NOTHING TO YAWN AT:
A STUDY ASSESSING THE IMPORTANCE OF SLEEP HABITS FOR ACADEMIC
STUDENT SUCCESS

by

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Nothing to Yawn at:
A Study Assessing the Importance of Sleep Habits for Academic Student Success

Olivia Arnold

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ABSTRACT

Increasing awareness and empirical evidence reveal that sleep is beneficial for memory, comprehension, attention, and academic success. Yet the importance of sleep within these contexts has infrequently been addressed within programs intended at optimizing academic performance. Ultimately, this study emphasizes the relationship between sleep habits and academic performance, most specifically, within the unique environment of college residence halls, as considered through self-reported GPA and other identifiable measures, while also contributing to current deficiencies in the literature. Three hundred and sixty-seven undergraduate students aged 18 to 67 years from an urban university in Northeastern Ohio completed an online survey regarding their sleep habits that included questions from the Pittsburgh Sleep Quality Index (PSQI) and questions regarding their academic level, lifestyle, and place of residence. In addition to self-reported measures of academic performance, a self-reported cumulative GPA was also gathered in response. Despite some study limitations, nonparametric analysis suggests that a relationship between sleep and academic success potentially exists in different groups of the study population. Furthermore, although realizing the importance of sleep and its restorative qualities, insufficient sleep and bad sleep habits are present at alarming levels among this college student population.
ACKNOWLEDGEMENTS

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I can say with honesty and pride, the following work is a reflection of my desire to question and explore that, which is not yet known.
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CHAPTER 1
INTRODUCTION

In a society that thrives on individual success, consequences of daily lifestyle habits in all areas are under scrutiny. While this is an area of increasing research, studies evaluating lifestyle habits and performance indicators among US college students—especially those investigating factors that potentially hinder academic success—have been sporadic and limited. Design limitations in current studies have made it problematical to fully assess the prevalence and extent to which these factors impact individual college performance. However, nation-wide surveys that assess this phenomenon, including the American College Health Association’s National College Health Assessment Survey, have shed new light on the phenomenon, distinguishing lack of sleep as one of the main obstacles to academic success (American College Health Association, 2007). This research attempts to address several findings and shortcomings in response to a recent pilot study that evaluated the relationship between sleep and academic success among students at an urban Northeastern Ohio university.

In addition to the consideration of the basic elements potentially disrupting sleep in the previous pilot study, this new research addresses potential links with a new dimension that focuses on place of residence, specifically, college residence halls. This thesis began with an evaluation of the current (limited) literature available on the subject of sleep as it pertains to academic performance and ultimately, success. Next, it investigated survey data from college students at a northeastern college in Ohio, focusing specifically on a population of college students that are defined as Student Residents.
Finally, results were compared quantitatively and qualitatively through a discussion suggesting the relationship between sleep and academic success.

**Statement of the Problem**

Academic success is debatably the most desired outcome of college students worldwide. Synonymous with personal achievement and ultimately, career success, academic success within the college setting is commonly measured on the scale of a cumulative grade point average (GPA). Within a culture of competitiveness, stringent institutional standards, and dog-eat-dog attitude, factors influencing GPA and among other things, personal success, are under intense scrutiny. To a large extent, we are vehicles of our own destiny: we hold much of the power to follow our motivation to succeed, or to succumb to the evils of instant gratification and pleasure. College is the window of opportunity for young adults to learn this major life lesson; it is a testing time where true character is amplified and either applauded, or shamed depending on the individual’s personal choices on their journey to self-identification. While there are a plethora of predictive health factors that students can either choose to sustain appropriately, or deny importance, this study is concerned with the impact of sleep; more specifically, the relationship between sleep habits (including both quality and quantity) and academic performance as considered through self-reported GPA and other identifiable measures. Sleep was chosen for examination because it is consistently ranked (according to student perception) to be one of the top three impediments to academic success (American College Health Association, 2007). Yet despite this widespread perception of its impact should individuals abuse it; unlike the effects of
other hygiene factors (alcohol consumption, drug abuse) the researchers feel it is more of a ‘silent killer’ that students fail to realize because of lack of education and awareness surrounding the issue within the collegiate environment.

Background and Need

It is not only from within the context of a student affairs/college lens viewpoint that the phenomenon of sleep habits and how they can impact academic success or failure is significant among college students of today. Sleep struggles can have major ramifications on all levels of a student’s well-being. Should the student experience these struggles within an environment that is not supportive or conducive to change, or encouraging of proactive behavior, the issue becomes confounded within a vicious cycle.

Students who live away from home may be more likely to fall into unhealthy and inappropriate sleep habits because they lack the scheduled routine of ‘home life’ and are inundated with new responsibilities they are expected to deal with themselves (Smetana Campione-Barr, & Metzger, 2006). Students need to realize that the college environment is not a scene that is conducive to appropriate sleep schedules unless they are extremely responsible and highly motivated to do whatever it takes to achieve personal success without distractions. There are solutions (Orzech, Salafsky & Hamilton, 2011, and Brown & Buboltz, 2002) other than the use of stimulants, reliance on energy drinks, prescription medicines and caffeine- we just need to promote them to place the ability to change bad habits back into the hands of students.

There is a need for more studies such as this that highlight the link between health behaviors and personal success to bring attention to the steps individuals can take in the
quest to be proactive in bringing about change to improve the success of their own future. There is not enough knowledge regarding the negative consequences of sleep deprivation and unhealthy sleep habits; most students are unaware of the extent to which negative sleep patterns can affect their academic success. Worst-case scenarios (such as failing or failure to complete classes) see students suffering from the delay of obtaining their degree, or, worse yet, withdrawing from study with the achievement of no degree at all.

Purpose of the Study

The purpose of this study is to assess the relationship between sleep and academic success among undergraduate college students attending a mid-sized urban collegiate institution in Northeast Ohio. College is an exciting time for young adults, and for many, this may be the first ‘real experience’ away from the family home, whether it is living in a college residence hall or moving into an apartment or shared living situation with friends. With this new experience, comes many new changes: an increase in responsibilities- ranging from the very trivial, to those that are significantly major; a platform for time management; a change in relationship dynamics with family and friends from home. As one of the many health behaviors and lifestyle habits that are ultimately predictive of academic success, sleep may be significantly affected by the dramatic changes to individual lifestyles that college may bring.

In light of a recent pilot study, it was expected that this study would reveal a relationship between sleep and academic success and suggest those with sub-par and inappropriate sleep habits will suffer when it comes to achieving academic success. Furthermore, as a specific focus of the target population, it was expected that students
living on campus in residence halls would be more likely to experience the negative consequences of poor sleep habits, living in an environment that is not conducive to appropriate sleep schedules in comparison to the other living situations (family home, off-campus apartment or house) of students that were assessed.

Research Questions

After extensive literature review, four main hypotheses form the focus of this study: (1) College students who get the recommended amount of sleep perform better academically, as measured through self-reported GPA; (2) Those who self-report overall sleep quality as ‘fairly bad’ and ‘very bad’ will tend to have worse academic performance as measured through lower GPAs; (3) The majority of students surveyed will describe sleep as important to their academic success and overall health and well-being; and (4) Place of residence will influence the sleep/academic relationship, specifically those living on campus will have worse sleeping habits, and have worse academic performance.

Significance to the Field

While there has been much recent research in the area of healthy habits and predictive factors of individual success, the investigation of such habits among US college students- especially those which have direct implications for healthcare and student affairs professionals alike- have been limited. Design limitations in current studies have made it problematic to assess the prevalence and extent to which this problem impacts upon individual college performance.
Ultimately, from the study, it is hoped that we are able to somewhat evaluate the extent of the college-sleep phenomenon facing students in northeast Ohio. The fact that this phenomenon already obviously exists (as reflected in primary sources and the previous pilot study) indicates a significant need for student affairs professionals to highlight and promote the immediate restorative effects of maintaining a regular sleep schedule that abides by the recommended sleep requirements. Depending on results collected from those who participate, long-term gains in raising awareness of this phenomenon may feature increased academic success, greater mental health, and positive indicators for individual well-being that can be achieved by altering priorities when it comes to the benefits and importance of maintaining healthy sleep habits. While it was the primary aim of this study to contribute to a large gap in available literature, it is also hoped that these findings will empower not only current but also future students to be more proactive about the situation and hopefully in turn, directly impact the level of success these individuals achieve.

Definitions

For the purposes of this research study, sleep will be defined as “the natural periodic suspension of consciousness during which the powers of the body are restored” (Merriam-Webster). Likewise, the recommended appropriate total amount of sleep for the target population has been defined at anywhere between 7 and 9 hours per 24-hour period (National Institutes of Health). In regards to the study population, participants will include all currently enrolled undergraduate students of the chosen Northeast Ohio institutions. Regardless of age, gender and other demographic factors, the survey will be
equally accessible via student email to all enrolled students to participate. Within the parameters of this study, a Student Resident is defined as any currently enrolled student of the study institutions who live on campus under a contract with University Housing. Furthermore, by definition, a residence hall (the preferred term among student affairs professionals) is not just a place to sleep on campus, but also a place that provides “opportunities for personal and educational growth” (University of Oregon, 2012, para 1).

Limitations

According to the nature of the academic calendar, there will always be a variance in the workload that each individual student faces with their own personalized academic schedule, in comparison to the next student. While it would be next to impossible to create a study that took into account each individual participant’s workload according to the ebb and flow of each class and its specific academic requirements, it is hoped that conducting this study toward the end of semester (when students are busy preparing for finals), will give a much more accurate account of the extent that sleep can affect academic success, because the suggested phenomenon (lack of sleep detrimentally affecting academic success) will be in full effect. While participants were surveyed toward the end of the 2011 fall semester, it should be noted that study results may have been differed if this study were conducted at the beginning of the fall or spring semesters.

Ethical Considerations

All considerations were made to ensure that research for this study was conducted in an ethical manner. This included following the Youngstown State University Institutional Review Board (YSU IRB) process for informed consent, obtaining
permission to access participants, and ultimately, minimizing potential risk to participants
who voluntarily choose to provide informed consent by becoming involved in the study.
Specifically, the study (protocol number 065-12) was presented to the YSU IRB under a
category 2 exemption from full committee review, because participants had to be at least
18 years old to participate, there were no risks to the participants, participating did not
involve deception of any level, participants were not be compensated for their
involvement, and lastly, because this study was a double-blind procedure, participants
remained anonymous and were not be identifiable through any demographic data. Please
refer to Appendix A for a copy of YSU IRB approval.
CHAPTER II
REVIEW OF RELATED LITERATURE

Introduction

Debatably the most desired outcome of college students worldwide, academic success is synonymous with personal achievement and ultimately, career success. Academic success within the college setting is commonly measured on the scale of a cumulative grade point average (GPA). Within a culture of competitiveness, factors influencing GPA and among other things, personal success, are under intense scrutiny. College is the window of opportunity for young adults to learn to either buckle down and follow their dreams, or to succumb to peer pressure and unhealthy behaviors. It is a testing time where true character is amplified and either applauded, or shamed depending on the individual’s personal choices on their journey to self-identification. While there are a multitude of predictive health factors that students can either choose to sustain appropriately, or deny importance, this study is concerned with the impact of sleep; more specifically, the relationship between sleep habits and academic performance as considered through self-reported GPA and other identifiable measures.

Sleep and its relationship with success

While sleep in general has been studied at length, studies that look specifically at college students and how sleep habits affect their overall individual academic success have been few and far between, only recently gaining interest. Pilcher and Ott (1998) were at the forefront of the research trend, and found evidence of an association between
poor sleep quality and negative health complaints, including an increase in confusion, depression, fatigue, anger, and anxiety. In regards to how poor sleep quality affects academic success during college, they found that students often experience worry regarding their ability to effectively utilize the limited time they have to meet all of the demands placed on them within the college environment. In 2000, Hicks, Fernandez and Pelegrini (2001) found that 71% of college students reported dissatisfaction with their own sleep habits, compared to an earlier 24% in 1978, suggesting not only the significance of this phenomena among college students of today, but one that is alarmingly, growing exponentially. Perhaps this increase over time is due to our “do it all” attitude, or maybe it’s the technological additions like voicemail and social media that have truly made us a 24-hour society that never stops to rest.

Buboltz, Brown and Soper (2001) also made significant contributions, evaluating more of the negative effects of sleep difficulties among the American college population. While they did not look specifically for any correlation in regards to academic success, they concluded their study by stating it would be “beneficial” to examine this influence. Following Buboltz, Brown and Soper, was Jensen (2003), who agreed: “college students’ sleep habits are changing dramatically” and in turn, “related sleep problems are increasing” (p. 25). While Jensen’s research evaluated up-to-date literature available on a plethora of detailed and recorded sleep ‘problems’, perhaps it is his realization of the American college setting as a “unique challenge” to effective sleep habits, that is the most telling piece of information.

In contrast, Tsai and Li (2004) narrowed their approach, focusing purely on sleep habits in relation to gender and class differences, choosing to ignore the effects of these
habits on academic performance. Regardless, they were successful in finding that gender differences, both in sleep patterns and degree of difficulty sleeping, were “remarkable”. Alarmed by their results, Tsai and Li recommended that “students should be informed of their sleep problems and the consequences”, once again giving rise to the notion that sleep habits of the college population may be having harmful impacts not only on academics, but also on quality of life (Tsai & Li, 2003, p.231). When considering sleep research, ‘quality of life’ appears as a continuing trend, and was one that Lund, Reider, Whiting & Prichard, 2009, decided to investigate. Their research efforts aimed to extend the current literature on adolescent sleep by examining factors that are both precipitating and perpetuating poor sleep in this age group. They found that low level sleep and inconsistent sleep/wake patterns (which have been extensively documented in younger adolescents) are alarmingly present in the college student population. They went on to suggest that given the associations between sleep quality and physical/mental health, “intervention programs for sleep disturbance in this population should be considered” (Lund, Reider, Whiting & Prichard, 2009, p. 124).

While all of this research has contributed to the literature, this current study is primarily concerned with a smaller percentage of studies that directly evaluated the relationship between sleep and academic success among students in college. Research conducted by Trockel, Barnes and Egget (2000), aligns perfectly with this study’s aims; they measured the negative effects of sleep disturbance on American students through GPA. While the inherent limitation in their study was the fact that sleep was just one of the variables measured, the study found that sleep, particularly wake-up times, accounted for the greatest variance in GPA.
Eliasson, Lettieri and Eliasson (2009) also considered the impact of sleep on academic performance by evaluating the relative importance of “total sleep compared to the timing of sleep and wakefulness for academic performance” (p. 71). They found that those with the highest academic performance had significantly earlier bedtimes and wake times, and that napping “tended to be more common among high performers” (Eliasson, Lettieri & Eliasson, 2009, p. 71). Hence, timing of sleep and wakefulness “correlated more closely with academic performance than total sleep time and other relevant factors”, including weekend sleep habits, gender, race, study time, use of caffeinated beverages, use of prescribed or over-the-counter stimulants (Eliasson, Lettieri & Eliasson, 2010, p. 71). Ultimately, their findings have implications that suggest academic performance could be improved by targeting student’s sleep habits, which is an important revelation, especially considering the research aims of this current study.

Other contributing research worth noting concerns the duration or quantity of sleep and its overall importance in this complex equation. Hicks, Fernandez, & Pellegrini (2001) found that the median hours of sleep reported by college students dropped by more than 1 hour from 7.75 to 6.65 hours between 1969 and 2001 (p. 660). Literature suggests that beliefs about sleep requirements have changed over time, and while there is no optimal or ‘best’ recommendation for the amount of sleep in hours that older teens and adults should get, the recommended appropriate total amount of sleep for this population has been defined at anywhere between 7 and 9 hours per 24 hours (National Institutes of Health).

Ultimately, at the grassroots level, it is undeniable that the combination of poor sleep habits and academic failure impact students in the most negative way conceivable;
consequences include the delay of obtainment of degrees, with the worst case scenario resulting in the student withdrawing from study with the achievement of no degree at all. Upon consideration of the extraneous variables accounting for skewed sleep habits of college students, there are almost far too many to comprehend; use of stimulants, reliance on energy drinks, naps taken, prescription medication use, number of credit hours taken, whether the individual is a ‘planner’ or ‘procrastinator’ type personality, disruption or stress caused by major life events and whether or not the subject in question has a full-time job or family while enrolled in college, are all factors that can affect sleep. While this study is interested in these factors, the scope of the research and consequential questions that arise as a result is simply far too large to consider in this one study. Therefore, ultimately this current study seeks to comment on the relationship between sleep habits and academic performance as considered through self-reported GPA and other identifiable measures, quality and quantity of sleep, use of stimulants, participation in extracurricular activities, and motivation to succeed.

Sleep: conducive to the college environment?

A process that is considered a natural part of every individual’s life, sleep is a behavioral state that is imperative for ‘normal’ motor and cognitive functioning (National Institutes of Health). An individual experiencing low energy, problems concentrating, overall fatigue and emotional instability during their normal work/school day may be unknowingly suffering from the effects of poor sleep habits. There aren’t many alternatives when it comes to substituting time lost for sleep. Of course there are temporary ‘fixes’ - coffee, energy drinks, power naps and the like, but there really is no
quality substitute when you haven’t received your required hours and you’re (sleep) walking into the land of sleep debt. Having discipline and forming good sleep habits is key: the side effects resulting from lack of sleep can be dangerous and devastating on many levels should individuals fail to create a healthy sleep schedule.

Controlled studies of sleep restriction have revealed that individuals sleeping significantly below recommended requirements (4 hours or less) suffer from impaired attentiveness (Fallone et al, 2001, p. 213) and impaired ability to retain new memories (Yoo et al, 2007). Poor sleep habits, and as a direct consequence, troubled sleep, is regarded as both “a predictive sign and symptom of many illnesses, and is associated with substantial decrements in the quality of life” (Lund, Reider, Whiting & Prichard, 2009, p.124). Yet while the numerous advantages of maintaining an appropriate sleep schedule are constantly highlighted in our society, numerous populations are still suffering from inadequate and low quality sleep.

Considering the ecological model of healthcare promotion, the perspective of the campus environment emphasizes the importance of identifying negative consequences of health issues and predictive links between health and learning (Sacher, Moses, Fabiano, Haubenreiser, Grizzell & Mart, 2005, as quoted in Edens, p. 433). A predictive tool measuring these links includes the National College Health Assessment. Developed in 1998 by college health professionals, the National College Health Assessment is the most inclusive and far-reaching data set available to assess the health of American college students. Specifically, the national survey identifies and tracks health trends.

After close analysis of data summaries, it was found that students surveyed over 22 survey periods- Spring 2000 through Fall 2010- consistently ranked sleep difficulties
as one of the top three factors having the most impact on academic performance (academic performance was defined as receiving a lower grade on an exam, or an important project; received a lower grade in the course; received an incomplete or dropped the course; or experienced a significant disruption in thesis, dissertation, research, or practicum work) (American College Health Association). While this research highlights an obvious problem, it does not hint at factors causing the issue.

Sleepy college students in the classroom are a common theme across universities nation-wide. The college ‘experience’ of today can include anything and everything from demanding academic schedules, work schedules, relationships and commitments to others (specifically family and friends), as well as a plethora of extracurricular activities. With such a challenging agenda, it seems only natural that students are feeling the pressure to ‘keep up’ with their peers, and get ‘caught up’ in the process. Add to this reality the competition of today’s job market and the confounding variable of trying to ‘fit in’ enough sleep, and you have a good picture of the reality facing college students of today (Edens, 2006). Major consequences of this “do it all” lifestyle, sleep deprivation and irregular sleep patterns have been labeled as one of the main health-related obstacles to gaining personal success (American College Health Association). From such habits, associations with “lower grades, incompletion of courses, as well as negative moods” have been identified (Kellah, p. 432). One of the most interesting subgroups of the college population facing this phenomenon includes Student Residents- students living on campus in residence halls. This group is unique within this study and its objectives, because it is perhaps the group that receives the most exposure and concentrated version of the ‘college experience’- all the different variables that college entails.
Within the American collegiate environment, the terms “dormitory” and “residence hall” are typically used interchangeably. By definition, a residence hall (the preferred term among student affairs professionals) is not just a place on campus to sleep, but also a place that provides “opportunities for personal and educational growth”. Within this environment, “highly trained Residence Life staff and Hall Government Officers support this objective by creating engaging activities and programs in each hall or complex” (University of Oregon, Housing & Residence Life). Historically, it has been a constant argument in society that an individual’s college experience was missing something should that student never gain the experience of living in a residence hall. According to Pascarella, Terenzini, & Blimling (1994), students who make the decision to live on campus in a residence hall are more likely to “persist and graduate” (p. 27). So with all of these ‘high impact’ academic determinants, what are some reasons that students living in residence halls are likely to get lower results academically? For this specific population, there may be a number of factors as to why sleep is such an obstacle to success.

Away from the support of family or guardians, students (in many cases) no longer have the luxury of arriving home to prepared meals and laundry that has already been taken care of. Factors such as loud music and other noise within halls, lack of temperature control in an adjusted living environment, lack of parental influence in enforcing curfews or bedtime, living with a roommate who has a schedule that is not conducive to their own, or disrespectful roommates who leave lights on (or who need to stay up late and study in the room rather than a study lounge) may cause significant disruption to sleep habits. For many students living in residence halls on college
campuses, this is their first ‘real’ experience living away from home. With this new experience, comes many new changes: an increase in responsibilities- ranging from the very trivial, to those that are significantly major; a platform for time management; a change in relationship dynamics with family and friends from home.

Increase in responsibilities

Living away from parental/guardian influence for the first time can be a welcome increase in personal freedom; but it is this very same ‘freedom’, that ironically, signals a greater responsibility for the individual’s daily schedule. Students are faced with the choices of when and where to study, whether or not to become a part of different social groups and activities, manage their own finances, exercise, and find time in their busy schedules to eat- and sleep (Smetana Campione-Barr, & Metzger, 2006). These daily questions form the basis of the individual’s constant challenge of learning how to effectively and efficiently balance the necessary routine of attending class, participating in extracurricular activities, completing assigned coursework within set parameters, taking physical and emotional care of oneself, as well as setting aside personal time for fun and relaxation. While living on campus in a residence hall does mean that the student has an instant network of support, this is also the first time for many students, that they are encouraged to start making their own decisions based on initiative, with anything to scheduling their own classes, making healthcare appointments, and seeking out help from professors.

Time Management

Beginning college and combining the experience with living on campus also places significant demands on time. Because of the feeling of constant pressure to
succeed despite all of their obligations, students can’t be blamed for feeling overwhelmed more often than not. Demands of college life change according to the ebb and flow of academic workload and the emotional maturity of the individual and their ability to cope under pressure. New students also experience new expectations when it comes to behavior and choices they make within the college environment. This is yet another period of adjustment for students as they learn to rely on themselves. Hopefully there is less interaction between parents and academic professionals during this time and students take accountability for their own academic success in working out problems or concerns with professors or residence life staff, rather than relying on guardians or parental figures (Ashwin, 2003).

Changes in Relationship Dynamics

With the change in responsibility from the freedom gained from moving away and living on campus independent of family and parents, comes a change in relationship dynamics with parents/guardians and those who are most significant (Baumeister, & Leary, 1995). While it may be a tough first few months away from home to endure homesickness, students usually find that once they have moved into residence halls and are able to live more freely away from parental constraint, it is also just as difficult to re-adjust to expectations at home, such as different responsibilities and curfews (Beyers, & Goossens, 2002). During all these changes that students endure, research has proven that away from the comfort of home, living among the support of housing and residence life staff professionals improves student’s chances of fostering relationships and meaningful connections that aid in the adaption and adjustment to the college environment, ultimately, contributing to overall success- academically and emotionally.
Summary

Because of their familiarity with the interdependence of health and learning within the collegiate environment, student affairs professionals working within the field of campus health should be supportive of students, promoting this relationship at all times. In order to overcome an obstacle to academic success, we must firstly understand it. From research such as that which is conducted by ACHA-NCHA, healthy campus initiatives offering effective solutions, have resulted due to increased awareness of health impediments to learning. While research assessing the extent to which place of residence either helps or hinders positive sleep habits among college students is limited, recent findings have suggested the need for on-campus support: healthy campus initiatives, increased awareness of students affairs professionals, and an emphasis on supporting resources available to students who suffer from inability to get adequate sleep are just some of the many ideas being implemented.
CHAPTER III
METHODS AND PROCEDURES

Introduction

This study uses a quantitative (with a minor qualitative component), non-experimental design where the relationship (if any) between sleep habits and academic performance, is measured through a survey self-administered by undergraduate students at the focus institution of higher learning. Participants were recruited through a campus-wide email announcement that was sent to all currently enrolled (fall session, 2011) students who had an active campus email account. Participation was voluntary through the completion of a survey that included two amended questions from what has been identified as a superior rating scale in the field of sleep research, the Pittsburgh Sleep Quality Index (PSQI).

After extensive literature review, four main hypotheses form the focus of this study: (1) College students who get the recommended amount of sleep perform better academically, as measured through self-reported GPA; (2) Those who self-report overall sleep quality as ‘fairly bad’ and ‘very bad’ will tend to have worse academic performance as measured through lower GPAs; (3) The majority of students surveyed will describe sleep as important to their academic success and overall health and well-being; and (4) Place of residence will influence the sleep/academic relationship, specifically those living on campus will have worse sleeping habits, and have worse academic performance.
Description of Participants

In order to gain the most accurate representation of the extent to which sleep habits impact academic success within the institution, it was the aim of the investigator to try to include as many current undergraduate students as possible. The urban college in focus is primarily a commuter campus with a smaller student resident body than other locally comparative schools that have a greater proportion of their student body living on campus in residence halls. Regardless of age, gender and other demographical factors, the survey was accessible via student email to all enrolled students to participate in.

Measures

Within this particular field of research, the Pittsburgh Sleep Quality Index (PSQI) was identified as a superior rating scale, and therefore, the online survey included two questions directly from its published scales. The PSQI is a tool that enables a distinction to be established between “good” sleepers and “poor” sleepers through the administration of a self-rated questionnaire that assesses both sleep quality and disturbances over a 1-month timeframe. Measures are gained from seven contributing areas: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the duration of the individual’s last month (Buysse, Reynolds, Monk, Berman & Kupfer, 1989). For purposes of this study, only PSQI questions 4 and 6 were incorporated: (1) “During the past month, how many hours of actual sleep did you get on average in a 24 hours period? (This may be different than the number of hours you spent in bed)”; and (2) “During the past month, how would you rate your sleep quality overall?
In addition to the published scales of the PSQI and basic demographic information, the survey included information pertaining to individual academic performance and personal thoughts on the importance of sleep through the inclusion of an open-ended question at the conclusion of the survey, in order to gain an important qualitative perspective. To assess academic performance, participants were asked to provide their academic major, class rank, grade-point average (on the institution’s standard 4.0 scale) and information about amount of credit hours they were taking within the current semester, as well as “how many hours outside of scheduled class hours [they] devote to study or homework assignments”.

For the purposes of this research study, sleep was defined as “the natural periodic suspension of consciousness during which the powers of the body are restored” (Merriam-Webster). Furthermore, the recommended amount of sleep this population should be receiving each 24 hour-period was defined as anywhere from 7 to 9 hours, according to the National Institutes of Health.

Description of Procedures

Participants were recruited through a campus-wide email announcement that will be sent to all students. To ‘weed out’ students who did not fall into the population of study (undergraduate students who were currently enrolled in classes at the institution), there was an option on the survey to identify one’s self as a graduate student. Surveys completed by graduate students were excluded from analysis. The first page on the email announcement assured potential participants of their anonymity, and asked individuals to provide informed consent by clicking on a link that took them to the survey where they
will again be reminded that they have to be at least 18 years of age to participate. Only then, could participants proceed to complete the data collection component of the survey. The survey was accessible online for approximately 2 weeks toward the end of the fall semester. Participants were excluded from the study based upon two criteria: 1) surveys that identified individuals as graduate students, or 2) partially completed surveys that failed to answer questions regarding the study variables.

Analysis Plan

Data was collected through the website ‘www.freeonlinesurveys.com”, and upon the deadline for submission, data was downloaded in spreadsheet form, and later uploaded to Predictive and Analytic Software Version 18 for analysis. A number of responses were identified that were outside the range of a logical response for that question. Responses that were beyond the stipulated range were not included in the analysis for that particular question. Where participants failed to answer survey questions relating to the variables of sleep or academic measures, their individual survey was eliminated from the analysis in its entirety in the hopes of achieving a more accurate and realistic representation of the relationship between sleep and academic success, if any. Furthermore, respondents who failed to meet inclusion criteria were excluded from the analysis entirely- these respondents typically failed to meet age requirements for inclusion (at least 18 years of age) or were of graduate status.

Hypothesis (1) “College students who get the recommended amount of sleep perform better academically, as measured through self-reported GPA,” was measured by sorting participants into groups of normal sleep (anywhere between the recommended 7
and 9 hours) and abnormal sleep (anything less/more than the recommended amount). These groups were then compared by the means of their self-reported cumulative GPAs through the use of an independent-samples t test to evaluate whether or not there was any statistically significant difference between the means of the two groups.

Hypothesis (2) “Those who self-report overall sleep quality as ‘fairly bad’ and ‘very bad’ will tend to have worse academic performance as measured through lower GPAs,” was measured and evaluated in much the same way. Participants were sorted into 2 groups: the first group (labeled ‘Poor Quality’) included those who rated their overall sleep quality as being either ‘fairly poor’ or ‘very poor’; the second group (labeled ‘Good Quality’) included students who rated their sleep quality overall as being either ‘fairly good’ or ‘very good’. Again, an independent-samples t test was used to compare the means of both groups, and to see whether or not any difference was statistically significant.

Hypothesis (3) “The majority of students surveyed will describe sleep as important to their academic success and overall health and well-being” included a more simple evaluation of attitude through the use of descriptive statistics. Those who responded through ranking the importance of sleep on a scale of “Not Important” to “Very Important,” were counted in a cumulative tally to gain an overall percentage of respondents who believed similarly, that sleep was important for individual success. What investigators were left with was a clear picture of participant attitude toward sleep and its relative importance.

Hypothesis (4) “Place of residence of the student will have bearing on the sleep/academic relationship; those living on campus have bad sleep habits, and have
worse academic performance” was measured by evaluating cumulative mean GPAs and mean hours of sleep, compared to place of residence. ANOVA was also used to compare the participants based on their residence grouping.
CHAPTER IV
RESULTS OF THE STUDY

Analysis

After omitting participants who did not correctly answer the survey questions, left no response when a question related to an important study variable, were too young, or were of graduate student status, investigators were left with a sample of N=367. Of these students, 364 chose to identify gender and contributed to the composite of 29.4% male (n=107), and 70.6% female (n=257). Twenty-five percent were of Freshman status (n=93); 19.8% were Sophomores (n=72); 23.4% were Juniors (n=85); and 31.3% were Seniors (n=114). On average, participants spent 15 hours studying outside of regularly scheduled class time each week.

When it came to whether students were able to achieve the recommended 7-9 hours of sleep each 24 hour cycle, 48.4% (n=164) were in the good sleep group and received somewhere in the range of the recommended amount, while 51.6% (n=175) were in the ‘abnormal’ group, either falling short of the recommended amount, or surpassing it. In regards to sleep quality, 6% (n=22) considered their sleep quality overall to be ‘very bad’; 54.8% (n=200) reported their sleep quality as ‘fairly bad’; 33.7% (n=123) considered their overall sleep quality to be ‘fairly good’; and just 5.5% (n=20) considered their sleep quality to be ‘very good’. Please refer to Appendix E, Table 1, for a summary that showcases profile information regarding the sample.

Pearson correlation coefficients were obtained and a correlation matrix was generated for the participant attributes and study variables associated with the specific
research hypotheses to assess for collinearity (see Table 13). Significant correlations were identified among some of the variables and participant attributes. GPA was significantly correlated with quality of sleep ($r = -.19$, $p = .01$), as was age and hours of sleep ($r = -.25$, $p = .01$), hours of work and hours of sleep ($r = -.26$, $p = .01$), as well as hours of sleep and caffeine use ($r = -.13$, $p = .05$).

To test hypothesis (1), an independent-samples t test was calculated comparing the mean cumulative GPA scores of those in the ‘normal’ sleep group (anywhere between the recommended 7 and 9 hours) to those in the ‘abnormal’ sleep group (anything less/more than the recommended amount). A significant difference was found ($t(4) = 2.694$, $p < .05$). The mean GPA of the ‘abnormal’ sleep group ($m=3.311$) was significantly different from the mean GPA of the ‘normal’ sleep group ($m=3.492$).

To test hypothesis (2), an independent-samples t test comparing the mean cumulative GPA scores of those in the ‘poor’ quality sleep group (participants who rated their sleep quality either ‘fairly poor’ or ‘very poor’) to those in the ‘good’ quality sleep group (those who rated their sleep quality either ‘fairly good’ or ‘very good’), found a significant difference between the means of the two groups ($t(345) = -3.661$, $p < .05$). The mean GPA of the ‘good’ quality sleep group was lower ($m=3.247$) than the mean of the ‘poor’ quality sleep group ($m=3.490$).

Interestingly, in other results, an independent-samples t test comparing the mean cumulative GPA scores of those who considered themselves to get both “good quality and recommended quantity” sleep and those who received “insufficient quantity and bad quality” sleep, found statistically significant results ($t(345) = -0.455$, $p < .05$). The mean of
the “good quality and recommended quantity” group was significantly lower (m = 3.344) than that of the “insufficient quantity and bad quality” group (m = 3.398).

When it came to testing Hypothesis (3), “The majority of students surveyed will describe sleep as important to their academic success and overall health and well-being” included a more simple evaluation of attitude through the use of descriptive statistics. Those who responded through ranking the importance of sleep on a scale of “Not Important” to “Very Important,” were counted in a cumulative tally to gain an overall percentage of respondents who believed similarly, that sleep was important for individual success. What investigators were left with was a clear picture of participant attitude toward sleep and its relative importance. From 257 respondents, 6 or 2.3% rated sleep as “not important”, 14 or 5.4% rated it “somewhat important”, 42 or 16.3% rated it “important”, 72 or 28.0% rated it “very important”, and the majority, 127 or 49.4% rated it “extremely important”. Ultimately, approximately 90% of participants considered sleep to be important.

Cumulative mean GPAs were compared by place of residence to address Hypothesis (4) “Participant’s place of residence will have bearing on the sleep/academic relationship; those living on campus face additional challenges to maintaining appropriate sleep schedules, and in turn have worse academic performance”. It was found that students living in the Residence Halls had the highest self-reported cumulative mean GPA (3.50/4.0 scale), while those who lived in the family home had the lowest cumulative mean GPAs (3.37/4.0 scale). Those who lived in an off-campus apartment or house had a mean cumulative GPA of 3.38/4.0 scale, while those who categorized their living situation as ‘other’ self-reported a mean cumulative GPA of 3.40/4.0 scale.
Furthermore, place of residence was also compared to average hours of sleep. It was found that residents who recorded the most hours of sleep lived within the residence halls, reporting a mean of 7.13 hours of sleep per 24 hours; those who lived in the family home reported the next highest mean hours of sleep at 6.54 hours; those who lived in an off-campus apartment or house reported a mean of 6.22 hours of sleep; while students who classified their living situation as ‘other’, reported a mean of 6.11 hours of sleep for each 24 hour period.

One-Way ANOVA was also used to compare the different sample groups from each residence category. When utilizing this test, it is a requirement that there be a single dependent variable (in this study, GPA) and a single independent variable, which is the value that determines the group that participants belong to (in this study, the place of residence of the students). ANOVA also requires the dependent variable to be of interval or ratio measurement level (in this study, the dependent variable, GPA, is of interval status), and the data is normally distributed. When it came to participants in this study, the mean GPA of students was compared using one-way ANOVA, based on their groupings determined by their place of residence. No significant difference was found ($F(3, 343) = 1.355, p > .05$). The students from the four different living situations did not differ significantly in regards to their cumulative GPAs. Students who lived in the Residence Halls had a mean GPA of 3.50, those who lived in off-campus apartments of houses had a mean GPA of 3.38, those who still lived in the family home had mean GPAs of 3.37, while those who considered their living situation as ‘other’ reported a mean GPA of 3.40.
In other results, over-the-counter stimulant or legal caffeine supplement use was also evaluated. Interestingly, 63.2% (228 respondents) reported “not at all”; 24.9% (90 respondents) reported “sometimes”; 6.4% (23 respondents) reported “often”; and 5.5% (20 respondents) reported “all the time” in regards to their usage of these types of supplements.

The importance of formal education was also evaluated. Less than 1% of participants (2 students) ranked formal education as “somewhat important”; 3% (11 students) ranked formal education as “important”; 14.8% (54 students) ranked formal education as “very important”; and 81.6% (298 students) consider formal education to be “extremely important”.

In regards to the extent that students perceived their sleep to be affected by social activities with friends, 17.5% (64 students) answered “no effect at all”; 22.7% (83 students) answered “somewhat affected”; 29.9% (109 students) answered “affected”; 17.3% (63 students) answered “very affected”; and 12.6% (46 students) answered “greatly affected”.

Students were also presented with clinical research that suggests that poor sleep habits, and failure to maintain adequate quantities of sleep are “a predicative sign and symptom of many illnesses, and is associated with substantial decrements in the quality of life” and asked to evaluate the impact that this knowledge had on them. Fifteen percent of participants (56 students) reported “no influence at all”; 18.7% (68 students) reported “some influence”; 29.7% (108 students) reported that the information “influenced” their perception; 20.6% (75 students) reported that they were “very
influenced”; and 15.7% (57 students) reported that the research impacted them “a great influence”.

Discussion

Overall, from the results we can see that the ‘typical’ respondent had a mean age of 25.4 years, got on average, 6.5 hours of sleep, had a cumulative GPA of approximately 3.39, was enrolled in about 13 or 14 hours of coursework during the Fall semester of 2011, and worked on average, about 18.4 hours each week.

Of the significant variables included in this study (i.e., sleep quantity and quality, GPA), none of the noteworthy correlations were necessarily directly associated with the specific research hypotheses. However such correlations still provided some interesting results. A significant negative correlation was identified for GPA and quality of sleep ($r = -.19, p = .01$), as was age and hours of sleep ($r = -.25, p = .01$), hours of work and hours of sleep ($r = -.26, p = .01$), and hours of sleep and caffeine use ($r = -.13, p = .05$).

The study data provided basis to support Hypothesis (1), “College students who get the recommended amount of sleep perform better academically, as measured through self-reported GPA”. An independent-samples t test was calculated comparing the mean cumulative GPA scores of those in the ‘normal’ sleep group (anywhere between the recommended 7 and 9 hours) to those in the ‘abnormal’ sleep group (anything less/more than the recommended amount). A significant difference was found ($t(4) = 2.694, p < .05$). The mean GPA of the ‘abnormal’ sleep group (m=3.311, sd=0.6179) was significantly different from the mean GPA of the ‘normal’ sleep group (m=3.492,
Therefore it was determined that for this particular population, varying sleep quantity did impact student success as measured by self-reported GPA.

It is interesting to compare these results to already established findings regarding sleep quantity and academic performance. These results somewhat support the findings of Kelly, Kelly and Clanton (2001) who suggested that students who were classified as ‘short’ sleepers (6 hours per night or less) had a lower GPA (2.74) than ‘long’ sleepers who had at least 9 hours of sleep per night and reported a mean GPA of 3.24. While students in the study in question, reported a greater mean GPA if they slept on average, more than 6 hours, the cut off point for recommended sleep was 9 hours, which means the findings only somewhat support those of Kelly, Kelly, and Clanton, who suggest that students who sleep longer, regardless of how many hours past the recommended goal, have better grades on average.

These findings also somewhat support those found by Pilcher and Walters (1997), who established a link between sleep deprivation and negative performance on the Watson-Glaser Critical Thinking Appraisal, because while some of the students in the ‘abnormal’ sleep group could potentially have had a negative performance due to lack of sleep, that still leaves students in the same group who ran over the amount of recommended sleep and definitely were not suffering from sleep deprivation. While previous research has suggested that sleeping too little can affect cognitive functioning adversely, it would be interesting to pursue further research investigating whether sleeping too much past the recommended amount might also reverse any positive effects of a ‘good night’s sleep’.
Hypothesis (2) “Those who self-report overall sleep quality as ‘fairly bad’ and ‘very bad’ will tend to have worse academic performance as measured through lower GPAs” was also not supported. This hypothesis was tested using an independent-samples t test to compare the mean cumulative GPA scores of those in the ‘poor’ quality sleep group (participants who rated their sleep quality either ‘fairly poor’ or ‘very poor’) to those in the ‘good’ quality sleep group (those who rated their sleep quality either ‘fairly good’ or ‘very good’). Results suggested a statistically significant difference between the means of the two groups (t(345) = -3.661, p < .05). The mean GPA of the ‘good’ quality sleep group was lower (m=3.247, sd=0.6992) than the mean of the ‘poor’ quality sleep group (m=3.490, sd=0.5380). These results contradict findings from a 2004 study conducted by Howell, Jahrig and Powell, whose research established a statistically significant correlation between poor sleep quality and reduced academic measures. They also contradict comparable findings in an Italian study, where students who reported poor self-rated sleep measures were inclined to fail classes in comparison to those students who had reported good quality sleep (Curcio et al 2006).

These results could suggest a number of things. Maybe the students who got poorer quality sleep have higher GPAs because they are staying up later to study in hopes of achieving better grades. Or perhaps those students with higher GPAs are the students who live off campus and have young families as an added responsibility they have to balance with their scholarly pursuits. It would be interesting to break down students into smaller groups based on academic major to evaluate whether or not different majors are more intensive and demanding on sleep schedules. In similar thought, it would also be
interesting to evaluate those students living on campus further, to see if students from
different residence halls had significant differences in their sleeping patterns.

In other results, an independent-samples t test comparing the mean cumulative GPA scores of those who considered themselves to get both “good quality and recommended quantity” sleep and those who received “insufficient quantity and bad quality” sleep, found no statistically significant difference (t(345)=-.455, p > .05). The mean of the “good quality and recommended quantity” group (m = 3.344) was not significantly different than that of the “insufficient quantity and bad quality” group (m = 3.398).

Hypothesis (3), “The majority of students surveyed will describe sleep as important to their academic success and overall health and well-being” included a more simple evaluation of attitude through the use of descriptive statistics, and was proven to be correct. Those who responded through ranking the importance of sleep on a scale of “Not Important” to “Very Important,” were counted in a cumulative tally to gain an overall percentage of respondents who believed similarly, that sleep was important for individual success. Investigators were left with a clear picture of participant attitude toward sleep and its relative importance. From 257 respondents, 6 or 2.3% rated sleep as “not important”, 14 or 5.4% rated it “somewhat important”, 42 or 16.3% rated it “important”, 72 or 28.0% rated it “very important”, and the majority, 127 or 49.4% rated it “extremely important”. Quantitatively speaking, 97.65% of participants described sleep as “important” on some level, to their “academic success”, obviously giving support to the notion that the majority of students believe sleep to be a crucial contributor to their individual success.
Using One-Way ANOVA, cumulative mean GPAs were compared as four groupings determined by place of residence to address Hypothesis (4) “Participant’s place of residence will have bearing on the sleep/academic relationship; those living on campus face additional challenges to maintaining appropriate sleep schedules, and in turn have worse academic performance”. While the ANOVA was not significant, it was found that students living in the Residence Halls had the highest self-reported cumulative mean GPA (3.50/4.0 scale), therefore in part, suggesting hypothesis 4 to be supported. Those who lived in the family home had the lowest cumulative mean GPAs (3.37/4.0 scale), while those who lived in an off-campus apartment or house had a mean cumulative GPA of 3.38/4.0 scale, and those who categorized their living situation as ‘other’ self-reported a mean cumulative GPA of 3.40/4.0 scale.

Furthermore, place of residence was also compared to average hours of sleep. It was found that residents who recorded the most hours of sleep lived within the residence halls- perhaps because of fewer outside responsibilities. This group reported a mean of 7.13 hours of sleep per 24 hours, again adding confidence to the suggestion that hypothesis 4 could not be supported. Additionally, those who lived in the family home reported the next highest mean hours of sleep at 6.54 hours; those who lived in an off-campus apartment or house reported a mean of 6.22 hours of sleep; while students who classified their living situation as ‘other’, reported a mean of 6.11 hours of sleep for each 24 hour period.

Looking specifically at the study participants in terms of their groupings by residence provides some interesting results. Interestingly, results suggest that on average, living in an on-campus residence hall may be the optimal living situation while in
college—the only group of students who, on average, achieved somewhere in the 7-9 hours range of recommended quantity of sleep. However while this group’s average placed them in the recommended range for sleep quantity, there should still be just as much cause for concern for their sleep habits and wellbeing as we should have for their commuting counterparts who don’t even manage to reach the lower end of the average recommended sleep quantity. Previous research has suggested that students who live on campus tend to compare their previous living situation (usually, a family home, which can be an extremely controlled environment), to their current situation, which confuses their perception of sleep quality, because they are too focused on the new (and most times frustrating) variables their new living situation has introduced. A study by postdoctoral fellow in sleep research at Brown University, Dr. Orzech, in conjunction with student health officials at the University of Arizona, brought to attention some of the issues preventing college students who live on campus, from getting adequate sleep. Orzech listed dorm noise, roommates (for both positive and social reasons, as well as negative reasons), incomplete schoolwork/unpreparedness for next day of classes, having a room atmosphere not conducive to sleep, and personal health issues as the main hindrances to students maintaining recommended sleep schedules (Orzech, Salafsky & Hamilton, 2011).

In other results, over-the-counter stimulant or legal caffeine supplement use was also evaluated. This investigation was included in the survey with the expectation that the majority of students, regardless of their age, gender, or place of residence, would rely on caffeine and stimulants to get them through their days, weeks, and semesters. Interestingly, 63.2% (228 respondents) reported “not at all”; 24.9% (90 respondents)
reported “sometimes”; 6.4% (23 respondents) reported “often”; and 5.5% (20 respondents) reported “all the time” in regards to their usage of these types of supplements. A significant percentage of respondents replied “not at all” (63.2%)—quite a divergence from the ‘typical’ image of many students racing around campus clutching large coffees, or the chatter regarding their reliance on energy drinks and supplements during finals week—which perhaps hinted that the study population was confused by what the study question was asking, or perhaps that it was not worded well. Beyond energy drinks, other popular caffeine supplements also include more ‘mundane’ products such as sodas with added caffeine, which, if consumed excessively, can have dangerous health consequences.

The importance of formal education was also evaluated. Less than one percent (2 students) of participants ranked formal education as “somewhat important”; 3% (11 students) ranked formal education as “important”; 14.8% (54 students) ranked formal education as “very important”; and 81.6% (298 students) consider formal education to be “extremely important”. Fortunately, it seems the majority of this population are vested in their education and realize the positive impact formal education can have in determining their future. In an attempt to assess the truth to the perception of resident halls or student-organized off-campus housing situations being socially distracting environments, the survey also asked participants to evaluate the extent they perceived their sleep to be affected by social activities with friends. Seventeen percent (64 students) answered “no effect at all”; 22.7% (83 students) answered “somewhat affected”; 29.9% (109 students) answered “affected”; 17.3% (63 students) answered “very affected”; and 12.6% (46 students) answered “greatly affected”. 

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Further efforts to assess student perception of the importance of sleep resulted in the incorporation of a final ‘reaction’ survey question. Students were presented with clinical research that suggests that poor sleep habits, and failure to maintain adequate quantities of sleep are “a predicative sign and symptom of many illnesses, and is associated with substantial decrements in the quality of life” and asked to evaluate the impact that this knowledge had on them. Fifteen percent (56 students) of participants reported “no influence at all”; 18.7% (68 students) reported “some influence”; 29.7% (108 students) reported that the information “influenced” their perception; 20.6% (75 students) reported that they were “very influenced”; and 15.7% (57 students) reported that the research impacted them “a great influence”.

CHAPTER V

CONCLUSION

Limitations and Recommendations

Any differences between the findings of this study and those previously found in past research could be due to a number of factors. Ultimately, the results of this study must be comprehended with strong regard for the limitations inherent in its design. The relatively low number of participants (when one considers the amount of current student enrollment), and the fact that the survey incorporated measures not only from an established indicator, but also those which were developed for the purpose of investigating the hypotheses (yet may not have appropriately measured the study variables) are two factors that should be considered. Only two questions were utilized from the Pittsburgh Sleep Quality Index for purposes of the survey, because they were more behaviorally related than health-based. Upon contemplation, it may also be that the actual hypotheses are inappropriate: there are numerous factors that factor into the equation that is one’s GPA. Perhaps individuals within this particular population do not require the recommended amount of sleep - after all, it is merely a recommendation for the ‘average’ person and their own requirements.

Considering the variable of sleep from the “past 30 days” could also be considered problematical, because sleep is a variable that can change drastically over the course of time. The survey failed to ask participants when or how they were sleeping. Some students reported that they reached the recommended quantity of sleep, but that it was not good quality. This may be because they reach the recommended quantity by
taking regular naps, or sleeping at odd hours of the day (for example, 4am until 12noon), rather than sleeping at ‘normal’ times to promote a healthy sleep schedule. Another fact to consider is that Student Residents have the luxury and convenience of a nearby bed to take naps in between classes: commuter students do not. This convenience may be helping Student Residents to achieve their recommended quantity of sleep. It would therefore be insightful to repeat the study with the addition of questions that address these issues to investigate sleep patterns and trends further.

When it came to composition of the study’s population, an overwhelming majority of respondents, 70.6%, were female (n=257). Although the gender distribution of the study was skewed to accurately reflect the greater student population of females at the study institution (7,018 undergraduate females compared to 6,351 undergraduate males attended YSU in the Fall, 2011 semester), the comparative percentages in this particular study are overwhelmingly skewed, which is a definite limitation when it comes to extending the results (YSU Office of Institutional Research & Policy Analysis, 2011). Other methodological limitations include the fact that while the study sample have fairly even representation of all class ranks, the sample was composed primarily of senior students 31.3% (n=114), and the mean age of students in the study was older than expected at 25.4 years. This age is not indicative of typical residence hall students, who are usually younger, freshman students, nor is it entirely representative of the typical YSU student, who has an average age of 24.5 years, yet a median age of just 21 years old (YSU Office of Institutional Research & Policy Analysis, 2011). This may limit generalizability to all different groupings of college students. It is the educated guess of the researcher that the high percentage of senior student involvement may have been a
result of senior students understanding of the value of participating in and supporting scientific research in comparison to their younger counterparts.

Another study limitation exists in the measurement of GPA, self-reported GPA was not independently checked against college transcripts, but was relied on through subject’s good faith. It is also worth considering that while the measure of cumulative GPA is something that is created and calculated over the course of the academic experience, an outcome for performance that is more time-sensitive may be the measurement of semesterly GPAs, a direct measurement of the academic success at a specific point in time. Average GPA of the participant population (3.39/4.0) was significantly higher than the mean GPA of the undergraduate student body at the institution (2.75/4.0), which once again suggests that those students who are more academically focused and successful were the type of student to participate in the study (YSU Office of Institutional Research & Policy Analysis, 2011).

As mentioned earlier, this was a single-institution study that only represented a sample of students. While the study announcement and survey link was sent out to the institution’s entire student body of approximately 14,500 students, only 411 initially responded, so it is worth considering the rate of return, and just how many students actually regularly check their student email accounts. Therefore, a limitation exists in the population itself; the participants in question consisted of college students from Ohio’s Northeast, which is a constraint geographically when one wishes to try to extend and generalize the findings to other college students in the United States. To reach a more holistic picture of this phenomenon and how it affects success of American students, researchers at other institutions could build on this study. The more that institutions
participate, the more likely it is that an accurate snapshot of the study relationship will be formed.

Regardless of the amount and quality of sleep as reported by the particular population in this study and how these factors affect their academic success, this research area continues to be of interest. Research findings examined in this study not only suggest the relationship between sleep and academic success exists, but also the alarming extent to which this relationship continues to perpetuate itself among the college students of America today.

Conclusion

This section considers the implications of this research study. A statistically significant relationship between sleep quantity and academic success was identified among the study population. These results not only have important implications for students, but also for student affairs professionals and college educators alike.

Several studies evaluating the neurological and psychiatric importance of sleep among teens and younger adults indicate its importance in creating new pathways to sections of the brain responsible for organization and planning, as well as its significance as a restorative function. Sleep not only has considerable associations with cognitive development, it is also important for the immediate safety and behavior of the individual. The consequences of inadequate sleep extend further than feelings of lethargy and irritability: several studies have found associations between poor quality/quantity sleep and increased substance/supplement abuse. The literature also sustains relationships between reduced/poor quality sleep and significant decreases in physical health and
overall mood. Any combination (or one) of these products should be enough of a drive to make students wish they had, or are, sleeping more while in college, let alone the impact that sleep can have on overall academic performance and information retention.

To be reasonable, it is important to consider the students who believe that getting adequate sleep will result in missed opportunities and fun adventures that combine to create the college ‘experience’. It is undeniable that if these students were getting the recommended quantity of sleep then yes, they most likely would be forfeiting some ‘fun’ experiences. Combine this ‘quest’ for the college experience again, with the given that college students have to juggle many commitments: school, work, extra-curriculars, relationships, and sometimes even families, and it becomes clear that students face a never-ending onslaught of decisions that are usually based more on what to achieve in their waking hours than when to sleep. While the results suggest that the majority (approximately 90%) of students understand the importance of sleep, the results also suggest that despite this perception, students aren’t getting the recommended amount of sleep. Pop culture that this college demographic is exposed to doesn’t help in reinforcing the importance of sleep either. Popular movies and advertising ridicule the choice for healthy sleep, instead favoring alternatives such as caffeine stimulants, relay the message that students can “do it all” with these unhealthy and potentially dangerous substitutes.

Study results reveal that the only group in the research population to receive an average quantity of sleep in the recommended amount was those students living in the Residence Halls. Yet the fight for sleep is not a lost cause- the solution is education and support. This same group of students also had the highest mean cumulative GPA, which perhaps suggests that the extra resources and support this group receives as a result of
living on campus, helps them to stay focused on the track to academic success.

Providing support by inviting students to discuss sleep issues may identify potential solutions to the issue, such as creative scheduling to increase efficiency of time management, healthy ways to manage stress, as well as ideal ways to create environments conducive to sleep. Furthermore, such discussion can also potentially act as the much needed gateway topic to address deeper, more sensitive secondary issues such as mental health with college healthcare professionals. Health advocates and experts within this field of academia have shown that education can influence students. With the support of former colleagues at the University of Arizona, Dr. Orzech received promising results from a campus-wide media intervention that cost less than $2,500 and improved the sleep habits of approximately 10 percent of students attending the university. The campaign included the campus-wide display of posters, student newspaper advertisements, as well as a “Go to Bed SnoozeLetter”, that emphasized taking time to unwind and de-stress; creating a cool, dark environment conducive to sleep; being prepared for class the next day; maintaining a proper diet; and exercising at some point during each day. From a practitioner standpoint, Orzech and her team learned that a campus-wide campaign relatively modest in cost can still yield significant results (Orzech, Salafsky & Hamilton, 2011). Brown and Buboltz (2002) have also paved the way with a useful foundation in this regard, highlighting the key elements for such a student sleep education campaign.

While they face consequences because of it, many students can at least pass classes without getting enough sleep. However, in light of these consequences, especially those pertaining to mental health, it is increasingly important that individuals facing additional issues academically, psychologically, and physiologically, are given
additional support and direction in regards to improving their sleeping habits. Students who realize and understand the importance of sleep in relation to academic success and mental health are already at an advantage within a culture that considers pulling an “all nighter” a rite of passage. While sleep requirements vary from individual to individual, both the research and the results suggest that more sleep is needed among this population. However in order to take full advantage of the benefits that a healthy sleep schedule can offer, students need not only consider sleep quantity, but also sleep quality. Student healthcare officials and educators need to take action and create an environment that is encouraging and supportive of sleep and its importance alongside the competing pressures of advertising and the hectic nature of student schedules. It is the hope that this research has aided in raising awareness of a debatably national (and possibly, global) phenomenon facing college students of today, and will spur others to campaign for an issue that is definitely nothing to yawn at.
REFERENCES


Eliasson, Lettieri and Eliasson (2009) Early to bed, early to rise! Sleep habits and academic performance in college students. Sleep Breath, 14: 71-75.


APPENDICES
APPENDIX A

HUMAN SUBJECTS APPROVAL

November 28, 2011

Dr. Salvatore Sanders, Principal Investigator
Ms. Olivia Arnold, Co-investigator
Department of Health Professions
UNIVERSITY

RE: HSRC Protocol Number: 065-2012
Title: Nothing to Yawn At: A Study Assessing the Importance of Sleep Habits to
        Academic Student Success

Dear Dr. Sanders and Ms. Arnold:

The Institutional Review Board has reviewed the abovementioned protocol and determined that
it is exempt from full committee review based on a DHHS Category 2 exemption.

Any changes in your research activity should be promptly reported to the Institutional Review
Board and may not be initiated without IRB approval except where necessary to eliminate hazard
to human subjects. Any unanticipated problems involving risks to subjects should also be
promptly reported to the IRB.

The IRB would like to extend its best wishes to you in the conduct of this study.

Sincerely,

Peter J. Kasivinsky
Dean, School of Graduate Studies and Research
Research Compliance Officer

cc: Mr. Joseph Mistovich, Chair
Department of Health Professions
APPENDIX B

INFORMED CONSENT

Nothing to Yawn at:

A Study Assessing the Importance of Sleep Habits for Academic Student Success

Dear Sir or Madam,

I am a graduate student at Youngstown State University working on my master’s thesis in an attempt to investigate the relationship between sleep habits and academic performance among the college student population. Dr. Sanders is serving as my thesis advisor for this study. Your involvement in this project will be used to determine the impact that sleep habits can have on academic pursuits while also contributing to the body of knowledge of this research interest. The results will be handled in a professional manner. The information you provide is being collected without identifiers, so your identity cannot be linked to the results of the survey.

It will take most participants about 10 minutes to complete this survey. We anticipate no risks to participants in this survey research.

Your participation in this research project is voluntary and you may withdraw from participating in the study by not submitting your survey, or by submitting a survey that is not completed. We understand your time is valuable. Your participation in this research project will help us gain a better understanding of factors affecting student success, and will provide grounds to potentially suggest that intervention programs for sleep disturbance in this population should be considered. We greatly appreciate your participation and support.

Please take a few minutes to complete the survey at this link:

http://FreeOnlineSurveys.com/rendersurvey.asp?sid=kdl1rybzyo95py2938193

Please complete and submit your survey by Saturday, December 17, 2011. By returning the questionnaire you agree that you are 18 years of age or older, have read the above description and voluntarily consent to participate in this research project.

If you have any questions regarding this research project please contact:

Dr. Sal Sanders, Faculty Advisor
Youngstown State University

For other questions, or concerns, please contact Dr. Edward Orona, Director of Grants and Sponsored Programs.
From: Olivia Arnold  
Sent: Tuesday, June 21, 2011 9:07 PM  
To: Buysse, Daniel  
Subject: Request of permission to utilize questions from the PSQI

Dr. Buysse,

I am a graduate student from Youngstown State University, and I am writing in request of permission to utilize questions from the Pittsburgh Sleep Quality Index as means of measurement in my pilot study for my pending thesis research. I initially aim to fulfill my research goal of commenting on any relationship between sleep and academic success among American college students, and later, desire to compare these results to college students in Australia to evaluate any cultural disparity. In order to fulfill this research aim, I have identified your index as a superior rating scale, and wish to include items 4 and 6 with the following amendments:

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

[“at night” was omitted due to the varying sleep schedules of some students who may work night shifts and sleep during the day.]

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

The Pittsburgh Sleep Quality Index instrument will be cited appropriately to give credit where it is due.

Thank you for your consideration, I look forward to your reply.

Sincerely,

Olivia Arnold.

----------------------------------------------------------

Olivia Arnold  
Youngstown State University  
The Office of Housing & Residence Life  
Graduate Assistant- Residential Education
Dear Olivia,

You have my permission to use the PSQI as amended for your research study. You can find the instrument, scoring instructions, the original article, links to available translations, and other useful information at www.sleep.pitt.edu under the Instruments tab. Please be sure to cite the 1989 paper in any publications that result.

This copyright in this form is owned by the University of Pittsburgh and may be reprinted without charge only for non-commercial research and educational purposes. You may not make changes or modifications of this form without prior written permission from the University of Pittsburgh. If you would like to use this instrument for commercial purposes or for commercially sponsored research, please contact the Office of Technology Management at the University of Pittsburgh at 412-648-2206 for licensing information.

Good luck with your research.

Sincerely,

Daniel J. Buysse, M.D.
Professor of Psychiatry and Clinical and Translational Science
University of Pittsburgh School of Medicine
APPENDIX D

QUESTIONNAIRE

NOTHING TO YAWN AT:
THE IMPORTANCE OF SLEEP FOR STUDENT ACADEMIC SUCCESS

SURVEY

Subjects must be at least 18 years of age to participate.
Please complete all questions- responses will be kept strictly anonymous.
Thank you for your participation and cooperation in aiding us to meet our research goals.

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

During the past month, how many hours of actual sleep did you get on average in a 24-hour period? (This may be different than the number of hours you spent in bed.)
   Hours of sleep per 24 hours______

During the past month, how would you rate your sleep quality overall?
   Very good _______
   Fairly good _______
   Fairly bad _______
   Very bad _______

On a scale of 1 to 5, with 1 being ‘Not important at all’ to 5 being ‘Extremely important’, how important do you feel sleep is in regard to your academic success?
   1 Not important at all____
   2____
   3____
   4____
   5 Extremely important____

What factors influence the amount of sleep you get?
   Study schedule______
   Work schedule______
   Social life______
   Level of stress/anxiety______
   Facebook or social media______
   Caffeine______
Overall level of distraction in residence hall______

Please rank the following (1 through 7) in order of influence regarding the amount of sleep you get, with ‘1’ corresponding to the factor that holds most influence and ‘7’ the least influence.
- Study schedule______
- Work schedule______
- Social life______
- Level of stress/anxiety______
- Facebook or social media______
- Caffeine______
- Overall level of distraction in residence hall______

How often do you use over-the-counter stimulants or legal caffeine supplements?
- Not at all______
- Sometimes______
- Often______
- All the time______

On a scale of 1 to 5, with 1 being ‘Not important at all’ to 5 being ‘Extremely important’, how important is formal education to you?
- 1 Not important at all______
- 2______
- 3______
- 4______
- 5 Extremely Important______

What are your primary motivations for academic success (check all that apply)?
- Importance of education______
- Competitive nature/competition with others______
- Love of learning______
- Parental influence______
- Career aspirations______
- Perceived societal pressure______
- Economic aspirations______
- Other______ Please Specify: ______________________________________

On a scale of 1 to 5, with 1 being ‘No affect at all’ to 5 being ‘Greatly affected’, to what extent is your sleep affected by the activities you do with your friends/peers?
- 1 No affect at all______
- 2______
- 3______
- 4______
- 5 Greatly affected______

What is your gender?
Male____ Female____

What is your age?___

What is your class rank?
   Freshman____ Sophomore____ Junior____ Senior____ Graduate student____

How many credit hours of coursework are you taking this semester?____

What is your current overall GPA (on a 4.0 scale) _____

What is your academic major?______________

Where do you live?
   Residence Hall___ Off-Campus Apartment or House___ Family Home___

How many hours outside of scheduled class hours do you devote to study or homework assignments each week?____

How many hours do you work each week?____

Clinical research suggests that poor sleep habits, and failure to maintain adequate quantities of sleep are “a predictive sign and symptom of many illnesses, and is associated with substantial decrements in the quality of life” (Lund, Reider, Whiting & Prichard, 2009). On a scale of 1 to 5, with 1 being ‘No influence at all’ to 5 being ‘A great influence’, to what extent will knowing this information influence you to get adequate sleep?
   1 No influence at all____
   2____
   3____
   4____
   5 A great influence____

## APPENDIX E

### TABLES

Table 1. Summary of Selected Research Involving Variables of Interest

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Standard Deviation</th>
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<td>363</td>
<td>25.4</td>
<td>18</td>
<td>67</td>
<td>9.487</td>
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<td>Hours of sleep in a 24-hour period</td>
<td>357</td>
<td>6.5</td>
<td>2</td>
<td>12</td>
<td>1.356</td>
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<tr>
<td>Credit hours this semester</td>
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<td>13.7</td>
<td>3</td>
<td>21</td>
<td>3.231</td>
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<tr>
<td>Hours of work each week</td>
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<td>0</td>
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<td>14.674</td>
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<tr>
<td>Hours outside of class devoted to study/assignments</td>
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<td>15.2</td>
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<tr>
<td>GPA</td>
<td>347</td>
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<td>4.0</td>
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Table 2. Gender of Participants

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<th>Gender</th>
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<td>Male</td>
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<td>Female</td>
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<td>70.0</td>
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Table 3. Sleep Quality of Participants

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<thead>
<tr>
<th>Sleep Quality</th>
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<th>Percent</th>
</tr>
</thead>
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<tr>
<td>Very Bad</td>
<td>22</td>
<td>6.0</td>
</tr>
<tr>
<td>Fairly Bad</td>
<td>200</td>
<td>54.5</td>
</tr>
<tr>
<td>Fairly Good</td>
<td>123</td>
<td>33.5</td>
</tr>
<tr>
<td>Very Good</td>
<td>20</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>365</td>
<td>99.5</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>367</td>
<td>100.0</td>
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</tbody>
</table>
Table 4. Over-the-Counter Stimulants or Legal Caffeine Supplement Use

<table>
<thead>
<tr>
<th>Use</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>Not At All</td>
<td>228</td>
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<tr>
<td>Sometimes</td>
<td>90</td>
<td>24.5</td>
</tr>
<tr>
<td>Often</td>
<td>23</td>
<td>6.3</td>
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<tr>
<td>All the Time</td>
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<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>361</td>
<td>98.4</td>
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<td>6</td>
<td>1.6</td>
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<td>Total</td>
<td>367</td>
<td>100.0</td>
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Table 5. How Important Formal Education is to Participants

<table>
<thead>
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<th>Rank</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>Somewhat Important</td>
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<td>.5</td>
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<tr>
<td>Important</td>
<td>11</td>
<td>3.0</td>
</tr>
<tr>
<td>Very Important</td>
<td>54</td>
<td>14.7</td>
</tr>
<tr>
<td>Extremely Important</td>
<td>298</td>
<td>81.2</td>
</tr>
<tr>
<td>Total</td>
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<td>.5</td>
</tr>
<tr>
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<td>367</td>
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</tbody>
</table>
Table 6. Extent Participants’ Sleep is Affected by Social Activities with Friends

<table>
<thead>
<tr>
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<th>Frequency</th>
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<tr>
<td>No Effect At All</td>
<td>64</td>
<td>17.4</td>
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<tr>
<td>Somewhat Affected</td>
<td>83</td>
<td>22.6</td>
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<tr>
<td>Affected</td>
<td>109</td>
<td>29.7</td>
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<tr>
<td>Very Affected</td>
<td>63</td>
<td>17.2</td>
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<tr>
<td>Greatly Affected</td>
<td>46</td>
<td>12.5</td>
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<tr>
<td>Total</td>
<td>365</td>
<td>99.5</td>
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<td>Missing</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Total</td>
<td>367</td>
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Table 7. Class Rank

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Freshman</td>
<td>93</td>
<td>25.3</td>
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<tr>
<td>Sophomore</td>
<td>72</td>
<td>19.6</td>
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<tr>
<td>Junior</td>
<td>85</td>
<td>23.2</td>
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<tr>
<td>Senior</td>
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<td>31.1</td>
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<td>Total</td>
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<td>Missing</td>
<td>3</td>
<td>.8</td>
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<tr>
<td>Total</td>
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<td>100.0</td>
</tr>
<tr>
<td>Impact</td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>No Influence at All</td>
<td>56</td>
<td>15.3</td>
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<tr>
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<td>Very Influenced</td>
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<td>A Great Influence</td>
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<td>Total</td>
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Table 9. Independent Samples T Test- Grade Point Average Group Statistics Based on Participants’ Sleep Quantity

<table>
<thead>
<tr>
<th>Sleep Group</th>
<th>N</th>
<th>Mean GPA</th>
<th>t</th>
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<tbody>
<tr>
<td>Recommended Sleep</td>
<td>164</td>
<td>3.492</td>
<td>2.694*</td>
<td>337</td>
</tr>
<tr>
<td>(0.6156)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Not Recommended Sleep</td>
<td>175</td>
<td>3.311</td>
<td>2.694*</td>
<td>335.734</td>
</tr>
<tr>
<td>(0.6179)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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Note. *= p < .05. Standard Deviations appear in parentheses below means.
Table 10. Grade Point Average Group Statistics Based on Participants’ Sleep Quality

<table>
<thead>
<tr>
<th>Quality Group</th>
<th>N</th>
<th>Mean</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Quality Sleep</td>
<td>139</td>
<td>3.247 (.6992)</td>
<td>-3.661*</td>
<td>345</td>
</tr>
<tr>
<td>Bad Quality Sleep</td>
<td>208</td>
<td>3.490 (.5380)</td>
<td>-3.479*</td>
<td>243.400</td>
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</table>

Table 11. Grade Point Average Group Statistics Based on Participants’ Sleep Quality and Quantity

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>t</th>
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<tbody>
<tr>
<td>Recommended Quantity and Good Quality</td>
<td>30</td>
<td>3.344</td>
<td>-.455</td>
<td>345</td>
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<tr>
<td></td>
<td></td>
<td>(.8921)</td>
<td></td>
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<tr>
<td>Insufficient Quantity and Bad Quality</td>
<td>317</td>
<td>3.398</td>
<td>-.324</td>
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<td></td>
<td></td>
<td>(.5878)</td>
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*Note: No statistical significance was found*
Table 12. Participants’ Perception of the Importance of Sleep

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<tr>
<th>Participants’ Perception</th>
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Table 13. Intercorrelations Between Participant Attributes and Study Variables

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<th>10</th>
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<td>Qual.</td>
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<td>.38**</td>
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<td>.04</td>
<td>-.02</td>
<td>-.19**</td>
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<td>.15**</td>
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<td>Class</td>
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**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).