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# Screen Time and Sleep Condition among Selected College Students

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Screen Time and Sleep Condition among Selected College Students

By

Angela L. Sargent

A Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science  
In  
Community Health Education

Minnesota State University, Mankato

Mankato, Minnesota

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Screen Time and Sleep Condition among Selected College Students

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This thesis has been examined and approved by the following members of the student's committee.

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Dr. Judith Luebke      Committee Member

## Abstract

## Screen Time and Sleeping Condition among Selected College Students

Angela Sargent, M.S. Minnesota State University (MSU) Mankato, 2017

College students underestimate the value of adequate sleep. The purpose of this research was to measure the relationship between students' sleep condition and screen time usage one hour prior to bed. The participants in this study were undergraduate students, from ages 18 to 25 years of age, enrolled in spring semester 2017 at a Midwestern University. A 15-item paper survey was distributed to participants for this research (55.7% female; 42.8% male).

This research found that sampled undergraduate students' amount of sleep each night ranged from 4 to 10 hours and averaged 6.9 hours of adequate sleep each night. This finding is consistent with previous literature that showed nearly 70% of college students receive five to seven hours of sleep each night (Gutierrez, 2002). Further, 92.9% of sampled students always or very often used electronic devices before bedtime. When measuring participants' relationship between their overall sleep condition and screen time usage, no significant difference was found [ $r(321) = -.010, p = .857$ ]. There also was no significant difference found when screen time usage before bedtime and hours of sleep received each night was compared [ $r(322) = .002, p = .966$ ].

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## **Chapter One: Statement of the Problem**

### **Introduction**

Many college students wake up each morning feeling tired and unmotivated to go to class (Owens, Belon and Moss, 2010). College students across the nation seem to have underestimated the power of a good night's rest (Carskadon, 1990). Medical professionals recommend seven to nine hours of sleep each night for college students to function properly (Hysing et al., 2015). Gutierrez (2002) states for sampled college students, 70% reported receiving only five to six hours of sleep on the weekdays, only 28% reported receiving seven to eight hours, while only 2% reported receiving nine hours each night.

Sleep deprivation recently has become a public health concern throughout the years with the trends of inadequate sleep, continuing to increase (Center for Disease Control and Prevention, 2015). In 1998, 35% of young adults reported obtaining eight hours of sleep each night (Centers for Disease Control and Prevention, 2011). Since then, the same survey was distributed in 2008 and the number of young adults reported obtaining eight hours of sleep each night decreased to 28% (Centers for Disease Control and Prevention, 2011). The long list of contributing factors continues to grow, but specifically screen time and excess use of light-emitting devices remain common factors for inadequate sleep each night among college students (Hysing et al., 2015).

## **Statement of the Problem**

The problem of excess screen time among college students contributes to not getting the recommended amount of sleep each night (Eggermont, 2006). Inadequate sleep continues and becomes more problematic as technological advancements and use of electronic devices continue to increase in the college setting (Pearson, 2015). Electronic devices are an integral part of college students' daily lives for both academic needs and social and leisure activities (Pearson, 2015). Today, it is not uncommon for students to utilize electronics to complete each of their class assignments (Pearson, 2015). In fact, nine in ten college students use a laptop or smartphone on a regular basis (Pearson, 2015). While the use of technology has its benefits, researchers are discovering that excess screen time can have a negative impact on students' sleep schedule (Czeizler, 2008). The excess use of electronic devices has the potential to negatively affect circadian rhythms within the human body and contribute to chronic sleep deprivation (Czeizler, 2008). Screen time usage among college students is here to stay, due to academic requirements and the high priority to stay socially connected through electronic devices (Pearson, 2015). By minimizing the use of such devices before bedtime, the trend of delayed bed times in college students can improve (Thorleifsdottir, Bjornsson, Benediktsdottir, Gislason and Kristbjarnarson, 2016).

## **Significance of the Study**

The literature regarding inadequate sleep and excess screen time on college students is limited. The majority of the existing studies focus on children as the studied sample. Thorleifsdottir and colleagues (2016) identified that minimizing electronic

devices before bedtime can improve high school students' sleep condition. Pagani (2010) found that excess screen time among children has little cognitive benefits and can lead to difficulties once the child enters grade school. While these studies are beneficial in understanding the impact of screen time on children, there are very few studies specifically focusing on college students. This current research studied college students' sleep and screen time usage before bed. It is hoped that the findings provide insight into the college student sample and the potential impact screen time may have on their sleep.

For this research project, the sample was college students, both male and females, ages 18-25 at a Midwestern University. The purpose of this research was to measure the relationship between students' sleep condition and screen time usage one hour prior to bed. Considering the research gaps in the literature, it is the researcher's desire that this research project inspires other studies to be conducted regarding college students' screen time usage and sleep conditions.

The role of health educators is to identify and establish the most effective ways to achieve health behavior change (Glanz et al., 2008). The results of this research may promote better sleep hygiene habits among college students. The improvement of sleep hygiene is shown to improve overall health and academic success among college students (Buysse, Barzansky, Dinges, 2003; University of Georgia, 2016).

## **Research Questions**

The research questions for this study focused on the behaviors of college students' screen time usage one hour prior to bedtime and how can affect their sleep condition. The research questions answered are as followed:

1. What is the average amount of sleep sampled college students get each night?
2. What is the reported sleep condition stated by sampled college students?
3. What is the reported screen time usage (one hour before bedtime) sampled college students have each night?
4. What is the relationship between screen time use (one hour before bedtime) and sleep condition each night?

## **Limitations of the Study**

The following were limitations of this research project:

1. The limited amount of time to collect data.
2. Participants may not have accurately recall behaviors related to screen time use and hours of sleep received each night.
3. Participants may have answered questions in a socially desirable manner.
4. A lack of understanding of the definitions and terminology used within the survey may also affected participants' answers.
5. The responses from participants may not be representative of the campus population.

6. Two items on the survey may have been potentially confusing to participants due to the item construction; however, the instrument has been validated and published from previous studies. Thus, the researcher left the questions as is to maintain content validity and scoring system.

### **Delimitations of the Study**

The following were delimitations of this research project:

1. The geographic area was limited to one United States Midwestern campus.
2. A period of one week data were collected over.
3. The convenience sample of college students used for this research.

### **Assumptions**

Assumptions of this research project include:

1. Participants responded truthfully and accurately to the survey.
2. Recall of participants' screen time usage and sleep condition was accurate.
3. Participants who did not feel comfortable taking the survey, at any point during the survey process would ceased participation.
4. The survey adequately measured students' screen time and sleep condition.

### **Definition of Terms**

**Light-emitting device/ diode (LED):** "A light source which emits light when an electric current is activated or used" (TechTarget, 2016, p 1).

**Screen time:** “The time spent using a device such as a computer, cell phone, television or game console one hour prior to bedtime” (English Oxford Living Dictionary, 2016, p 1). For this study, screen time was measured by how often the participant used any electronic device the hour before bedtime.

**Sleep condition:** For this study, sleep conditions were be measured by the following:

1. The time it takes the participant to fall asleep at bedtime.
2. The amount of time the participant is awake at night.
3. The number of nights per week the participant has troubles with sleep.
4. The quality of sleep the participant received.
5. The extent that poor sleep affected the participants’ mood, energy or relationships
6. The extent that poor sleep affected participants’ concentration, productivity or ability to stay awake.
7. The extent poor sleep troubled the participant in general.
8. The time period the participant had a problem with sleep.

The scores on the survey indicate the participants’ diagnostic sleep criteria including but not limited to insomnia, sleep disturbance and quality of sleep (Espie, et al., 2014). A high sleep condition scored indicated better overall sleep received by the participant. For further clarification on how sleep condition was measured, see Appendix C.



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

### **Introduction**

The purpose of this research was to measure the relationship between screen time usage and sleep condition among a sample of college students attending a Midwestern University. Existing literature regarding screen time and sleeping condition among college students is limited. The review of literature begins with discussion on the Social Cognitive Theory. Next, the importance of adequate sleep and typical sleeping patterns among college students are described. Main factors that lead to inadequate sleep among college students follows. Then, consequences of inadequate sleep for college students is addressed. Lastly, existing sleep promotion campaigns that may be explored as a solution to this health concern are described.

### **Social Learning Theory**

The Social Learning Theory was developed to provide “a framework for understanding, predicting and changing human behavior” (Bandura, 2001, pp. 15, 26). This theory suggests that individuals can learn through observation, modeling and imitation (Bandura, 1989). Bandura (1989) explained that an individual’s health choices are influenced by a combination of personal factors, environmental factors and behaviors. The theory suggests that each of these factors influence one another in an individual’s life (Bandura, 1989). The constructs of reciprocal determinism, self-control and reinforcement could be applied as underlying constructs for this research study.

Reciprocal determinism was used to describe a person's behavior by both influences from personal factors and their social environment (Bandura, 1989). For this research, one's expectations, beliefs, and goals toward electronic devices use before bed may have an influence on whether it affects their sleep. For example, if an individual has strong beliefs that staying connected to friends via electronic devices, at all times of the day, is important or beneficial to their social environment, then they may not be willing to reduce screen time before bed. In other words, their value of staying socially connected overrides their belief that adequate sleep is necessary. Reciprocal determinism also refers to the individual shaping his or her environment as well. For example, if an individual lives in an environment that has electronic devices near the bed, then he or she will likely adapt the behavior of using the electronic devices before bed.

The same is true when the construct of self-control is applied to this research. Self-control is how a person regulates his or her behavior by setting a goal for the behavior change (Bandura, 1989). For example, a student may establish a goal to reduce screen time before bedtime to ensure adequate sleep. This established goal provides an opportunity for the student to practice goal-setting, problem solving and self-reward, which are all concepts discussed in the Social Learning Theory (Bandura, 1989). Lack of self-control due to screen time habits before bedtime may also negatively affect a person's sleep hygiene.

Reinforcement is a term used to describe the received response to a person's behavior that increases or decreases the likelihood of the behavior to reoccur (Bandura, 1989). For this research, reinforcement may be to establish a set bedtime schedule each

night to ensure adequate rest is accomplished. If the student finds that there are benefits to getting adequate rest each night, then he or she will reinforce this behavior each night. Negative reinforcement may also play a role in behavior change (Bandura, 1989). If an individual has a set bedtime each night, but receives social pressure to be online gaming or communicating online for social reasons, then the individual may alter his or her sleep schedule to continue to be connected to others electronically.

Bandura (1989) states that three psychological processes are needed in order for an individual to change their behavior. The individual must first see the modeled behavior. This modeled behavior for this research would be getting adequate sleep each night. Next, the individual then must consider how they can apply this modeled behavior to their own life. This step may require resources and identifying barriers to adequate sleep in order to change behavior. Finally, the plan for the behavior change must translate into an applicable action (Bandura, 1989). This means that the plan must be feasible to complete and allow the individual to maintain behavior change. Health educators can assist with behavior change and promote positive sleep hygiene habits among college students (Becker et al, 2008). Health educators can help identify barriers to adequate sleep and provide individuals with educational resources on positive sleep hygiene habits. One potential barrier to positive sleep hygiene may be the use of screen time one hour prior to bedtime (Hysing et al., 2015).

### **Importance of Adequate Sleep**

Sleep plays a vital role in everyday functions, overall health and well-being. It is an essential component to productivity, fighting illness, and maintaining a stable overall

quality of life (National Heart, Lung, and Blood Institute, 2012). The consequences of inadequate sleep are problematic to one's health (Hysing et al., 2015). Without sleep, the human body's ability to fight off infections and diseases becomes impaired, leading to the development of an illness (University of Georgia, 2016). Besedovsky, Lange, and Born (2012) studied how adequate sleep supports immune function and found that sleep and the circadian system are strong regulators of the immunological process. When adequate sleep is established, a complex chain of physiological events occurs within the human body and is believed to support the formation of long-lasting immunological cell memory (Basedovsky, Lange, Bord & Pflugers, 2012). When the immune cells within the human body form a seamless memory, an individual's risk of getting sick becomes significantly less compared to those who have not gotten adequate sleep (Basedovsky, Lange, Bord and Pflugers, 2012).

Mayo Clinic Health System researchers (2016) further explain the cell memory process by describing how one's immune system releases proteins called cytokines during adequate sleep. Cytokines are produced by immune cells like macrophages, B-lymphocytes, T lymphocytes and mast cells (Mayo Clinic Health System, 2016). They serve as a natural defense mechanism within the human body that assist with fighting viruses and illnesses, as well as repairing any cells that may be damaged or wounded (Nathan & Sporn, 1991). Without the development of cytokines during sleep, the human body is more susceptible to illnesses (Mayo Clinic Health System, 2016). Illnesses such as upper respiratory infections, the common cold virus and even pneumonia are just some of the health problems students face when not getting adequate sleep (Mayo Clinic

Health System, 2016). Though an increased risk of illness is strong evidence for value of adequate sleep, many students continue to be sleep deprived (Hysing et al., 2015).

When sleep is continuously deprived, an individual's risk of chronic diseases also rises (Mayo Clinic Health System, 2016). Obesity, diabetes, cardiovascular disease and chronic obstructive pulmonary disease are some of the complicated health concerns an individual may face with long term sleep deficiency (Mayo Clinic Health System, 2016). These chronic diseases have been linked to premature death rates and are serious concerns to an individual's health (Mayo Clinic Health System, 2016). Mullington, Haack, Toth, Serrador and Meier-Ewert (2009), reported that inadequate sleep increased one's risk of cardiac morbidity and was positively correlated to the development of chronic diseases. In a prospective cohort study, researchers found that men and women who slept less than seven hours per night had an increased risk of mortality compared to those who received seven to eight hours of sleep each night (Bollinger, Bollinger, Oster, & Solbach 2010).

Illnesses and chronic diseases are not the only potential challenges students face when not getting adequate sleep. Students are more likely to feel the stressors from college and everyday life, are at increased risk of mental health illnesses, such as depression and anxiety, and their academic performance may be negatively affected by lower test grades and/or overall lower grade point average due to lack of adequate sleep (University of Georgia, 2016).

It is not uncommon to hear college students state they are overly stressed. Associated Press and mtvU conducted a survey in 2008 finding that one out of every five college

students feel stress frequently or most of the time. Lund, Reider, Whiting and Prichard (2010) measured students' sleep quality and stress, and found that 60% of students from an urban Midwestern University considered themselves poor-quality sleepers. Of that 60% surveyed, 24% indicated stress and tension as significant contributors to poor sleep quality (Lund, Reider, Whiting, & Prichard, 2010). Chen, Wang and Jeng (2006) found specifically that adequate sleep may be a protective factor against an unhealthy lifestyle and stress. A significant negative association was found between inadequate sleep and the ability to utilize effective stress management techniques (Chen, Wang and Jeng, 2006). Of sampled students from a Midwestern University, 44.6% experienced more than average stress within the past year (American College Health Association, 2016). Students from also reported that only 11.8% felt they received adequate sleep to feel rested in the morning (American College Health Association, 2016).

Students frequently state they cannot sleep because of stress, but getting the recommended amount of sleep each night can actually prevent stress from occurring (Sapolsky, 2004). A chain of chemicals induces the release of adrenaline and other stress hormones when an individual is experiencing a stressful situation or event (Sapolsky, 2004). Furthermore, Dr. Robert Sapolsky, a Stanford professor and expert on stress, claims there is evidence that adequate sleep actually blocks the release of this chain of chemicals and thus the individual does not feel the effects of being stressed (Sapolsky, 2004). Simply put, sleep is literally a natural defense mechanism within the body to manage stress.

Although some stress can actually be beneficial, chronic stress and lack of adequate sleep can further contribute to mental illnesses (Maldonado, 2014). Mental illnesses are prevalent on college campuses across the nation. Specifically, at Minnesota State University, Mankato 82.8% of the student population reported feeling overwhelmed and 40.4% reported feeling hopeless within the past twelve months (American College Health Association, 2016). The American Psychological Association (2013) estimates that 41% of college students experience anxiety, while 36% experience depression during their college career. These findings are consistent with the data reported from students at selected university, with 52.7% reporting overwhelming anxiety and 28.9% experiencing depression (American College Health Association, 2016).

Though mental health concerns continue to be prevalent on college campuses, sleep can actually help reduce the risk of mental illnesses (American Academy of Sleep Medicine, 2010). Benca, Obermeyer, Thisted, and Gillin (1992) suggested that adequate sleep can be a protective factor against the onset of depression. Throughout the practices of modern medicine, insomnia and lack of sleep have been viewed as symptoms of mental illnesses (Mayo Clinic Health System, 2015). It was not until recently, where studies suggested that sleep problems may actually be a contributing factor to the development of some mental health conditions (Harvard Health, 2016a). This newly discovered correlation suggests that adequate sleep not only fosters mental and emotional resilience, but also may improve typical symptoms of mental illnesses (Harvard Health 2016).

## **Sleep Patterns among College Students**

Sleepiness is defined as “the inability or difficulty in maintaining alertness during the major wake period of the day” (American Academy of Sleep Medicine, 2012, p. 2). It is estimated that approximately fifty to seventy million US adults are diagnosed with a sleep disorder and nearly forty percent of all American adults are sleep deprived (CDC, 2015; National Geographic, 2014). According to the National Sleep Foundation (2015), adolescents and young adults require an average of eight to ten hours of sleep each night to function adequately in school and everyday activities. Researchers at the University of Georgia (2016) conducted a study on how much sleep college students actually get. On average, college students typically got 6 to 7 hours of adequate sleep per night (University of Georgia, 2016). The data collected for this study indicated that all-night study sessions were not included or accounted for in this study. Although 28.2% of students at the selected university report sleep difficulties as difficult to handle, only 5% of them view their sleepiness as a major problem (American College Health Association, 2014). The prevalence of sleep disorders and sleep quality in college students was assessed at a large, southeastern public university during the 2007-2008 academic year (Gaultney, 2010). The findings of this study revealed 27% of students were at risk for at least one diagnosable sleep condition (Gaultney, 2010).

A national survey done by the American College Health Association (2012) found that 60% of students report that they are sleepy or tired at least three days a week or more. Further, only about 11% of college students are getting the recommended amount of sleep on a continuous basis (American College Health Association, 2012). The trend



of inadequate sleep is a public health concern that needs to be addressed (Centers for Disease Control and Prevention, 2015).

### **Factors Leading to Inadequate Sleep among College Students**

The Sleep Foundation (2006) states that students ranging from 12 to 25 years of age are at a high risk for sleep deprivation. Becker and colleagues (2008) found that three-quarters of undergraduate college students report sleep problems. In a study done by The National Sleep Foundation (2016), participants were asked to rate the importance of several elements that make their room ideal for sleeping. The respondents listed a quiet, dark room with a cool temperature as the top three elements for adequate sleep (The National Sleep Foundation, 2016). Not surprisingly, the typical dorm room on college campuses generally offers none of those three elements highly sought after for adequate sleep (Flanagan, 2014).

College students also report their academic performance can be impacted by sleep difficulties (American College Health Association, 2016). A total of 19.8% of students from Minnesota State University, Mankato reported their individual academic performance was affected due to sleep difficulties (American College Health Association, 2016). Gomes, Tavares and Azevedo (2011) examined the associations of sleep patterns in undergraduate university students and their academic performance. The researchers found that sleep quality, sleep irregularity and sleep deprivation were significantly associated with academic performance (Gomes, Tavares and Azevedo, 2011). Further explanation of the research study findings shows that the participants who reported adequate sleep also succeeded academically compared to their counterparts who reported

not getting adequate sleep (Gomes, Tavares and Azenvedo, 2011). Dr. Fred Danner, of University of Kentucky, found that the hours of sleep were significantly positively correlated with grade point average in students (American Academy of Sleep Medicine, 2008). Other research done on sleep and academic performance also demonstrates sleep quality and academic performance are closely related (Curcio, Ferrara and Gennaro, 2006).

College students may also benefit greatly by using better study habits (Hershner & Chervin, 2014). The literature suggests that students who attempt all-night study sessions, in hopes for a better grade, are not successful in learning the curriculum (Hershner & Chervin, 2014). Stickgold and Hobson (2000) found that participants who were sleep deprived showed no improvements of academic learning, even two days past the all-night study session. The subjects who were not sleep deprived continued academic performance improvements for the next four days (Stickgold & Hobson, 2000).

Another contributing factor to sleep disturbance among college students is the increased use of light-emitting devices (Jones & Madden., 2002). Electronic devices have been shown to significantly disrupt sleeping patterns (Czeisler, 2008). These devices include cell phones, lap tops and computers, televisions, electronic tablets and video gaming consoles that emit light. A study by the National Sleep Foundation (2011) found that six in ten Americans are using their computers and laptops regularly before trying to go to sleep. Specifically, this study reported 20% of Americans who reported using electronic devices before bed were individuals from 19 to 29 years of age (National Sleep Foundation, 2011).

This screen time usage has been shown to result in disrupted sleeping patterns and push back one's bedtime as far as six hours (Czeisler, 2008). It is estimated that the average American experiences over 8 hours of screen time each day, with a significant increase of twelve hours of screen time in full-time college students compared to individuals who are not enrolled in a college or university setting (Minnesota Department of Health, 2014; Harris Interactive, 2009). In a study by Van den Bulck (2004), individuals who had one or more electronic device(s) in their bedroom appeared to get less sleep on weekdays than individuals who did not have one in their bedroom.

This explanation may be due to the blue light waves that are displayed on the screen of the electronic device (Czeisler, 2008). The literature has shown that screen time disrupts the natural sleeping patterns by sending a surge of wakefulness due to the light wavelengths and causing the body to suppress the production of melatonin (Czeisler, 2008). Melatonin is a naturally occurring hormone that assists the body to facilitate sleep each night (Psychology Dictionary, 2016). In particular, the blue light waves from the electronic devices contribute to insomnia (Harvard Health 2016). Harvard researchers compared the effects of exposure to blue lights versus green lights on the electronic device's screen (Harvard Health, 2016). They found that exposure to blue light suppressed melatonin twice as long as the green light did (Harvard Health, 2016). With the suppression of melatonin, the feeling of sleepiness is delayed and the bedtime may be pushed back later than intended (Harvard Health, 2016).

Cell phone usage also impacts sleeping patterns among college students (Roberts, Yaya and Manolis, 2014). Research by the National Sleep Foundation (2011) found that four in ten Americans bring their cell phones into their bedroom and use them to try to go

to sleep. Students regularly use their smart phones to stay connected to the internet and social media world (Kwon, Kim, Cho & Yang, 2013). Roberts and colleagues (2014) found that 60% of U.S college students are addicted to their smart phone and 77% use their smart phone to access the internet on a daily basis (Brenner, 2012). The term “cell phone addiction” refers to the repeated use of a cell phone, despite the negative consequences suffered (Alavi et al., 2012). A recent study by The PEW Research Center, found that cell phone use had increased by 33% since 2004 (Madden, Lenhart , Duggan, Cortesi and Gasser, 2013). This technological advancement has been shown to interfere with the ability to fall asleep and stay asleep through the night (Irwin, McClintick, Costlow, Fortner, White, & Gillin, 1996). Van den Bulck (2004) has also found cell phone addiction to be associated with sleep delay and irregular sleeping patterns.

Social networking sites have been widely adopted by students across all college campuses. The trend of social media usage among college students is continuing to grow (Oberst 2010). Cotton and Jelenewicz (2006) surveyed freshmen students in residence halls at a mid-Atlantic University and found high rates of social media activity usage online. Peluchette and Karl (2008) further explored the use of social media among college students at a mid-sized university in the Midwest, and found Facebook to be the most heavily used social media networking site.

In a descriptive exploratory research study, done at Johnson and Wales University, the results indicated that 45% of the sampled students spent 6-8 hours each day on various social media sites (Wang, Chen and Liang, 2011). Oberst (2010) found that 73% of students are connected with one or more social media sites. Facebook currently is the

most widely used social network, with over 500 million active users (Peluchette & Karl, 2008). Other popular social media sites are Twitter, Vine, MySpace, SnapChat, LinkedIn and Pinterest. Lenhart, Purcell, Smith and Zickuhr (2010) found that 48% of students have a profile on MySpace, 19% use Twitter regularly and 14% have a profile on LinkedIn. An increase of individuals who have two or more different social networking profiles has increased from 42% to 52% since May 2008 (Lenhart, Purcell, Smith & Zickuhr, 2010).

While social media research studies are popular in literature, very few researchers are studying the negative impacts social media may have on college students' sleep conditions. Researchers at the University of Pittsburgh conducted a study that measured the frequency and volume of social media use (Breus, 2016). The analysis showed a strong correlation between individuals who use social media frequently and experience sleep disturbances (Breus, 2016).

### **Sleep Promotion Campaigns on Campuses**

Becker and colleagues (2008) state college students would benefit tremendously from health education programs that aim to change the trend of poor sleep hygiene. These health education programs should strive to educate individuals on the factors that lead to sleep deprivation (Becker et al, 2008). Researchers from the Institute of Medicine of the National Academies, recommend education on sleep deprivation as a strategy to reduce medical expenses relating to sleep deprivation (Colten & Altevogt, 2006). Specifically, the recommendation is to create more public awareness campaigns regarding the

importance of sleep to students from elementary school to undergraduate college students (Colten a& Altevogt, 2006).

Thankfully, colleges are starting to implement such campaigns on campuses. The Centers for Disease Control and Prevention (2014) awarded funding to The American Academy of Sleep Medicine, for an educational health promotion program from 2013 to 2018. The sleep awareness project provided educational resources about sleep hygiene to students across the United States (Centers for Disease Control and Prevention, 2014). Providing education on the importance of sleep in the college setting is necessary to create more public awareness on sleep conditions (Centers for Disease Control and Prevention, 2014).

Boston College sleep awareness campaign “Sweet Dreams”, launched in June 2016, helped students on campus identify barriers to getting adequate sleep and assisted them with effective coping strategies to help overcome the barriers (Boston College Campus, 2016). Common barriers students identified as interrupting their sleep were the stress of balancing academics, social activities (including social media exposure), and their roommates (Boston College Campus, 2016). The Office of Health Promotion on Boston College Campus (2016) collected responses from individual appointments with students regarding their sleep condition. The students were also given educational materials such as the “Sleep Smart” pamphlet and “Sleep Logs” to assist with overcoming their identified barriers to getting a good night’s sleep (Boston College Campus, 2016). Evaluation on the effectiveness of this sleep campaign is still being calculated, however the campaign has recently been declared the official sleep health campaign for the Office

of Health Promotion on Boston College Campus (2016). Thus indicating the results may be positive in assisting students with identifying barriers to sleeping well (Boston College Campus, 2016).

Similarly, Hampden-Sydney College, a private liberal arts college for men, started their campaign “Sleeping Well” to introduce and reinforce positive sleep habits (Hampden-Sydney College, 2016). This campaign consisted of a variety of educational sessions, sleep consultations and relaxation activities (Hampden-Sydney College, 2016). In the education sessions, minimizing electronic use one to two hours prior to bedtime was recommended for students to follow (Hampden-Sydney College, 2016). Tips, adapted from the National Sleep Foundation (2016), were taught to each of the participants during their sleep consultation, to emphasize the importance of adequate sleep (Hampden-Sydney College, 2016). Some of the tips included advice on minimizing screen time before bedtime, using a bright light by day to manage circadian rhythms and reserving one’s bed for sleep purposes only (Hampden-Sydney College, 2016). While there was not an official evaluation done to determine if the implemented strategies were successful in improving students’ sleep conditions, the overall consensus of the campaign was that awareness on sleep was well-received by students on the campus (Hampden-Sydney College, 2016).

Providence Private College, received a grant to implement their “Get More Sleep” campaign (Doyle & Bornschein, 2013a). Their campaign consisted of a “Sleep Challenge” where 20-40 students were recruited to keep a sleep journal for three full weeks. This journaling exercise was to document and assess the effectiveness of the sleep

campaign on a more detailed level. Students were instructed to document any benefits or challenges they faced during those three weeks, including any particular contributing factors, such as screen time, that may have played a role in inadequate sleep (Doyle and Bornschein, 2013a).

This campaign also consisted of “Flash Nap”, where students in the dining hall congregated and took a nap in order to raise awareness on adequate sleep. Additional posters and handouts about sleep were distributed to students on campus to promote adequate sleep. In efforts to evaluate the effectiveness of the “Get More Sleep”, a survey was sent out to all students on campus one month before the campaign began and one week after the campaign ended (Doyle & Bornschein, 2013a). From the evaluation of pre and post-test survey results, the strategies utilized to promote adequate sleep among the students were considered successful on the campus (Doyle & Bornschein, 2013a). The staff of the Student Health Center found that the campaign reached a total of 20% of the student population (Doyle & Bornschein, 2013a).

The results from the sleep campaign also inspired the staff of the Student Health Center to identify existing apps for students to download on their phone and use for better sleep outcomes (Doyle & Bornschein, 2013b). The app called “Sleep Pillow Sounds” assists students in getting adequate sleep by providing high quality sounds that are proven to help relaxation and sleep to occur (Doyle & Bornschein, 2013b).

In 2011, the University of Arizona engaged the student population on campus with a campus-wide media intervention for improving sleep conditions (Orzech, Salafsky & Hamilton, 2011). The campaign focused on limiting students’ use of electronics before



bedtime and creating more awareness on the benefits of sleep. The educational campaign reportedly assisted 10% of the student population with their sleep conditions and was considered a public health success (Orzech, Salafsky & Hamilton, 2011). The campaign was also relatively inexpensive to implement on the college campus and still five years later most of the campaign posters and educational materials can be found in the Health Promotion Office at the University of Arizona (Orzech, Salafsky and Hamilton, 2011).

The National Institutes of Health reports that college students are one of the most sleep deprived populations (Hershner & Chervin, 2014). Although college students are known for their sleep deprivation, the majority of college campuses do not offer sleep campaigns to their students (Bakotić et al. 2009; Cain et al. 2011; Cortesi et al. 2004; Moseley & Gradisar 2009). Research has shown sleep promotion programs that focus on sleep education have been effective campaigns in improving sleep among students (Bakotić et al. 2009; Cain et al. 2011; Cortesi et al. 2004; Moseley and Gradisar 2009). It is also important to point out that health promotion programs that influence health behavior, are the most successful when theory is utilized within the program or intervention (Glanz et al., 2008).

With the continuity of these beneficial sleeping campaigns, a good night's rest can be taught to college students and expand sleep health promotion and sleep awareness (Centers for Disease Control and Prevention, 2014). Prioritizing sleep, having a set bed time routine every night and eliminating screen time before bed time are just a few approaches that each individual college student can utilize to achieve a restful night of sleep (Centers for Disease Control and Prevention, 2014). These small, but effective

changes, can make students more aware of their sleeping behaviors, get adequate rest each night and allow students to also be more academically successful in the classroom (Buysse, Barzansky & Dinges, 2003).

### **Summary**

In summary, chapter two reviewed the literature on The Social Learning Theory, the importance of sleep, typical sleep patterns among college students, factors leading to inadequate sleep, and sleep promotion campaigns on college campuses. Although there are numerous contributing factors of sleep deprivation among college students, the literature suggests that sleep promotion campaigns can assist students' with identifying barriers and setting goals to ensure adequate sleep each night.

## **Chapter Three: Research Methodology**

### **Introduction**

The purpose of this research was to determine if there was a relationship between selected undergraduate students' screen time and their sleep condition. In efforts to find the answer, the researcher established specific research procedures and methodology to follow. This research examined screen time usage one hour before bedtime and the hours of sleep each night. Since recalling behaviors can be challenging to do, students were asked to recall only their behaviors of screen time usage and hours of adequate sleep, they received in the last month. The study was reviewed and approved by the Institutional Review Board at a Midwestern University on February 2<sup>nd</sup>, 2017 [See Appendix E]. This chapter will describe the methodology, research design, sample selected and, instrumentation utilized in this research study. This chapter will also describe the data collection procedures and the data analysis performed.

### **Research Design**

The research design was a quantitative research study involving cross-sectional data collection on a convenience sample of 325 participants at a Midwestern University during the spring semester of 2017. The researcher chose cross-sectional data collection because of the time constraint. The data collection method included the distribution of a 15-item paper survey to sampled undergraduate students who were enrolled in Introduction of Sociology 101, Business Law 200, and Drug Education 240. The survey items were designed to identify students' screen time usage and sleep condition.

### **Sample Selection**

The researcher located courses on an online portal that listed all of the courses available and selected courses that were in-person general education 100-200 level courses that had 45 or more students enrolled. Courses excluded were: online courses, 300/400 level, graduate courses, partial-session courses, courses with a high volume of pre-nursing students enrolled and courses requiring special permission. Courses with a high volume of pre-nursing students enrolled was excluded in the research due to the researcher's current role as an academic advisor within the School of Nursing. Fourteen departments within a Midwestern university were selected by the researcher to receive an invitation to participate in the study. Courses that fit the criteria were put in a hat to be drawn by the researcher. This process determined which course selections the researcher would invite to participate in the study. Of the fourteen departments that were invited to participate in the study, a total of six courses were drawn by the researcher because they matched with the researcher's selection criteria. Each selected course was an in-person 100-200 general education course that had more than 45 students enrolled and contained a low volume of pre-nursing students. The six selected courses also allowed the researcher to achieve the desired minimum sample size appropriate of the overall population of the university. A minimum goal of three hundred collected surveys was set for the sample size for this research. For each course that was drawn by the researcher, the instructors of those courses were sent an email requesting their participation. After one week, a second email invite was sent to those who had not yet responded. Had all six instructors that were drawn by the researcher given permission to the researcher, 1,046

students would have been invited to participate in this research, however, due to only three instructors granting permission for data collection, only 331 selected students actually participated. Of the total 331 participants who were invited to participate, 325 surveys were adequately filled out. The overall response rate for this study was 98%. Participants who were enrolled in Sociology, Business Law, and Drug Education courses participated in the study.

### **Instrumentation**

Permission to utilize “The Sleep Condition Indicator: A Clinical Screening Tool to Evaluate Insomnia Disorder” survey was granted by researcher Colin Espie, a Professor of Sleep Medicine in the Nuffield Department of Clinical Neuroscience at Oxford University (See Appendix D). The survey was adopted from “The Sleep Condition Indicator: A Clinical Screening Tool to Evaluate Insomnia Disorder” survey that was used to measure sleep conditions among selected students (Espie et al., 2014).

Based on review of literature, the researcher developed the “Screen Time and Sleeping Condition Survey.” Survey items were designed to identify participants’ screen time usage one hour prior to bedtime and sleep condition, using items from The Sleep Condition Indicator. The survey consisted of a total of fifteen questions inquiring about demographics, sleep condition and use of electronics. Demographic items included participants’ age, gender, ethnicity, major and year in school.

Upon permission-from Espie and colleagues (2014), eight sleep condition items were taken from The Sleep Condition Indicator. Example items include “how long did it

take you to fall asleep at bedtime”, with a response option of “0-15 minutes, 16-30 minutes, 31-45 minutes, 46-60 mins, and more than 60 minutes,” “how many nights per week did you have a problem with your sleep”, with a response option of “0-1 nights, 2 nights, 3 nights, 4 nights and 5-7 nights” and “to what extent has poor sleep troubled you in general,” with a response option of “not at all, a little, somewhat, much, very much” and “very good, good, average, poor, very poor.”

The survey included one question measuring the participant’s electronic device. The question asked the participant “Considering the past month, how often do you use any electronic devices the hour before bedtime.” The response options were “always, very often, sometimes, rarely and never.” One open-ended question measured the participants’ hours of sleep received each night. The question asked the participant “In the last week, on average, how many hours of sleep did you get each night.” The response option was left blank for the participant to fill in the number of hours.

To ensure content validity and face validity, the researcher asked ten faculty members to review each survey item with consideration to study’s research questions. Two of the faculty were from the Student Health Office, three were from the School of Nursing Office, one was from the Biology department, and four were from the Health Science Department. The faculty reviewed each survey item and the research questions of the study to determine if the items appropriately measured participants’ screen time and sleep condition. The faculty were asked to determine if each survey item was “essential, useful but not essential, or not necessary”. Three corrections were made to three items that were confusing or misleading on the survey instrument before distribution was

carried out. Questions one and ten on the survey were re-worded for better clarification. Based on the feedback from faculty, one question was omitted from the survey all together because it was determined not necessary and did not measure screen time the way the researcher intended.

The final section of the survey consisted of five demographic questions. The demographic questions measured the participant's age, gender, ethnicity, academic major and year in school. Three demographic questions were multiple-choice items. The questions asked the participant about the gender they identify with and response options were "female, male and other, please specify." The question regarding the participant's ethnicity had response options of "American Indian or Alaskan Native, Asian, Black or African American, Caucasian (White), Hispanic or Latino, other, please specify and choose not to disclose." The question asking the participant what year in school had response options of "Freshman, Sophomore, Junior, Senior or Unclassified." Two of the demographic questions were open-ended questions. The question asking the participant how old they were was left blank for the participant to fill in their age. The question asking the participant what their major, was also left blank for the participant to fill in their major (See appendix C).

### **Data Collection Procedures**

Permission from course instructors in Introduction of Sociology 101, Business Law 200, and Drug Education 240 was obtained by email before visiting each of the classrooms for the data collection. The researcher distributed 325 surveys to five

sections; two sections of Introduction to Sociology courses, one section of Business Law course and two sections of Drug Education courses. Participants were explained the purpose of the survey was to measure behavior regarding screen time and sleep conditions among college students, ages 18-25 years of age. The researcher articulated to participants that all answers would remain confidential and anonymous throughout the entirety of the study. To ensure consistent instructions were given, the researcher read a script to each class prior to survey distribution (See Appendix B). The participants were also told that participation was voluntary and they had the right to stop taking the survey at any point. Participants were told it would take about five to fifteen minutes to complete the survey. The informed consent explained the participant's rights for this study and gave them contact information of the Institutional Review Board if they had any additional questions regarding the research. The participants took the survey during their normally scheduled class time. Envelopes were provided to all students in the class in which to put their completed survey. The students who did not wish to participate were instructed to put the blank survey in the envelope. The researcher informed students in each class that the completion of the survey indicated consent to participate in the research and they were the age of 18 years old or older. Consent forms were given to all participants to keep.

### **Data Analysis**

After data collection, all surveys were reviewed. Any incomplete surveys were removed and not included in data analysis. Six surveys were eliminated due to being incomplete. The data were entered into a Statistical Program for Social Sciences (SPSS).



The collected data were analyzed by using descriptive statistics, frequencies, Pearson's product moment relation and an independent t test.

### **Summary**

In summary, the researcher obtained permission from instructors from Introduction to Sociology, Drug Education and Business Law courses to distribute the The Screen Time and Sleep Conditions Survey to measure behavior regarding screen time and sleep conditions among college students, ages 18 to 25. A total of 325 surveys were collected during data collection procedures.

## **Chapter Four: Results and Discussion**

### **Introduction**

The purpose of this research was to measure the relationship between screen time usage and sleeping condition among a sample of college students attending a Midwestern University. The study was done in attempt to answer the following research questions:

1. What is the average amount of sleep sampled college students get each night?
2. What is the reported sleep condition stated by sampled college students?
3. What is the reported screen time usage one hour prior to bedtime sampled college students have each night?
4. What is the relationship between screen time usage one hour prior to bedtime and sleep condition each night?

Data for this study were collected in person using a 15-item survey that was developed to assess college students' screen time usage and their sleep condition. This chapter discusses the results obtained from the quantitative analysis of the data. The findings are organized in correspondence to each research question.

### **Analysis and Interpretation of the Data**

The results of the study include data from students enrolled in two sections of Introduction to Sociology course, one section of Business Law course and two sections of Drug Education course. A total of 325 undergraduate students ages 18-25 participated in this research study. Analysis included descriptive statistics, frequencies, Pearson product

moment and an independent sample t test using the Statistical Program for Social Sciences (SPSS).

### **Participants' Demographic Characteristics**

Table 4.1 represents the demographic results of the research study. Participants were undergraduate students, ages 18-25 years of age who attended classes at a Midwestern University. A total of 325 students participated in this research, and of the sample, 55.7% ( $n= 181$ ) were female, 42.8% ( $n= 139$ ) were male and 1.5% ( $n=5$ ) reported other or chose not to disclose. To determine if there was a significant difference between males and females regarding the average hours of sleep, the researcher conducted an Independent T-test. The results showed that there was no statistically significant difference between genders [ $t(317) = -.253, p = .80$ ]. An independent T-test was also conducted to determine if there was a significant difference between males and females regarding how often the participants used an electronic device one hour before bedtime. The results showed that there was no statistically significant difference between females [ $t(318) = 1.40, p = .160$ ].

The mean age of participants was 19.5 years old ( $SD= 1.83$ ), with a range of 18-25 years of age. Of the sampled students, 49.2 % ( $n = 159$ ) of the participants were college freshmen, 26.6% ( $n= 86$ ), sophomores, 18.9% ( $n=61$ ), juniors, 4.6% ( $n=15$ ), seniors and .7% ( $n=4$ ) of the participants reported unclassified or chose not to disclose. The ethnicity distribution of this sample consisted of 78.3% ( $n= 253$ ) Caucasian, 5.3% ( $n=17$ ) Black or African American, 1.9% ( $n=6$ ) Hispanic or Latino/a, 5.6% ( $n= 18$ )

Asian, .3% ( $n=1$ ) American Indian or Alaskan Native, 7.1% ( $n=23$ ) of the participants reported themselves as other and 1.5% ( $n=5$ ) chose not to disclose.

Table 4.1

*Demographic Characteristics of Students*

Characteristics	<i>n</i>	%	M(SD)
Gender	325		
Female	181	55.7%	
Male	139	42.8%	
Chose not to disclose	5	1.5%	
Age	325		19.5 (1.83)
18	79	24.5%	
19	105	32.6%	
20	62	19.3%	
21	38	11.8%	
22	17	5.3%	
23	10	3.1%	
24	6	1.9%	
25	4	1.2%	
Year in School			
Freshman	159	49.2%	
Sophomore	86	26.6%	
Junior	61	18.9%	

Senior	15	4.6%
Unclassified	4	.7%

#### Ethnicity

White/Caucasian	253	78.3%
Black or African American	17	5.3%
Hispanic/Latino/a	6	1.9%
Asian	18	5.6%
American Indian or Alaskan Native	1	.3%
Other	23	7.1%
Choose not to disclose	5	1.5%

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### Findings Related to Research Questions

The following section describes the findings of the study relating to the research questions.

#### **Research Question 1: What is the average amount of sleep sampled college students get each night?**

Question number 1 on The Screen Time and Sleep Conditions Survey measured this research question. Participants were asked to fill in the average amount of hours of sleep they received each night for the past month. If a participant listed a range of hours, the researcher took the average between the two listed numbers. Participants' answers ranged from four hours to ten hours of sleep received. College students ( $n = 324$ ) on average, received a mean score of 6.9 hours of sleep each night ( $SD = 1.18$ ).

When measuring the average hours of sleep the sampled students received, the researcher analyzed the data by using descriptive statistics. A total of 65.5% ( $n= 212$ ) of participants reported getting on average 7 hours or more of sleep, but 34.5% of participants did not meet the recommended amount of sleep. The recommended amount of sleep needed for college students to function properly is seven to nine hours of sleep each night (Hysing et al., 2015). Participants averaged on the low-range of the recommend hours of sleep, reporting an average of 6.9 hours of sleep received.

**Research Question 2: What is the reported sleep condition stated by sampled college students?**

Participants were asked a series of questions that were developed and adopted by Colin Espie and colleagues (2014) from Oxford University from an existing survey “The Sleep Condition Indicator: A Clinical Screening Tool to Evaluate Insomnia Disorder. Questions two through nine measured the participants’ sleep condition.

Descriptive statistics and frequencies were calculated to find major findings regarding the participants’ sleep condition. Results showed that 62.1% ( $n=202$ ) of the participants took 30 minutes or less to fall asleep at bedtime, and 74.4% ( $n= 241$ ) of participants reported if woken up during the night, it took them 0 to 15 minutes to fall back asleep, yet 58% ( $n =188$ ) of participants rated their quality of sleep as average, poor or very poor quality. The analysis also found that 37.5% ( $n = 122$ ) of the participants stated sleep was a problem 0 to 1 day per week. When assessing whether poor sleep had affected participants’ mood, energy or relationships, 47.4% reported somewhat or much as their response. This indicates that nearly half of the participants view sleep as troublesome

relating to their mood, energy or relationships. Similar findings were discovered when assessing the participants' concentration, productivity or ability to stay awake. Of the 325 participants, 52% ( $n = 169$ ) stated their concentration, productivity or ability to stay awake was somewhat or much affected by poor sleep.

Questions two through nine on The Screen Time and Sleep Conditions Survey measured the participant's sleep condition. The minimum sleep condition score was 0 and the maximum score possible was 32. A high score indicated the participant received adequate sleep and a low score indicated the participant was at an increased risk for insomnia disorder (Espie, et al., 2014). The participants' scores ( $n=325$ ) ranged from 2 to 32 and had an average score of 21 ( $SD= 6.20$ ). Nearly 1 in 4 (23%) participants scored a summated score of 16 or less, which indicates a higher risk for insomnia related conditions. See Table 4.2 for more details regarding participants' sleep condition scores.



Table 4.2

*Students' Sleep Condition**Q1- Hours of sleep received each night**Q2- Minutes it took to fall asleep at bedtime**Q3- Minutes awake during night if woken up**Q4- Nights per week having problem with sleep**Q5- Quality of sleep**Q6- Extent poor sleep affected your mood, energy or relationships**Q7- Extent poor sleep affected your concentration, productivity, or ability to stay awake**Q8- Extent poor sleep troubled you in general**Q9- Amount of time sleep has been a problem*


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Sleep Question	<i>n</i>	Minimum	Maximum	M (SD)
(On Survey)				
Q1	324	4.00	10.00	6.99 (1.18)
Q2	325	.00	4.00	2.68 (1.17)
Q3	324	.00	4.00	3.53 (.958)
Q4	325	.00	4.00	2.76 (1.29)
Q5	324	.00	4.00	2.39 (.805)
Q6	325	.00	4.00	2.34 (1.06)
Q7	325	.00	4.00	2.22 (1.05)
Q8	325	.00	4.00	2.55 (1.01)
Q9	325	.00	4.00	2.60 (1.65)

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**Research Question 3: What is the reported screen time sampled college students have each night?**

Question 10 on The Screen Time and Sleep Conditions Survey measured the participants' electronic device usage. Of the sample, 75% ( $n = 242$ ) of students reported they always use an electronic device one hour before bedtime. Table 4.3 displays the answers below.

Table 4.3

*Students' Usage of Electronic Devices one hour before Bedtime*

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*Considering the past month, how often do you use any electronic devices the hour before bedtime?*

	<i>n</i>	Percentage
Total	323	
Always	242	74.9%
Very Often	58	18%
Sometimes	17	5.3%
Rarely	5	1.5%
Never	1	.3%

**Research Question 4: What is the relationship between screen time use and adequate sleep each night?**

A Pearson product moment correlation was calculated to determine if screen time use before bedtime was related to the participants' hours of sleep received each night. There was no statistically significant difference found regarding screen time use before bedtime and the participants' hours of sleep received each night [ $r(322) = .002, p = .966$ ]. The researcher also ran a Pearson product moment correlation to determine if screen time use before bedtime was related to the participants' overall sleep condition. There was no significant difference found regarding screen time use before bedtime and the participants' overall sleep condition [ $r(321) = -.010, p = .857$ ].

**Summary**

The focus of this study was to determine if there was a relationship between screen time use before bedtime and participants' sleep condition. Additionally, this research looked at the average amount of sleep sampled college students received, what the reported sleep condition was among the participants, and the reported electronic device sampled college students had each night.

The results of this study revealed that the sample included 55.7% ( $n = 181$ ) were females, and 42.8% ( $n = 139$ ) were males. The majority of the participants were Caucasian (78.3%,  $n = 235$ ) and freshmen (49.2%,  $n = 159$ ) or sophomores (26.6%,  $n = 86$ ).

The average amount of sleep received each night by participants, was 6.9 hours (SD = 1.18). This finding closely aligns with previous literature stating that seven to nine hours of sleep each night are necessary for every day functioning (Hysing et al., 2015). The reported sleep condition score ranged from 2 to 32 with an-average score of 21 (SD= 6.20). Nearly 1 in 4 (23%) participants scored 16 or less, which indicates a higher risk for insomnia related conditions. For the question measuring participants' screen time use one hour before bedtime, 75% ( $n= 242$ ) of participants reported always using an electronic device one hour before bedtime. Lastly, a Pearson product moment correlation was calculated to determine if screen time use before bedtime was related to the participants' hours of sleep received each night. There was no statistically significant difference found regarding screen time use before bedtime and the participants' hours of sleep received each night [ $r(322) = .002, p = .966$ ]. There also was no significant difference found regarding screen time use before bedtime and the participants' overall sleep condition [ $r(321) = -.010, p = .857$ ]. The summary, conclusions, and recommendations are provided in chapter five.

## **Chapter Five: Summary, Conclusions, and Future Recommendations**

This chapter will summarize the general findings of this research study, which surveyed students from a Midwestern University enrolled in five sections in selected courses including findings from the research regarding sleep conditions and screen time use. Conclusions of this research, as well as recommendations for health educators and researchers are also included.

### **Summary**

Sleep plays a vital role in everyday functions, overall health and well-being. It is recommended that college students receive seven to nine hours of sleep each night to function (Hysing et al., 2015). Although adequate sleep is important, 70% of college students reported receiving only five to six hours of sleep on the weekdays each night (Gutierrez, 2002). The long list of contributing factors to not getting adequate sleep each night continues to grow, but specifically screen time and excess use of light-emitting devices remain common factors for inadequate sleep each night among college students (Hysing et al., 2015).

In this study, a sample of undergraduate college students were asked to answer questions relating to their sleep condition and use of electronic devices. In this research, 325 students participated in taking the survey, and of the sample, 55.7% ( $n= 181$ ) were female, 42.8% ( $n= 139$ ) were male, and 1.5% ( $n=5$ ) reported other or chose not to disclose. The majority of participants were Caucasian (78.3%,  $n = 253$ ). The mean age of participants was 19.5 years old ( $SD= 1.83$ ). Participants ranged from 4 to 10 hours of

sleep each night and averaged 6.9 hours of adequate sleep each night and had a mean sleep condition score of 21. This means that the majority of the selected students do not suffer from sleeping conditions. Further, seventy five percent ( $n = 242$ ) of students reported they always use an electronic device one hour before bedtime.

This study measured the relationship of students' screen time use one hour prior to bedtime and whether it affected their sleep condition. Results indicated there was no significant relationship between screen time use before bedtime and the participants' sleep condition [ $r(322) = .002, p = .966$ ].

## **Conclusion**

In this study, 23% of participants scored a sleep condition score of 16 or less, thus indicating they are at higher risk for insomnia related disorders. This finding differs from Espie and colleagues' (2014) findings of 89% of their sample identified as having probable insomnia disorder. An explanation for the differing findings could be that the ages of the individuals in the sample for in each of the studies were different. Further explanation of different findings can be credited to the data reported for the research done by Espie and colleagues was collected from five validation samples with a total of 30,941 participants with varying age groups compared to this study.

Literature reviewed states that 70% of college students reported receiving only five to six hours of sleep on the weekdays, only 28% reported receiving seven to eight hours, while only 2% reported receiving nine hours each night (Gutierrez, 2002). Medical experts recommend individuals to receive seven to nine hours of sleep each night to

function (Hysing et al., 2015). While the participants' hours of sleep is very close to the recommended hours of sleep each night (6.9 hours), the findings still remain on the low-end of the recommendations. This finding could be partially explained by the ranges of hours participants provided on survey item one. Many of the participants had responses such as "4-10 hours" of sleep received each night. To come up with a single number, the researcher took the average of this range. By averaging the response, the results for the hours of sleep received may have affected the mean score of 6.9 hours of sleep each night. Another explanation could be the participants were educated in the hours of sleep needed each night and answered the survey the way they thought the researcher wanted them to answer. It seems to be common knowledge that eight hours of sleep is considered sufficient sleep, so the participants in the study may have answered accordingly.

It was discovered in this research that 58% ( $n = 188$ ) of participants rated their quality of sleep as average, poor or very poor quality, and yet 50.5% ( $n = 164$ ) stated that they did not have a problem with sleep or have only had a problem with sleep for less than one month. This finding was interesting because one would think that if one does not have problems with sleep then he or she would rate their overall quality of sleep as good or very good. These results can be best explained by individual's life experiences. For example, if an individual does not believe he or she has a problem with sleep but still believes his or her current mood, energy or relationship is still being affected by lack of sleep, then he or she may downgrade their overall quality of sleep to average or poor.

Overall, the findings in this research contradict much of the literature reviewed in chapter two. In this study, there was no significant relationship found between screen

time use before bedtime and the participants' hours of sleep received each night. Previous literature reviewed electronic devices to significantly disrupt sleeping patterns (Czeisler, 2008). The differing findings in this research could be credited to only having one survey item on that measured use of screen time before bedtime. The implications of this finding is that it may be necessary to add additional items assessing screen time before bedtime. Including items that measure how the devices being used one hour before bedtime, and what particular devices are being used are suggested additions to improve this research.

### **Recommendations for Health Educators**

The average hours of sleep received by participants has proven to be on the low-end of the recommendations of amount of sleep. Hysing and colleagues (2015) recommends individuals receive seven to nine hours of sleep each night to function. In this study, participants' hours of sleep averaged 6.9 hours each night ( $SD = 1.18$ ). Due to this finding, health educators should focus on making students more aware of their hours of sleep received and assist them with developing skills to overcome barriers to adequate sleep. By doing so, college students can change their sleeping behaviors and make sleep a high priority each night.

Providing education on the importance of sleep is necessary to incorporate in the college setting to create more public awareness on sleep conditions (CDC, 2014). The goal of assisting college students with prioritizing their sleep can be done through a comprehensive sleep promotion campaign that utilizes evidence-based interventions. Sleep promotion campaigns can be modeled similarly to pre-existing sleep campaigns such as the ones described in chapter two. Such campaigns may teach students about



effective coping strategies to help overcome the barriers of sleep deprivation, provide a variety of educational sessions that provide tips, such as minimize electronic use before bedtime, offer individualized consultations regarding sleep habits and provide relaxation activities such as organizing a campus-wide nap to promote sleep among college students.

Educating students on this topic as early as middle school can be very helpful in establishing a proper bedtime routine and avoiding sleep deprivation. Health educators must reinforce the importance of sleep and all the benefits one can receive by receiving adequate sleep.

### **Recommendations for Future Research**

One item, on The Screen Time and Sleeping Conditions Survey that measured screen time use one hour prior to bedtime, may not be sufficient to fully measure the concept. Inserting additional items regarding screen time use before bedtime, on The Screen Time and Sleeping Conditions Survey, may be beneficial to future research because it would provide more data related to screen time use before bedtime. The survey items that could be added to enhance the research could look at the number of electronic devices used before bedtime, what specific electronic devices are used before bedtime and how many minutes are electronic devices used before bedtime. Future research could also explore whether the electronic devices used have an option to turn off the blue light waves on the screen. Adding a question on the survey that assesses the use of blue light waves may improve future research findings. Many electronic devices have the option to turn on the “night shift” which dims or shuts off the blue light waves that are known to

suppress the production of melatonin. Knowing if students utilize that feature on their devices could be beneficial.

Additionally, the use of technology, such as Fitbits and Apple watches, could be utilized to track quality of sleep and hours of sleep received each night. These technological devices allow individuals to see the total minutes of disrupted sleep and track the total hours of sleep received. By utilizing such devices, the researcher would be eliminating potentially inaccurate recall of the participants related to hours of sleep received each night.

There is significant opportunity for further research that explores other aspects of sleeping behaviors and screen time use of college students compared to the general population.

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Appendix A

Print Copy of Informed Consent

## Informed Consent Form

## Anonymous Survey Consent

You are invited to participate in a research study supervised by Dr. Amy Hedman-Robertson. The goal of this survey is to understand students' sleep conditions and their screen time. This survey should take about 5 to 15 minutes to complete. If you have any questions about the research, please contact Dr. Amy Hedman-Robertson at [amy.hedman-robertson@mnsu.edu](mailto:amy.hedman-robertson@mnsu.edu).

Participation of this study is voluntary. You have the option not to respond to any of the questions. You have the right to stop taking the survey at any time. If at any time you wish to discontinue or chose not to participate please put the unfinished survey back into the provided envelope. Participation or nonparticipation will not affect your relationship with Minnesota State University, Mankato. If you have questions about the treatment of human participants and Minnesota State University, Mankato, contact the IRB Administrator, Dr. Barry Ries, at 507-389-1242 or [barry.ries@mnsu.edu](mailto:barry.ries@mnsu.edu).

Responses will be anonymous. However, there is always the risk of compromising privacy, confidentiality, and/or anonymity when taking surveys in the classroom. None of your answers will be released and no names will be recorded. Original surveys will be kept in the Principal Investigator's locked office for three years, at which time they will be shredded on May 5<sup>th</sup>, 2020. The risks of participating are no more than experienced in daily life. There are no direct benefits to you as a result of participation in this research.

Submitting the completed survey will indicate your informed consent to participate and indicate your assurance that you are at least 18 years of age.

Please keep a copy of this page for your future reference.

IRB# 1022066

Date of MSU IRB Approval: February 2, 2017



## Appendix B

### Script for Data Collection

### Script for Data Collection

"My name is Angela Sargent, I am a graduate student in the Department of Health Science.

I am here today to invite you to participate in a research study to understand Undergraduate students' sleep conditions and their screen time.

Participation is completely voluntary. Your responses will be confidential. The informed consent form that I am handing out right now provides details about the confidentiality, risks and benefits of participating in this research. Please read the informed consent and if you agree to participate in the study, please complete the survey. The informed consent form is for you to keep for your records.

Upon completion of the survey, please put your survey into the provided envelope so I am able to collect them.

Thank you for your attention and participation today. Are there any questions before we get started?"

## Appendix C

### Screen Time and Sleeping Conditions Survey

Screen Time and Sleeping Conditions Survey

The purpose of this survey is to measure behavior regarding screen time and sleeping conditions among students, ages 18-25 years of age, at Minnesota State University, Mankato. Please do not write your name or any personal identifying information on this survey. All answers will be confidential. Completion of this survey is voluntary. If you do not feel comfortable answering any or all of the questions you have the right to stop the survey at any time.

Directions: Please make sure to read every question thoroughly before answering. Complete each question by circling the best-suited answer that applies to you.

1. In the past month, on average, how many **hours** of sleep did you get **each night**? \_\_\_\_\_
  
2. Thinking about a typical night in the past month, how long did it take you to fall asleep at bedtime?
  - a. 0-15 min
  - b. 16-30 min
  - c. 31-45 min
  - d. 46-60 min
  - e. More than 60 min
  
3. Thinking about a typical night in the past month, if you woke up during the night, how long were you awake for in total?
  - a. 0-15 min
  - b. 16-30 min
  - c. 31-45 min
  - d. 46-60 min
  - e. More than 60 min
  
4. Thinking about a typical night in the past month, how many nights per week did you have a problem with your sleep?
  - a. 0-1 nights
  - b. 2 nights
  - c. 3 nights
  - d. 4 nights
  - e. 5-7 nights

5. Thinking about a typical night in the past month, how would you rate the quality of sleep you received?
  - a. Very good
  - b. Good
  - c. Average
  - d. Poor
  - e. Very Poor
  
6. Thinking about the past month, to what extent has poor sleep affected your mood, energy, or relationships?
  - a. Not at all
  - b. A little
  - c. Somewhat
  - d. Much
  - e. Very Much
  
7. Thinking about the past month, to what extent has poor sleep affected your concentration, productivity, or ability to stay awake?
  - a. Not at all
  - b. A little
  - c. Somewhat
  - d. Much
  - e. Very Much
  
8. Thinking about the past month, to what extent has poor sleep troubled you in general?
  - a. Not at all
  - b. A little
  - c. Somewhat
  - d. Much
  - e. Very Much
  
9. How long have you had a problem with your sleep?
  - a. I don't have a problem/less than one month
  - b. 1-2 months
  - c. 3-6 months
  - d. 7-12 months
  - e. More than a year

10. Considering the past month, how often do you use any electronic devices the hour before bedtime?
- Always
  - Very often
  - Sometimes
  - Rarely
  - Never
11. How old are you? \_\_\_\_\_years old
12. What is the gender do you identify with?
- Female
  - Male
  - Other, please state:\_\_\_\_\_
13. What is your ethnicity? Circle all that apply
- American Indian or Alaskan Native
  - Asian
  - Black or African American
  - Caucasian (White)
  - Hispanic or Latino
  - Other, please state: \_\_\_\_\_
  - Choose not to disclose
14. What major do you belong to?\_\_\_\_\_
15. What year in school are you?
- Freshman
  - Sophomore
  - Junior
  - Senior
  - Unclassified

Appendix D

Permission to use survey instrument

**From:** Colin Espie <[colin.espie@ndcn.ox.ac.uk](mailto:colin.espie@ndcn.ox.ac.uk)>  
**Sent:** Sunday, January 15, 2017 5:56 AM  
**To:** Sargent, Angela Lynn  
**Cc:** Annemarie Luik  
**Subject:** Re: Survey permission

Angela

Thank you for your email. I am very happy for you to use the SCI in your research, and my colleague Dr Annemarie Luik will be able to send you an electronic version and the scientific papers on it, which you should cite as the source!

BW Colin

Prof Colin A. Espie BSc, MAppSci, PhD, DSc, FBPsS, CPsychol, CSci

Professor of Sleep Medicine

Senior Research Fellow, Somerville College

Sleep & Circadian Neuroscience Institute (SCNi)  
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On 12 Jan 2017, at 19:51, Sargent, Angela Lynn <[angela.sargent@mnsu.edu](mailto:angela.sargent@mnsu.edu)> wrote:

Dear Colin,

My name is Angela Sargent and I am a graduate student at Minnesota State University, Mankato. I am currently doing research, for my thesis, on screen time and how it affects sleeping patterns among college students. As I was looking for reliable surveys and questionnaires, I came across a Sleep Quality Questionnaire- the Sleep Condition Indicator that Arianna Huffington used in her book "The Sleep Revolution". I was wondering if I could get permission from you to adopt the survey questionnaire for my own research study. This questionnaire would only be utilized for academic research purposes. I have attached the specific questionnaire on the email for further clarification on what questionnaire I am looking to utilize.

Please let me know on whether this would be allowed to do so as soon as possible. I appreciate any input you may have and look forward to hearing from you in the near future.

Thanks,

Angela



Appendix E

Permission from Institutional Review Board



February 4, 2017

Dear Amy Hedman-Robertson:

Your proposed changes to your Minnesota State University, Mankato Institutional Review Board (IRB) approved research ([1022066-3] Screen Time and Sleeping Conditions among Selected College Students) have been accepted as of February 4, 2017. Thank you for remembering to seek approval for changes in your study.

If you make additional changes in the research design, funding source, consent process, or any part of the study that may affect participants in the study, you will have to reapply for approval (see <http://grad.mnsu.edu/irb/continuation.html>). Should any of the participants in your study suffer a research-related injury or other harmful outcome, you are required to report them to the Associate Vice-President of Research and Dean of Graduate Studies immediately.

The letter approving your changes is attached to your original proposal; therefore, the original approval date has not changed. When you complete your data collection or should you discontinue your study, you must submit a Closure request (see <http://grad.mnsu.edu/irb/continuation.html>). If you will be collecting data for one calendar year or longer, please submit a Continuation (<http://grad.mnsu.edu/irb/continuation.html>). All documents related to this research must be stored for a minimum of three years following the date on your Closure request. Please include your IRBNet ID number with any correspondence with the IRB. Please include your IRBNet ID number with any correspondence with the IRB.

We wish you success in your research. If you have any questions, feel free to contact Mary Hadley at [irb@mnsu.edu](mailto:irb@mnsu.edu) or 507-389-5102.

Cordially,

A handwritten signature in cursive script that reads "Mary Hadley".

Mary Hadley, Ph.D.  
IRB Coordinator

A handwritten signature in cursive script that reads "Jennifer Veltsos".

Jennifer Veltsos, Ph.D.  
IRB Co-Chair

A handwritten signature in cursive script that reads "Julie A. Carlson".

Julie Carlson, Ed.D.  
IRB Co-Chair