  $SD=.99$ ). GPA shared a weak, albeit significant, correlation ( $r=-.12$ ,  $p < .01$ ) with the amount of sleep prior to school or work. Students on probation (GPA  $< 2.0$ ) were 30% more likely to suffer from obstructive sleep apnea ( $X^2=10.70$ ,  $p < .01$ ) and 26% more likely to be at risk for circadian rhythm disorders ( $X^2=10.87$ ,  $p < .01$ ) than non-probationary students. However, Castens and Overbey’s (2009) correlational analysis found that there was no significant correlation between the sleep disorder insomnia and GPA ( $\rho = -.15$ ,  $p > .01$ ).

### **Summary**

Sleep and academic performance has been widely studied. There are multiple researchers that have created their own surveys, but they have not validated or found reliability in their instruments. Clearly, the PSQI is one of the best measures for sleep quality in adults since it has been validated and proven reliable in addition to the ease of use for participants and researchers

alike. Additionally, variables such as health issues, poor habits and time management, nap taking, gender, and student classification have been found to have an effect on sleep and academic performance. No other study has tried to determine a correlation between self-reported sleep quality by way of the PSQI and GPA collected from university records in first-year students.



### **Chapter Three: Methodology**

The purpose of this study was to determine the relationship between sleep quality and academic performance in freshmen. The study consisted of a sleep quality survey being distributed to UNIV 1012: Success Central students in the middle of the fall 2012 semester. This chapter addresses the current study's methodology and is organized into the following sections: participants, instruments, procedure, and statistical analyses.

#### **Participants**

The average freshman class at the University of Central Oklahoma (UCO) was approximately 2,500 students for the 2012-2013 academic year, however only approximately 1,600 students took UNIV 1012: Success Central. UCO is a metropolitan institution that boasts a population of over 17,000 students and is a part of the Regional University System of Oklahoma. In a similar research study performed by Gilbert and Weaver (2010), a coefficient of  $-0.12$  was used to determine the power necessary for significance in the currently study. To establish significance, it was necessary to recruit between 345-781 students. However recruiting that many students was not feasible for this study since 30 or more sections of Success Central would have needed to be solicited for participants. It was the goal of the researcher to obtain a minimum of 320 participants, or 20% of the freshman class. Therefore, approximately 15 sections of UNIV 1012 were solicited for subjects. Only first-semester freshman were allowed to participate in the study. Any student who completed the survey, but did not complete the semester at UCO, was not included in the study.

#### **Instrumentation**

Grade point average (GPA) was utilized to determine the participant's academic performance. A traditional 4.0 scale was used to report the subjects' grades for the semester.

GPA was calculated by turning letter grades into numbers (A=4, B=3, C=2, D=1, F=0) and multiplying that value by the number of credit hours of a class to yield quality points. (Corwin, McCormick, Griffin-Overocker, & Rahm-Barnett, 2008). The quality points were added together and divided by the total number of credit hours to yield a student's GPA (Corwin et al., 2008). For the current study, semester GPA was obtained from the UCO Registrar's Office for each participant. Only the GPA for the semester, in which the study was conducted, was included in analysis; any credit earned concurrently during the participant's high school career or Advanced Placement credit was not be evaluated.

The Pittsburgh Sleep Quality Index (PSQI) gives a standard measurement for sleep quality through a 19-item questionnaire requesting subjects to supply information about the previous month's sleeping habits (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Appendix B). Researchers found the PSQI to be reliable (Cronbach's  $\alpha=0.83$ ) and valid through criterion-based validity. The PSQI has seven component scores that are added together to create a global score that determines if a subject is a "poor" or "good" sleeper (Buysse et al., 1989). Global scores range from 0 to 21; higher global scores indicate that the participant is a "poor" sleeper.

### **Procedures**

Permission from the UCO Institutional Review Board was sought prior to the study (Appendix C and D). Before recruiting participants, the researcher acquired the permission of William McCormick, Director of First-Year Experience Programs, to enlist professors of Success Central, UNIV 1012, to allow the researcher to come to their classrooms to administer the survey (Appendix C). (UNIV 1012 is a course designed to assist first-year students in their transition from high school to college. Enrollment is open to only first-semester freshman students.) Upon the director's approval, the researcher secured consent from instructors to allow

a small amount of class time to be utilized for completing the informed consent forms (Appendix A) and the instrument (Appendix B).

In the month of October, students were given the informed consent and the PSQI to complete. Professors were asked to leave the room while the survey instrument were being completed by participants. In the informed consent, students agreed to allow the researcher to obtain their GPA for the fall 2012 semester using their UCO student identification number. Students were informed that the researcher would keep all grades and research instruments confidential, and that there would be no harm or benefit to them for completing the survey.

Data scoring was completed as the researcher calculated the global PSQI scores from the component scores for each subject and compiled the results of the self-reported data into an SPSS file to later be used in analysis. The PSQI Scoring Database from the University of Pittsburgh was downloaded and utilized to calculate and enter all scores. After grades were posted for the semester, the participants' transcripts were accessed in order to obtain the semester's GPA for each participant. If a student did not indicate their UCO identification number on the informed consent their data was not used for analysis of the relationship between variables, but was utilized in examining overall sleep quality in participants. Additionally, if the survey was not completed the participant was not included in the study. Thus, after data cleaning was performed three students were found to have not supplied their UCO identification number ( $n=267$ ) or and nine did not complete all of the survey's questions ( $n=258$ ).

### **Statistical Analyses**

The null hypothesis for the current study was that sleep quality and grade point average would have no correlation. Analyses were computed using SPSS version 18. Descriptive statistics provided insight into multiple facets of sleep quality and GPA. Multiple statistical

analyses were utilized with the level of significance set at  $\alpha=.05$ . Pearson's correlation analysis was used to determine whether a significant relationship existed between variables.

Additionally, a one-way ANOVA was used to determine whether there was a difference between sleep quality and GPA in morning, midday, and afternoon class sections.

## Chapter Four: Results

The purpose of this study was to determine the relationship between sleep quality and academic performance in first-year college students. The study consisted of first-semester freshmen at UCO that were enrolled in the freshman orientation course, UNIV 1012: Success Central. This chapter is organized into the following sections: descriptive statistics, correlation results, and ANOVA results.

### Descriptive Data

Overall, the mean GPA was 2.62 ( $SD=0.91$ ; Table 1) on a four point scale, and the mean PSQI score was 6.87 ( $SD=3.21$ ; Table 2) indicating poor sleep quality (Table 3). More than three out of four students' PSQI scores were over five, indicating poor sleep quality. Females comprised 61% of the sample. The mean PSQI and GPA scores were higher for females ( $m=7.21$ ,  $SD=3.25$ ;  $m=2.71$ ,  $SD=0.88$ ) than males ( $m=6.32$ ,  $SD=3.08$ ;  $m=2.52$ ,  $SD=0.93$ ; Figure 1). The highest score reported on the 21-point PSQI scale was 17. For PSQI there was positive but weak skewness (0.52) and kurtosis (.01), while it was negative for GPA (-0.64, -0.14; Table 3).

Over 60% of students reported sleeping between six and eight hours each night on average (Table 4). The mean hours of sleep per night was 6.63 ( $SD=1.23$ ) while the mean sleep latency was 25 minutes ( $SD=20.63$ ). Mean wake time was 8:02 a.m. ( $SD=1:09$ ). Nearly half of participants reported having a roommate in the same room but different bed (42.7%), 29.2% had no bed partner/roommate, 16.5% had partner/roommate in another room, and 8.5% reported having a partner in the same bed. Students that shared a room but not a bed with another individual had the highest mean PSQI of each of the bed partner category groups (Figure 2).

Nearly 10% of participants reported very good sleep quality, while 58.1% reported fairly good sleep quality, 30.7% reported fairly bad sleep quality, and less than 2% reported very bad sleep quality. Scores for the PSQI increased as the self-reported sleep quality declined. Participants reporting very good sleep quality ( $n=25$ ,  $m=2.40$ ,  $SD=1.29$ ) had the best PSQI scores, followed by fairly good ( $n=151$ ,  $m=6.17$ ,  $SD=2.42$ ), fairly bad ( $n=77$ ,  $m=9.45$ ,  $SD=2.75$ ), and very bad ( $n=5$ ,  $m=10.40$ ,  $SD=1.14$ ). GPA scores were more sporadic and unpredictable in regards to self-reported sleep quality (Figure 3). Those claiming they had very bad sleep quality had a mean GPA of 3.11 ( $SD=0.62$ ), while very good sleepers had the second highest mean GPA of 3.08 ( $SD=0.71$ ), followed by fairly good sleepers with a mean GPA of 2.57 ( $SD=0.94$ ), and fairly bad sleepers also with a 2.57 GPA ( $SD=0.86$ ; Figure 3).

### **Correlation Results**

With the level of confidence set at  $\alpha=.05$ , a Pearson's correlation found a significant, although very weak, negative correlation between the variables of sleep quality and GPA ( $r=-.145$ ,  $p=.02$ ; Table 5). Because the correlation was so weak, the null hypothesis was accepted and the research hypothesis rejected.

### **ANOVA Results**

Participants were divided into three groups based on the time of day that the class met. Morning classes had a start time between 8:00 AM and 11:00 AM ( $n=64$ ); midday classes started between 11:00 AM and 1:00 PM ( $n=98$ ) and afternoon classes began after 1:00 PM ( $n=105$ ). An ANOVA determined that there was no significant difference between the three groups in regards to PSQI ( $F[2, 255]=.19$ ,  $p=.824$ ,  $SD=3.21$ ; Table 6) and GPA ( $F[2, 264]=2.80$ ,  $p=0.062$ ,  $SD=0.91$ ; Table 7).

## **Chapter Five: Discussion, Conclusions, and Recommendations**

The purpose of this study was to determine the relationship between sleep quality and academic performance in first-year college students. The study consisted of 267 UCO freshmen were enrolled in UNIV 1012: Success Central in October 2012. The research hypothesis was that there was a significant relationship between sleep quality and academic performance, and it was tested at the .05 level of significance. This chapter is organized into the following sections: summary of findings, interpretation of the results, relationship of the results to the literature, application of the results, recommendations for future study, and conclusions.

### **Summary of Findings**

As with other studies, there was a statistically significant relationship between sleep quality and GPA, however being so weak ( $r=-.145, p=.02$ ) the null hypothesis was accepted and the research hypothesis was rejected. As with other studies, female participants experienced poorer sleep quality than males. Surprisingly, there was no difference between morning, midday, and afternoon classes in sleep quality or GPA. While the PSQI determined that three out of four participants were poor sleepers, nearly 70% of participants self-reported that they received fairly good to very good sleep quality. Also, 11% of participants reported receiving the recommended eight hours of sleep on average.

### **Interpretation of the Results**

Interestingly, the number of participants that reported their overall sleep quality as fairly good or better (67.5%) was in stark comparison to 75.6% of the sample that scored above a score of five on the PSQI, indicating poor sleep quality. Buboltz et al. had similar findings with 11% of participants considered good sleepers and 73% had sleep difficulties as measured by their instrument. This may be due to a number of things, but the PSQI instrument may have a

question that was misunderstood by freshmen at UCO. The question asks the participant to rate their overall sleep quality as very good, fairly good, fairly bad, and very bad. These choices are to be interpreted by the participant. Depending on the participant's outlook, fairly good and fairly bad could really be the same thing. Also, those students that rated themselves as having "very bad sleep quality" may have had a higher mean GPA but poor sleep due to being stressed about school assignments, projects, or exams. Additionally, those that shared a room with someone other than a significant other had poorer sleep quality, most likely due to the activities of their roommate impeding their sleep quality. For students, this information would be beneficial in helping them determine a roommate; students should seek out roommates that have similar sleep habits so that they are not hindering one another from good sleep quality and quantity. The enforcement of quiet hours or curfews for university dormitories may prove beneficial in the improvement of grades of all students, those being loud and those being affected by the noise of their roommates and neighbors.

### **Relationship of Results to the Literature**

While this study found a significant, albeit weak correlation between sleep quality and GPA, it is consistent with the findings of similar studies. Trockel et al.'s study (2000) found negative and weak correlation between multiple facets of sleep and GPA, as did Johns et al. (1976). Gilbert and Weaver's (2010) results were nearly identical to the findings of this study in terms of correlation ( $r=-0.12$ ,  $p=.01$ ) and number of hours spent sleeping per night ( $m=7.2$ ,  $SD=1.2$ ), as were the findings of Gaultney (2010;  $r=-0.12$ ,  $p<0.01$ ). Galambos et al. (2009) determined that sleep quality was able to predict the amount of time that students spent on academics the next day ( $r=-0.27$ ,  $SE=.09$ ). Similarly, Pilcher and Walters (1997a) determined that students with minimal sleep performed lower on tests than those that had slept the night



before. Consistent with the findings of this study, Buboltz et al. (2001), Tsai and Li (2004), Lund et al. (2010) found that females received poorer sleep than males. While this study determined the average UCO freshman takes 25 minutes to fall asleep, Forquer et al. (2008) and Engle-Friedman et al. (2003) had a similar finding of 30 and 33 minutes respectively.

### **Application of the Results**

Most university faculty and staff are in higher education because they care about students and helping them learn. The current study's results suggested that health factors such as sleep quality can have an impact on academic performance. It is important that educators assist students in learning successful behaviors outside the classroom. Integrating health and wellness curricula in UNIV 1012 courses helps students learn to maintain good health habits such as ensuring adequate sleep quality and quantity. Ideally, by learning the importance of good sleep habits in college the students will carry these good habits through the rest of their lives. Information such as that provided in this study would lend itself well to academics and student affairs alike; housing staff, mentors, and faculty members can all have a large impact and influence on student's health habits and their impact on academic performance through education.

### **Recommendations for Future Study**

Future implications for this study would be to add additional variables, such as stress, personality, overall health status, and course load to determine if another variable has a stronger correlation to sleep quality and GPA. Motivation and achievement level (high achieving students versus low achieving students) would provide interesting results in regards to sleep quality and quantity. Additionally, further analysis could be done on the excess data found in this study because the PSQI has numerous questions that were not a part of the hypothesis of the

current study but would be interesting to look at for future studies. For example, it could prove beneficial for student affairs staff to determine whether a relationship exists between roommate status and poor sleep quality and GPA. Also, it would be interesting to determine whether the sleep quality of those students taking medications to assist them in sleeping positively affected their sleep quality. The PSQI was created nearly 25 years ago, and while it has been the gold standard for sleep quality for many years there are other instruments that measure sleep quality that may now be more appropriate. Having such a complicated algorithm for calculating the component and global scores makes it difficult to do for large samples without the use of the online database provided by Buysse et al. (1989). However, this downloadable database strictly computes a score once the data has been entered for a single participant by the researcher. With the amount of technology there may now be a better instrument that is more easily distributed and scored for large participant pools. Additionally, it would be interesting to follow up with the current participants and look at their GPA and sleep quality over the next three years.

### **Conclusions**

The lack of a strong relationship between PSQI scores and GPA may be due to the number of variables that play a role in a student's sleep quality and GPA. Stress, the student's personality and personal motivation, course load, illness, and many other variables can affect both GPA and sleep quality. The current study's results were similar to other studies indicating that it was not a coincidence that a significant yet weak, negative correlation existed between the two variables. While the relationship found was weak, the information that the current study provided can be utilized in classes such as UNIV 1012 and by student affairs staff to teach students that their sleep habits can affect their academic performance.

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**Tables**

Table 1

*GPA Frequencies of Participants*

<b>GPA</b>	<b>Frequency</b>	<b>Percentage</b>
≤1.69	43	16.1
1.70-1.99	15	5.6
2.00-2.49	42	15.8
2.50-2.99	62	23.2
3.00-3.49	52	19.4
3.50-3.99	39	14.7
4.00	14	5.2
Total	267	100

*Note:* Academic probation includes students with below a 1.70, and freshman academic notice includes students from 1.70-1.99. Good academic standing is 2.00 and above.

Table 2

*Frequency of PSQI Scores*

<b>Score</b>	<b>Frequency</b>	<b>Percent</b>
$\leq 4$	63	24.6
5	38	14.6
6	32	12.4
7	21	8.1
8	29	11.2
9	21	8.1
10	20	7.8
11	14	5.4
12	4	1.6
13	8	3.1
$\geq 14$	8	3.1

*Note:* One participant did not answer a necessary question, therefore  $n=266$ .



Table 3

*Descriptive Statistics*

	PSQI	GPA	Hours of Sleep	Fall asleep time
Mean	6.87	2.62	6.63	24.00
Std. Deviation	3.21	0.90	1.23	20.63
Minimum	0	0	3.50	1.00
Maximum	17	4.00	10.00	120.00
Skewness	0.524	0.643	.082	2.032
Kurtosis	0.012	0.137	-.174	5.645

*Note:* Fall asleep time is measured in minutes while hours of sleep is an average per night ( $n=267, p=.05$ ).

Table 4

*Frequency of Average Hours Slept Per Night*

<b>Hours</b>	<b>Frequency</b>	<b>Percentage</b>
<4	2	0.8
4-4.99	11	4.2
5-5.99	40	15.1
6-6.99	87	32.8
7-7.99	73	27.4
8-8.99	41	15.4
9-9.99	10	3.8
>10	2	0.8
Total	266	100

*Note:* One participant did not answer a necessary question, therefore  $n=266$ .

Table 5

*Correlation Results*

	PSQI	GPA
Pearson Correlation	-.145*	-.145*
Significance (2-tailed)	.020	.020
N	258	267

*Note:* \* indicates correlation is significant at the 0.05 level. Nine students did not complete the PSQI instrument leaving  $n=258$ , however they supplied their UCO identification number to be used in GPA analysis.

Table 6

*PSQI ANOVA Results*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.019	2	2.009	.194	.824
Within Groups	2643.500	255	10.367		
Total	2647.519	257			

*Note:* Level of significance was set at 0.05.

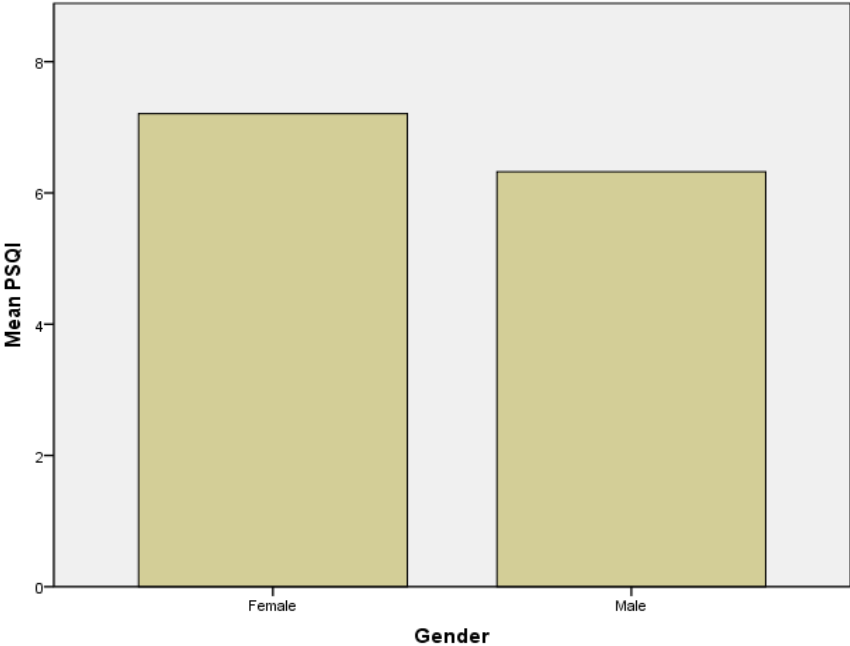
Table 7

*GPA ANOVA Results*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.559	2	2.280	2.802	.062
Within Groups	214.771	264	.814		
Total	219.330	266			

*Note:* Level of significance was set at 0.05.

**Figures**



*Figure 1.* Mean PSQI scores by gender.

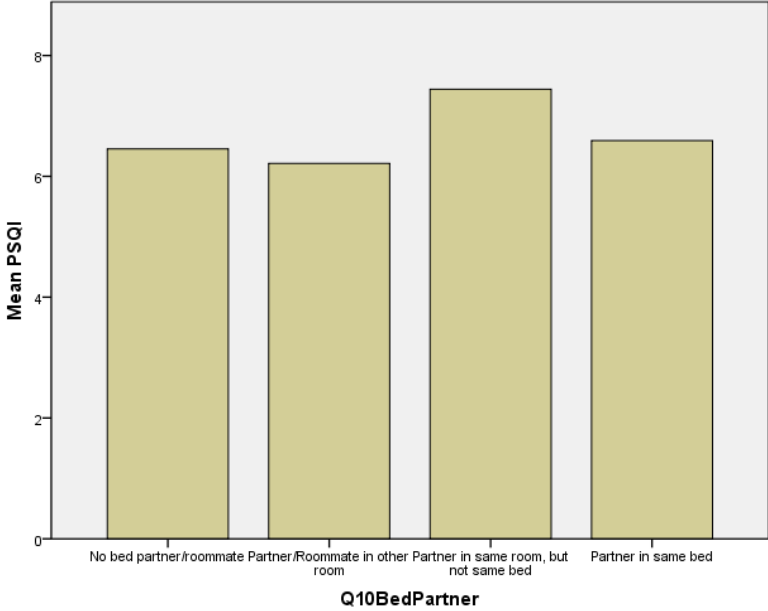


Figure 2. Mean PSQI scores by bed partner category.

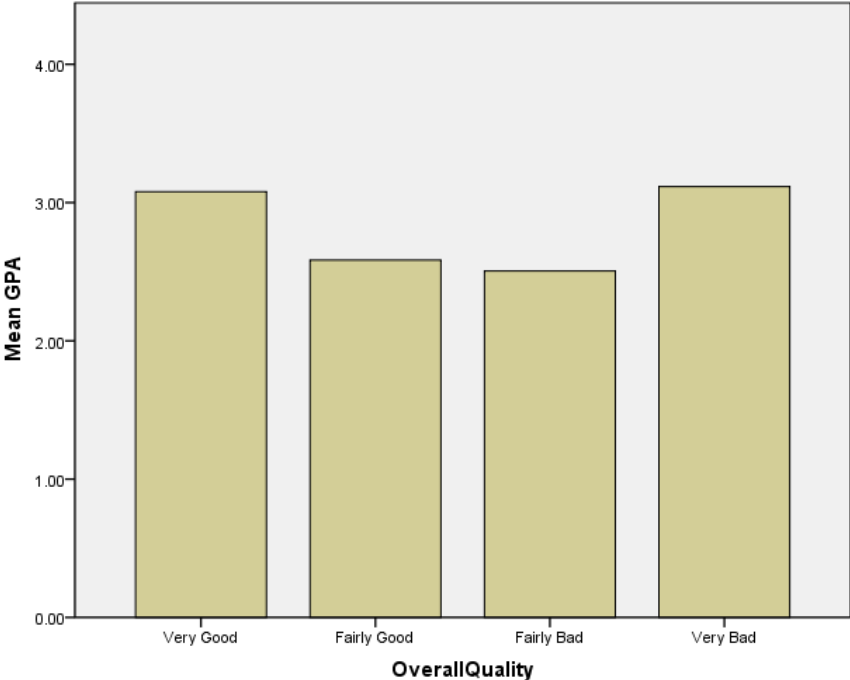


Figure 3. Self-reported sleep quality and mean GPA.



**Appendix A: Informed Consent**

### Informed Consent

**Research Project Title:** Determining a Relationship Between Sleep Quality and Academic Performance in First-Year University Students

**Researcher (s):** Meagan Carter, Dr. Sara Cole

**A. Purpose of this research:** The purpose of this study will be to determine if there is a relationship between sleep quality and academic performance in first-year college students.

**B. Procedures/treatments involved:** A short survey will be completed in participant's sleep habits in the previous month. By providing consent and their UCO ID number, participants will permit the researcher to access fall 2012 grade point averages from the UCO Registrar.

**C. Expected length of participation:** 15 minutes

**D. Potential benefits:** There are no benefits to study participants. Society will benefit by gaining an understanding of the importance of sleep and its relationship to daily wellbeing.

**E. Potential risks or discomforts:** Confidential semester grades will be released to the researcher.

**F. Medical/mental health contact information (if required):** None required

**G. Contact information for researchers:** 405-974-2267, mcarter21@uco.edu, scole13@uco.edu

**H. Contact information for UCO IRB:** 405-974-5497, irb@uco.edu

**I. Explanation of confidentiality and privacy:** Through the survey instrument, students will supply their UCO identification number to the researcher to be turned over to the UCO Registrar's office so that semester GPA can be accessed. No one outside of the researcher, researcher Dr. Sara Cole, and the UCO Registrar will have access to these records.

**J. Assurance of voluntary participation:** Participation is completely voluntary. Students have the right to not participate and to withdraw their consent at any time during the study.

### AFFIRMATION BY RESEARCH SUBJECT

I hereby voluntarily agree to participate in the above listed research project and further understand the above listed explanations and descriptions of the research project. I also understand that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty. I acknowledge that I am at least 18 years old. I have read and fully understand this Informed Consent Form. I sign it freely and voluntarily. I acknowledge that a copy of this Informed Consent Form has been given to me to keep.

Research Subject's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

UCO Student ID #: \* \_\_\_\_\_

Date: \_\_\_\_\_

**Appendix B: Data Collection Instrument**

Subject's Initials \_\_\_\_\_ ID# \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ AM  
 PM

**PITTSBURGH SLEEP QUALITY INDEX**

**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.

1. During the past month, what time have you usually gone to bed at night?

BED TIME \_\_\_\_\_

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

NUMBER OF MINUTES \_\_\_\_\_

3. During the past month, what time have you usually gotten up in the morning?

GETTING UP TIME \_\_\_\_\_

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

HOURS OF SLEEP PER NIGHT \_\_\_\_\_

***For each of the remaining questions, check the one best response. Please answer all questions.***

5. During the past month, how often have you had trouble sleeping because you . . .

a) Cannot get to sleep within 30 minutes

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

b) Wake up in the middle of the night or early morning

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

c) Have to get up to use the bathroom

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

d) Cannot breathe comfortably

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

e) Cough or snore loudly

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

f) Feel too cold

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

g) Feel too hot

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

h) Had bad dreams

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

i) Have pain

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

j) Other reason(s), please describe \_\_\_\_\_

How often during the past month have you had trouble sleeping because of this?

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

6. During the past month, how would you rate your sleep quality overall?

Very good \_\_\_\_\_

Fairly good \_\_\_\_\_

Fairly bad \_\_\_\_\_

Very bad \_\_\_\_\_

7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all \_\_\_\_\_  
 Only a very slight problem \_\_\_\_\_  
 Somewhat of a problem \_\_\_\_\_  
 A very big problem \_\_\_\_\_

10. Do you have a bed partner or room mate?

No bed partner or room mate \_\_\_\_\_  
 Partner/room mate in other room \_\_\_\_\_  
 Partner in same room, but not same bed \_\_\_\_\_  
 Partner in same bed \_\_\_\_\_

Adapted from:

© 1989, University of Pittsburgh. All rights reserved. Developed by Buysse, D.J., Reynolds, C.F., Monk, T.H., Berman, S.R., and Kupfer, D.J. of the University of Pittsburgh using National Institute of Mental Health Funding.

Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: *Psychiatry Research*, 28:193-213, 1989.

**Appendix C: Institutional Review Board Application**



Print Form

UCO IRB Number  
For Office Use Only

**INSTITUTIONAL REVIEW BOARD**  
**APPLICATION FOR REVIEW OF HUMAN SUBJECTS RESEARCH**  
*(Pursuant to Title 45-Code of Federal Regulations-Part 46)*

**Date:** Sept. 5, 2012

**Title of Project:** Determining a Relationship Between Sleep Quality and Academic Performance in First-Year University Students

**Principal Investigator(s):** Meagan Carter, Dr. Sara Cole

**Name of Primary PI:** Meagan Carter

**Title** Ms.  **Department:** KHS **College:** CEPS

**Campus Box:** 149 **Campus Phone:** 974-2267 **PI Status:** Graduate Student

**Email (UCO Preferred):** mcarter21@uco.edu

**Mailing Address:** 1821 Godhania Rd., Edmond, OK 73003

**Daytime Phone:** 405-9974-2267

**Name of Co-PI:** Sara Cole

**Title** Dr.  **Department:** KHS **College:** CEPS

**Campus Box:** 189 **Campus Phone:** 974-5130 **Co-PI Status:** Faculty

**Email (UCO Preferred):** scole13@uco.edu

**Mailing Address:** 100 N University Drive, box 189, Edmond, OK 73034

**Daytime Phone:** 405-974-5130

**Funding:** RCSA Grant



**1. Describe the purpose/hypothesis of the project or the research problem in enough detail that we can ascertain what the project is about. Describe why it is being done and the importance of the knowledge expected to result.**

The purpose of this study is to determine if there is a relationship between sleep quality and academic performance in first-year college students. This study is significant because it is the goal of a university to educate their students and assist them in succeeding inside and outside of the classroom. Current research supports a relationship between sleep and academics, however few studies performed on sleep quality and academic performance are targeted at first-year students. This study eliminates the self-reported variable of grade point averages (GPA) by the researcher collecting GPA. Ultimately, if students are getting the recommended eight hours of sleep per night then GPA's will be higher, thus, more students can be retained and graduate.

**2. Describe the subjects needed for this project and, at a minimum, provide the following information:**

**a. The type of individuals needed as subjects:**

Any UCO Student  
Students in investigator(s) class  
Other (describe below)

Students from UNIV 1012 will be recruited to take the survey.

**b. The procedures used to recruit subjects:**

Advertisement (flyer)  
Email blast  
Direct/targeted email  
Online posting  
In-class announcement  
Other (please describe below)

Permission was requested from the Director of First-Year Experience Programs, W. McCormick, to utilize the UNIV 1012 classes for recruitment. UNIV 1012 professors volunteered use of their class time for data collection.

**c. Site of recruitment of subjects:**

Data will be collected in UNIV 1012 classrooms.

**d. Do you plan to recruit subjects from outside businesses, schools, or other organizations?**

Yes  No

*If "yes," attach a copy of the required written permission (email or letter) from the appropriate person authorized to grant such permission.*

e. Do you plan to recruit from specific classes?

Yes  No

If "yes," attach a copy of the required written permission (email or letter) from the course instructor.

If instructor is a PI or Co-PI, describe measures to minimize undue influence or coercion during recruitment:

f. Do you plan to recruit subjects via email or conduct any of your research via the internet?

Yes  No

If "yes," you must give a copy of your IRB application to the UCO Office of Information Technology for authorization. This may be done simultaneous to ORC submission.

g. Do you intend to use an oral or written script or any materials (flyer, letter, advertisement, announcements) as part of the recruitment of research subjects?

Yes  No

If "yes," attach a copy of the these scripts/documents.

3. a. What is the maximum number of subjects you expect to participate?

375

Provide a justification for that number, i.e. effect size, variability.

To establish significance it is necessary to recruit between 345-781 students, however, that is not feasible for this study. It is the goal of the PI to obtain a minimum of 320 participants, or 20%, of the freshman class. If 15 sections with 25 students each are solicited for participation, approximately 375 students will have been invited to participate.

b. Will you be specifically including or targeting any of the following groups for research subjects? (Select all that apply)

Minors (<18 years old)  
Cognitively Impaired  
Pregnant Women  
Prisoners  
Native Americans  
Seniors (65 or older)  
None of the Above

If any were selected, please explain the additional safeguards used to protect the welfare of these vulnerable groups.

4. **a. Describe the experimental design, i.e. group assignments, measurements or observations of subjects or their environments, and explain what subjects will experience.**

Instructors will leave the classroom during the recruitment and data collection. Subjects will be asked to complete the informed consent and the Pittsburgh Sleep Quality Index (PSQI). The PSQI gives a standard of measurement for sleep quality and is in the form of a survey. Those that prefer to not participate in the study will be asked to sit quietly until all research materials have been collected from participants. All participants will supply their UCO student identification number to the PI on the instrument so that their final fall 2012 GPA can be collected for analysis. In December 2012, a list of participants' student identification numbers will be sent to the UCO Registrar and utilized to pull fall 2012 grade point averages.

**b. Will you be using questionnaires, surveys, tests or other written instruments?**

Yes  No

*If "yes," attach a copy of these scripts/documents.*

**c. Where will data actually be collected (i.e. room number, place)?**

Data collection will be collected in UNIV 1012 classrooms.

**d. Will you be using existing data?**

Yes  No

*If "yes," are data de-identified?*

Yes  No

*If "yes," is database available to the public?*

Yes  No

**e. Will tissue or blood samples be collected for data?**

Yes  No

*If "yes," explain the procedures for disposal.*

**f. Projected start date:**

Upon IRB Approval  Other (specify)

**Projected end date:**

**5. Will medical clearance be necessary for subjects to participate because of tissue or blood sampling, or administration of food or drugs, or physical exercise conditioning?**

Yes  No

*If "yes," explain how the medical clearance will be obtained.*

6. Does the research involve any of the following? (select all that apply)

Physical stress including exercise or exertion
Psychological or social stress
Exposure to radiation
Legal risk
Economic risk
Exposure to infectious disease
Personal or sensitive information about subject or family
Offensive, threatening, or degrading materials
Use of confidential records (medical or educational)
None of the above
Other (explain below)

For each item selected:

**a. Describe the degree of risk or harm.**

Student academic records (GPA) for the fall 2012 semester will be accessed by the UCO Registrar's Office and turned over to the PI for analysis.

**b. Justify why the risk is necessary.**

The limitation of self-reported data will be eliminated for the academic performance variable by using a student's GPA from their transcript.

**c. Explain how the risk will be minimized.**

The PI is a staff member in Enrollment Management and is accustomed to keeping student records confidential.

7. Will the subjects be deceived or misled in any way?

Yes  No

If "yes," describe the deception or omission, justify the necessity, and explain how and when subjects will be debriefed (attach script if used).

8. Will any inducements be offered to the subjects for their participation?

Yes  No

a. If "yes," please describe the inducements.

- Course Credit Option
- Extra Credit
- Money (specify amount)
- Other (specify below)

**b. If extra course credit is offered to research subjects who are students, what alternative means of obtaining additional credit are available to those students who do not wish to participate in the research project?**

**9. a. How will consent be obtained?**

Select one:

Subject will sign consent form ▼

Attach a copy of the consent form or information sheet (see *Informed Consent Form guidelines* at [www.uco.edu/academic-affairs/research-compliance](http://www.uco.edu/academic-affairs/research-compliance)).

*\*Submit a Waiver of Documentation of Informed Consent (also available at our website) with your application if there is no signed consent form.*

**b. Who will be consented? (select all that apply)**

Participant
Child (<18)
Parent/Legal Guardian

**c. Specify where consenting will occur:**

**d. Is a Waiver of Informed Consent requested? (If approved, informed consent will not be obtained. This is different from the Waiver of Documentation of Informed Consent.)**

Yes  No

**e. Will you obtain a Certificate of Confidentiality?**

Yes  No

*If "yes," please provide a copy once obtained.*

**10. a. Will any aspect of the data be made a part of a record that can be identified with the subject?**

Yes  No

*If "yes," describe and justify the necessity.*

The UCO student identification number will be provided by participants and then given to the UCO Registrar to obtain the participants' GPA for the fall 2012 semester. Once GPA data has been entered into the database, the data will be anonymous since ID numbers are not necessary other than to collect GPA. Upon entering GPA into the database, the ID information will be destroyed.

**b. Will a master code sheet be kept for purposes of identity security?**

Yes  No

*If "yes," explain the process and protection of code sheets for identity.*

**c. Does the study involve?**

- Audio taping of the subjects  
 Video taping of the subjects  
 Taking photographs of the subjects  
 Digital Imaging of the Subjects  
 None of the above

*If "yes," explain necessity and protections of anonymity. Attach a copy of release or permission form. Describe the storage, disposition, and security provisions taken to protect recordings/photos.*

**d. Will subjects be identifiable in these recordings?**

- Yes  No

*If "yes," explain why this is necessary.*

**11. Please describe the steps you will take to ensure the confidentiality of the data you collect by answering the following questions:****a. How will the data be reported or disseminated?**

Group/aggregate

**b. Where (specify office #) and how will the data be securely stored?**

Data will be kept in the PI's office on campus (NUC 121). Computers and flash drives will be password protected, and any printed copies will be kept locked in a filing cabinet.

**c. Who will have access to the data and/or password?**

Both

Dr. Cole, Co-PI, will have access to data because she is thesis chair.

**d. Who will be responsible for secure storage?**

PI

**e. What will the length of time each of the following will be kept?**

Paper data documents: <3 years

Electronic data documents: <4 years

Signed Informed Consent Forms  
(Federal regulations require a minimum of 3 years): <4 years

**f. How will the data be destroyed? Be sure to specify for electronic data, paper data, and code sheets (as relevant).**

All information is confidential and will only be viewed by researchers, and will be destroyed.

**12. Will the fact that a subject did or did not participate in a specific experiment or study be made a part of any record available to supervisor, teacher, or employer?**

- Yes       No

If "yes," describe and justify the necessity.

**13. Describe the benefits of participation for subjects (if any).** [If there is none, say so.]

There is no direct benefit to participants.

**14. Describe the benefits of your study to society.**

Society will benefit by gaining an understanding of the importance of sleep and its relationship to daily well-being.

**REQUIRED AUTHORIZATION SIGNATURES**

**SIGNATURE/AFFIRMATION/REPRESENTATION OF PRINCIPAL INVESTIGATOR(S):**

*(Primary PI must read and initial by hand at each of the below.)*

1. \_\_\_\_\_ This application represents an accurate and complete description of my proposed research project.
2. \_\_\_\_\_ I agree to provide the proper surveillance of this project to ensure that the rights and welfare of the human subjects are properly protected.
3. \_\_\_\_\_ I agree to comply fully with any requirements made by the UCO IRB.
4. \_\_\_\_\_ The human contact portion of my (our) research will not begin until the UCO IRB has given its written approval.
5. \_\_\_\_\_ Any additions or changes after the project has been approved will be submitted to the IRB for approval prior to implementation.

\_\_\_\_\_  
**Signature of Primary Principal Investigator**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature of Co-Primary Principal Investigator**

\_\_\_\_\_  
**Date**

If additional Co-PIs are associated with this project, please attach an additional sheet with name, signature, and date.

I have reviewed this Application for Review of Human Subjects Research, and, subject to approval by the UCO Institutional Review Board, authorize the Principal Investigator(s) to conduct this research. My signature acknowledges that I am aware of this project.

Name of Department Chair: Dr. Debra Traywick

Department: KHS

\_\_\_\_\_  
**Signature of Department Chair**

\_\_\_\_\_  
**Date**

Name of College Dean: Dr. James Machell

College: CEPS



**CHECKLIST FOR IRB APPLICATION SUBMISSION:**

Please mark which documents you have attached to your IRB Application:

	Attached	Not Applicable
Research Proposal (i.e. thesis proposal, RCSA application, grant proposal)	<input checked="" type="radio"/>	<input type="radio"/>
Recruitment Script/documents	<input checked="" type="radio"/>	<input type="radio"/>
Informed Consent Form (or Waiver)	<input checked="" type="radio"/>	<input type="radio"/>
Instrument(s) (questionnaires, surveys, etc.)	<input checked="" type="radio"/>	<input type="radio"/>
Written authorization--classes, organizations	<input checked="" type="radio"/>	<input type="radio"/>
Protecting Human Research Participants (PHRP) Training Certificate(s)	<input checked="" type="radio"/>	<input type="radio"/>
Have you submitted your application to the Office of Information Technology for approval?	<input type="radio"/> Yes	<input checked="" type="radio"/>

**CONTACT INFORMATION FOR QUESTIONS OR CONCERNS:**

Dr. Jill A. Devenport  
 Chair, UCO Institutional Review Board  
 Director, Office of Research Compliance  
 Academic Affairs  
 405-974-5479  
 irb@uco.edu

Submit **one hard copy** of your application, with all required signatures to:

UCO-IRB Office  
 ADM 216  
 Edmond, OK 73034  
 405-974-5497  
 405-974-3825 (fax)

**AND**

Submit **one electronic file** without signatures to irb@uco.edu.

Please note your application will not be processed until the original application with all required signatures is received.

**APPENDIX A**

List all study personnel who will interact with subjects or private, identifiable data

<b>Research Staff (Last, First)</b>	<b>Degree (B.A., Ph.D...)</b>	<b>Affiliation (UCO or Other)</b>	<b>Role in Research (Data Collection, Conduct Interviews, etc.)</b>	<b>PHRP* Training Certification Date</b>	<b>UCO Email Address</b>
Carter, Meagan	B.S.Ed	UCO	Data Collection, Entry, and Analysis,	8/23/2014	mcarter21@uco.edu
Cole, Sara	Ph.D.	UCO	review of data		scole13@uco.edu

\*Protecting Human Research Participants (PHRP) is a National Institutes of Health on-line training course as required by the Department of Health and Human Services regulations. Visit <http://phrp.nihtraining.com/users/login.php>. Copies of Certificates of Completion should be attached to the application. Recertification is required every two years and CITI certification can be substituted.

## APPENDIX B

### Required for Student Investigators

Purpose of project: Masters Thesis

Student qualification to conduct research: (Select all that apply)

Currently in or completed research methods course  
 Protecting Human Research Participants (PHRP) training\*\*  
 Prior experience as an independent or supervised Research Assistant  
 Other (specify below)

### Faculty Oversight Assurance

*I have reviewed and approved this application and I agree to ensure that all UCO IRB regulations will be complied with.*

Name of Faculty Member: Dr. Sara Cole

Signature of Faculty Member: \_\_\_\_\_

Thesis Chair

\* See Student Research Guidelines on our website: [www.uco.edu/academic-affairs/research-compliance](http://www.uco.edu/academic-affairs/research-compliance).

\*\*Protecting Human Research Participants (PHRP) is a National Institutes of Health on-line training course as required by the Department of Health and Human Services regulations. Visit <http://phrp.nihtraining.com/users/login.php>. All personnel working with subjects or identifiable data must be certified and should attach copies of certificates (see Appendix A).



August 16, 2012

To whom it may concern,

I have asked our instructional staff in the Office of First-Year Experience Programs to work with Mrs. Meagan Carter to coordinate her efforts to obtain data samples pertaining to her study on freshman sleep behaviors, utilizing freshmen enrolled in our UNIV 1012: Success Central courses.

This research has potential benefits for our departmental efforts to provide students with health and wellness education as a part of a larger examination of student success in the collegiate environment and we are happy to offer our course sections to her to obtain the information that she needs.

Thank you for your consideration of her research initiative.

Respectfully,

A handwritten signature in black ink, appearing to read 'William McCormick', is written over a faint, larger version of the same signature.

William McCormick  
Director, First-Year Experience Programs

**Meagan Carter**

---

**From:** Adam Johnson  
**Sent:** Wednesday, September 05, 2012 1:12 PM  
**To:** Meagan Carter  
**Subject:** Permission

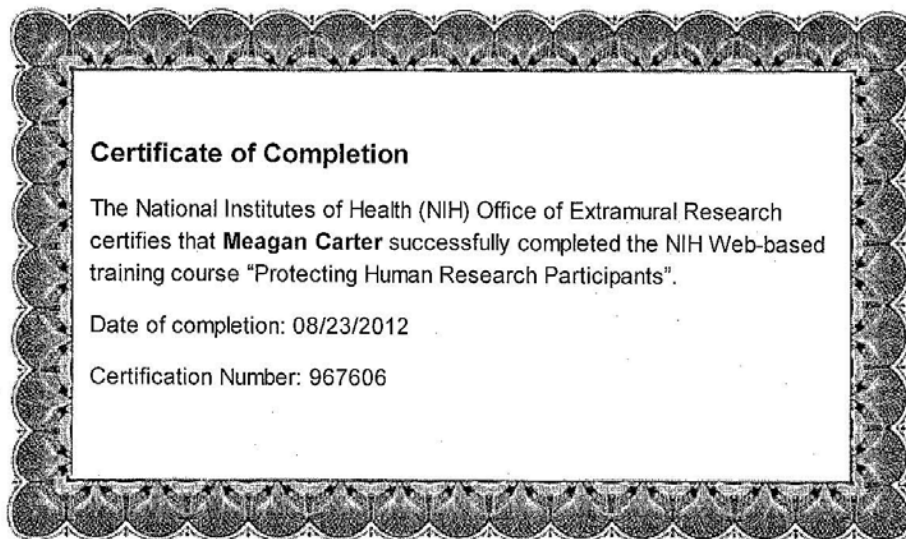
**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Based on our previous discussion, you are permitted to acquire fall 2012 student information for your study based on informed consent.

Adam Johnson, Associate Vice President/Registrar  
Enrollment Management  
University of Central Oklahoma  
100 N. University Drive  
Edmond, Ok 73034  
(405) 974-2385  
(405) 974-3930 (fax)  
[Click here to visit UCO's website](#)  
**Live Central!**

Protecting Human Subject Research Participants

<http://phrp.nihtraining.com/users/cert.php?c=966606>



**Appendix D: Institutional Review Board Approval Letter**

**Meagan Carter**

---

**From:** IRB  
**Sent:** Wednesday, September 26, 2012 2:55 PM  
**To:** Meagan Carter; Sara Cole  
**Subject:** IRB #12096 Approval

September 26, 2012

IRB Application #: 12096

Proposal Title: Determining a Relationship Between Sleep Quality and Academic Performance in First-Year University Students

Type of Review: Initial-Expedited

Investigators:

Ms. Meagan Carter  
Dr. Sara Cole  
Department of Kinesiology and Health Studies  
College of Education and Professional Studies  
Campus Box 189  
University of Central Oklahoma  
Edmond, OK 73034

Dear Ms. Carter and Dr. Cole:

**Re: Application for IRB Review of Research Involving Human Subjects**

We have received your revised materials for your application. The UCO IRB has determined that the above named application is APPROVED BY EXPEDITED REVIEW. The Board has provided expedited review under 45 CFR 46.110, for research involving no more than minimal risk and research category 7.

Date of Approval: 9/26/2012

Date of Approval Expiration: 9/25/2013

If applicable, informed consent (and HIPAA authorization) must be obtained from subjects or their legally authorized representatives and documented prior to research involvement. A stamped, approved copy of the informed consent form will be sent to you via campus mail. The IRB-approved consent form and process must be used. While this project is approved for the period noted above, any modification to the procedures and/or consent form must be approved prior to incorporation into the study. A written request is needed to initiate the amendment process. You will be contacted in writing prior to the approval expiration to determine if a continuing review is needed, which must be obtained before the anniversary date. Notification of the completion of the project must be sent to the IRB office in writing and all records must be retained and available for audit for at least 3 years after the research has ended.

It is the responsibility of the investigators to promptly report to the IRB any serious or unexpected adverse events or unanticipated problems that may be a risk to the subjects.

On behalf of the UCO IRB, I wish you the best of luck with your research project. If our office can be of any further assistance, please do not hesitate to contact us.

Sincerely,

Jill A. Devenport, Ph.D.  
Chair, Institutional Review Board  
Director of Research Compliance, Academic Affairs  
Campus Box 159  
University of Central Oklahoma  
Edmond, OK 73034



**Appendix E: Participant Recruitment Script**

Good afternoon,

My name is Meagan Carter and I am a graduate student in the Wellness Management program and a freshman academic advisor. I am conducting my thesis on whether there is a correlation between sleep and academics in first-year students. Participants will complete a survey on their sleep quality in the past month and provide their student identification number to me so that I can access semester grade point averages in December. To participate in my research you will need to read and sign the informed consent form, complete the survey, and provide your UCO identification number in order to access your Fall 2012 GPA for analysis. No one outside of myself, the UCO Registrar, and Dr. Sara Cole will have access to your personal information. Your participation is completely voluntary and you have the right to not participate and withdraw your consent at any time. Your professor will not know who did or did not complete the survey.

**Appendix F: Thesis Summary**

## **Thesis Summary**

### **Statement of the Problem**

A student's first semester at college can be a huge learning experience both in and out of a classroom. Most students go from living with their families during high school to transitioning to a residence of their own with little or no guardian supervision, and one of the first changes in daily routines is towards shortened sleep (Gilbert & Weaver, 2010). It can be a difficult task to learn to balance class attendance, homework, employment, and social activities all while finding time to eat and sleep. Not only can students become sleep deprived, but their grades may start to suffer.

### **Summary of the Literature**

One of the most frequent complaints of college students is not getting enough sleep at night (Yang et al., 2003). Eight hours has always been the golden rule for the amount of sleep that a person requires (Lack, 1986). Gender, age, and the amount of recent sleep determine how much sleep the body needs (Bonnet & Arand, 2010). Adequate sleep is explained by Bonnet and Arand as "a sleep duration that is followed by a spontaneous awakening and leaves one feeling refreshed and alert for the day." Multiple issues arise when a person does not get adequate sleep. Limited sleep is shown to decrease performance, cognition and short-term memory, and attention span (Bonnet & Arand, 2010). Sleep disturbances have been found to have negative effects on general health, performance, mood, memory and cognition (Breus, 2004).

Early class times coupled with late nights limit students' night-time rest. Studying, social activities, roommates, and stress are among the many different things that keep college students awake long into the night (Gaultney, 2010). Technology is also guilty of keeping students from getting adequate sleep. Mesquita and Reimão (2010) found that 60% of their participants were poor sleepers due to evening computer and television use. There were significantly more poor

sleepers that used computers or watched television in the evening hours compared to the good sleep group (Mesquita and Reimão, 2010).

### **Thesis Statement**

The purpose of this study will be to determine if there is a relationship between sleep quality and academic performance in first-year college students.

### **Research Methodology**

This study uses quantitative analysis to determine whether a correlation between the variables of sleep quality as measured by the Pittsburgh Sleep Quality Index (PSQI) and grade point average (GPA) in freshmen.

### **Summary of Findings**

With the level of confidence set at  $\alpha=.05$ , there was a significant, although very weak, negative correlation between the variables of sleep quality and GPA ( $r=-.145$ ,  $p=.02$ ). Overall, the mean GPA was 2.63 on a four point scale, and the mean PSQI score was 6.87, indicating poor sleep quality. More than three out of four students' PSQI scores were over five, indicating poor sleep quality. Just under 10% of participants reported very good sleep quality, while 58.1% reported fairly good sleep quality, 30.7% reported fairly bad sleep quality, and just under 2% reported very bad sleep quality. Over 60% of students reported sleeping between six and eight hours each night on average. Most students reported having a roommate in the same room but different bed (42.7%), while 29.2% had no bed partner/roommate.

### **Confirmation of Thesis**

This project confirmed that a significant, negative relationship does exist between the variables of sleep quality and GPA, although it is very weak.

**Statement of Significance of the Findings**

This study is significant because it is the goal of a university to educate their students and assist them in succeeding inside and outside of the classroom. The lack of a strong relationship between PSQI scores and GPA may be due to the number of variables that play a role in a student's sleep quality and GPA. Stress, the student's personality and personal motivation, course load, illness, and many other variables can affect both GPA and sleep quality. Future implications for this study would be to add an additional variable such as those listed previously to determine if another variable has a stronger correlation to sleep quality and GPA. The results of this study correspond with the findings of similar studies using the PSQI and GPA.