Examining the Relationship between Adequate Sleep, Sleep Behaviors, and Psychological Distress in College Students

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Examining the Relationship between Adequate Sleep, Sleep Behaviors, and Psychological Distress in College Students

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Abstract

Objective: Examine the relationship between sleep hygiene behaviors, overall distress, and total hours of sleep in a college population. The predictors analyzed were: sleep quality, total hours of sleep, level of distress, bedtime, wake time, time to fall asleep, alcohol/drug use, exercise, caffeine consumption and grade point average.

Methods: A retrospective chart review gathered client information from the CCAPS-34 questionnaire and the Standardized Data Set (SDS), obtained by Counseling and Wellness Services at Wright State University. ANOVA determined statistically significant relationships between the variables.

Results: Seven-hundred sixty-seven charts were reviewed. The majority of students included in the study were white (64.2%), women (59.7%), and 18-25 years old (80%). Forty-one percent of the students indicated a high level of distress. Statistically significant differences (p<0.05) were found between sleep hygiene behaviors and overall distress. The following predictors were related to increased distress in this population; poor sleep quality, <7 hours of sleep, bedtime after 12am, >30 minutes to fall asleep, alcohol/drug use to sleep, current caffeine consumption, and lack of exercise. The following predictors were found to be related to lower amounts of total sleep: poor sleep quality, high distress, late bedtime, >30 minutes to fall asleep, alcohol/drug use to sleep and caffeine use.

Conclusion: Several sleep hygiene behaviors have a relationship between high levels of distress and poor total sleep in the college population. It is important to consider these factors when working with students with high distress and target preventive behaviors while building resilience among college students to manage distress.

Keywords: sleep quality, bedtime, wake time, exercise, caffeine, CCAPS-34
Examining the Relationship between Adequate Sleep, Sleep Behaviors, and Psychological Distress in College Students

Sleep is important for health and well-being (National Heart, Lung, and Blood Institute, 2012). Humans spend approximately one third of their lives sleeping (Institute of Medicine, Committee on Sleep Medicine and Research [IMCSMR], 2006), and so they should take care of their bodies by ensuring that they get adequate sleep.

Sleep is essential to living and adults “receiving less than seven hours and greater than eight hours of sleep are at higher risk for morbidity and mortality” (Knowlden & Sharma, 2014, p. 271). According to the National Sleep Foundation (NSF) (2015), young adults (18-24 year olds) need seven to nine hours of sleep. Population-based research has shown that 28.3% of United States (U.S.) adults sleep less than six hours per night, 35.3% sleep less than seven hours per night, and 38% report falling asleep during the day at least once in a 30 day period (Knowlden, Sharma, & Bernard, 2012). There has been a 14% decrease in sleep over three decades with 6.65 hours of sleep being the median in 2001 (Knowlden et al., 2012).

Daytime sleepiness often results from poor sleep hygiene and has been shown to impact quality of life. According to the United States Behavioral Risk Factor Surveillance System (BRFSS) (Centers for Disease Control and Prevention [CDC], 2009), quality of life is assessed via 36 domains and patients with insomnia report poorer functioning and quality of life on eight of those domains. The quality of life findings were similar to those who suffer from congestive heart failure and depression (IMCSMR, 2006).

Not only does inadequate sleep cause harm to the individual, it also increases the cost of healthcare. Patients in the highest quartile using the Epworth Sleepiness Scale (Johns, 1991) spend 11% more healthcare dollars than those with adequate sleep (IMCSMR, 2006). Direct
costs of care including medical expenses from doctor visits, hospital services and prescriptions were $13.9 billion in 1995 (IMCSMR, 2006). Indirect costs include morbidity, mortality, disability, loss or productivity, increased alcohol consumption, and accidents. Inability to adjust to late work shifts alone cost $60 billion in 1994 and $150 billion for workplace accidents and loss of productivity (IMCSMR, 2006). As the percentage of sleep deprived individuals increased nationally, costs have skyrocketed and are quite burdensome on the country (IMCSMR, 2006). Advocating for increased treatment and education on the importance of sleep is vital in reenergizing the American people.

Sleep deprivation affects how we function in every aspect of daily life, and sleep deprivation is a population safety concern. One behavior that is not only dangerous to the sleep deprived individual but to the general public, is driving. Perrier and colleague’s (2014) study of sleep deprivation and hazardous driving found sleep deprivation increased the chance of motor vehicle accidents by 2.5 to 3 fold compared to drivers with good sleep, and demonstrated that sleepiness accounts for almost 20% of road accidents. Not only are sleep-deprived drivers dangerous, but they also rate themselves as being able to function and operate a vehicle equal to those with adequate sleep, even though data shows they had more lane crossings, were more distracted and less alert (Perrier et al., 2014). It is vital that those with insomnia or chronic fatigue are educated on the dangers of driving while tired. The cost of automobile accidents attributed to sleepiness in 1994 is $29.2 to $37.9 billion (IMCSMR, 2006).

The U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion [U.S. DHHS, DPHP], n.d.) created Healthy People 2020 with two goals including: to increase awareness and knowledge of adequate sleep and to improve mental health through prevention. These two goals are greatly intertwined because sleep problems can often be
symptoms of anxiety, depression and psychological distress (Parekh, 2015). Poor sleep quality has been positively correlated with suicidal ideation, violent behavior, depression, risky sexual behavior, compromised immune system, and overall early mortality (Gellis, Park, Stotsky, & Taylor, 2014). Poor sleep quality and erratic sleep behaviors are therefore major health concerns. According to Drapeau, Marchand, and Beaulieu-Prevost (2012), psychological distress refers to a multitude of symptoms ranging from depression, anxiety, personality traits, functional disabilities, and behavioral problems. Understanding how various factors relate to the development of distress is important in both treating those with distress and preventing distress from developing. Drapeau et al.’s (2012) summary of multiple studies concluded that the prevalence of distress ranges from 5% to 27% in the general population. Sleep disturbances are a common feature of mood disorders, especially daytime sleepiness, which can result in injury and loss of productivity. Concepcion et al. (2014) suggest that psychiatric disorders, especially mood and anxiety disorders are one of the leading causes of disability globally.

College Students and Sleep

Young adults entering college need about seven to nine hours of regular sleep in order to function at full capacity and prevent comorbidities (CDC, 2015a). A large percentage of this population does not get adequate sleep and many experience the short-term and long-term effects of not attaining seven to nine hours of sleep. Thirty-seven percent of 20-39 year olds get less than six hours of sleep per night, compared to 30% of those older than 60, and 43.7% of 18-25 year olds have unintentionally fallen asleep at least once in the last month (CDC, 2015b). College students mirror the general public as they trend towards decreased sleep. Since 1969, there has been a 14% decrease in average sleep time from 7.75 hours to 6.65 hours in 2001 (Knowlden & Sharma, 2014). Only 29.4% of college students are sleep eight or more hours at
night (Lund, Reider, Whiting, & Prichard, 2010). Not only are college students not sleeping, but lack of sleep is causing distress; 26.4% of students reported sleep difficulties as being “traumatic or very difficult to handle” in the past 12 months and 57% felt they did not sleep enough to feel rested on more than three days a week (Vargas, Flores, & Robles, 2014, p. 2). Reduced sleep quality is also a problem because 73% of students reported sleep problems and only 11% met criteria for good sleep quality (Buboltz, Brown, & Soper, 2001).

Sleep deprivation is an epidemic among college students (Valerio, Kim, & Sexton-Radek, 2016) and needs to be addressed in order to maximize their potential for learning and well-being. Approximately 10% of college students meet the criteria for insomnia. Over 50% of college students report daytime sleepiness compared to 36% of adolescents and adults; 60% of college students report dragging, tired, or sleepy feelings (Hershner & Chervin, 2014). Valerio, Kim, and Sexton-Radek (2016) looked at the 2011 Sleep in America Poll for young adults aged 19-29 years and found that 66% of participants admitted driving drowsy, 67% feel unrefreshed, and 25-50% report poor sleep quality. Sleep deprivation affects social functioning, academic success, and leads to depression, anxiety, hostility, interpersonal sensitivity, obsessive behaviors, increased drug and alcohol use, and other mental illnesses (Valerio et al., 2016).

**Statement of Purpose**

The purpose of this project was to examine the relationship between sleep hygiene variables and overall distress levels in college students. Variables used to assess sleep included total hours of sleep per night and perceived sleep quality. Sleep feature variables included bedtime, wake time, and time to fall asleep. Sleep behaviors included drug/alcohol use for sleep, caffeine use, and exercise. Grade point average (GPA) was also identified as a possible indicator
of distress. The project also looked at the type of relationship these sleep variables and GPA have on the total hours of sleep someone gets per night.

**Literature Review**

The following literature review provides an overview of research about the various antecedent behaviors relating to obtaining adequate sleep. It summarizes various risk factors that preclude people from obtaining adequate sleep and describes psychological distress in relation to both sleep behaviors and certain risk factors that lead to psychological distress

**Antecedent Behaviors Related to Adequate Sleep**

**Intention to get good sleep.** Wanting to achieve an ideal or desired behavior is one of the strongest predictors of actually accomplishing the behavior (Ajzen, 1991). Intention to get good sleep is vital for someone to achieve seven to nine hours of sleep. In the context of Theory of Planned Behavior (Ajzen, 1991) the intention to achieve good sleep also depends on perceived behavioral control and subjective norm of the behavior. In a recent study, the three predictors were perceived behavioral control, subjective norm and attitude toward behavior and they explained 36.2% of the variance in an individual’s intention to get good sleep, showing how antecedents can work together to prevent someone from achieving a goal (Knowlden et al., 2012).

**Sleep hygiene.** Sleep hygiene is a group of behaviors that promote well-rested consistent sleep. Oftentimes, sleep hygiene behaviors are targeted when a person is having difficulty with obtaining enough sleep. Behaviors that have been identified as good are consistent sleep-wake schedules, regular exercise, reduced caffeine intake, and decreased alcohol consumption (Brown, Buboltz, Walter, & Soper, 2002)
Social norming of sleep in society/college. The way people interact with each other is both dependent upon and influenced by culture. America has developed a ‘fast-paced’ and efficient culture where it is easy to disregard the importance of sleep. Cultural and societal factors play a role in not obtaining seven to nine hours of regular sleep. Lifestyle factors such as working longer hours, shift work, and irregular sleep schedules are forms of ‘voluntary sleep restriction’ that are becoming normal in American society (Knowlden et al., 2012). As a result, the college environment has modeled societal norms and has created an environment for poor sleep. The environment has been slowly going towards a norm of sleeping less even though sleep dissatisfaction has been steadily increasing (Knowlden et al., 2012),

The Health Belief Model (Rosenstock, 1974) helps explain predisposing factors that lead to a behavior or cause someone to not achieve said behavior. Knowlden and Sharma (2014) analyzed sleep in college students within the framework of the Health Belief Model. Perceived susceptibility was tested by asking various questions regarding whether not getting the target behavior of seven to nine hours of sleep would lead to weight gain, disease and accidents. The research failed to identify a relationship of perceived susceptibility to sleep behavior.

Perceived severity was assessed by asking how much not getting enough sleep would affect certain aspect of daily functioning. Results suggested that as perceived severity increased, sleep behavior increased. Short-term consequences have a stronger influence on whether or not someone increases better sleep behavior because they can readily see the effects (Knowlden & Sharma, 2014).

Perceived barriers were assessed by asking about things that would prevent someone from achieving adequate sleep, like time and stress. A negative relationship was found; as perceived barriers, such as stress and time increased, sleep duration decreased (Knowlden &
Cues to action were assessed by asking how likely someone would get seven to nine hours of sleep because they feel caught up on work, responsibilities or tired. The study also demonstrated that as cues to action increase, so did sleep behavior (Knowlden & Sharma, 2014).

Self-efficacy was assessed by asking how confident participants felt that they could do the following: (1) create good sleep environment, (2) relax before bed, and (3) maintain consistent sleep to achieve adequate sleep. The study found that as self-efficacy increased, sleep behaviors increased with consistent sleep schedules, decreasing stress and having an appropriate sleep environment being the largest factors (Knowlden & Sharma, 2014).

**Risk Factors for Inadequate Sleep**

**Sleep hygiene awareness.** Sleep hygiene is a group of behaviors aimed at restorative and good quality sleep which is often used to prevent or treat sleep disorders (Voinescu & Szentagotai-Tatar, 2015). Knowledge of sleep hygiene behaviors is important in understanding the cause of inadequate sleep, especially in college students. Sleep hygiene awareness was found to be significantly lower in young adult college students as compared to middle-aged adults (Voinescu & Szentagotai-Tatar, 2015). These authors analyzed the relationship between lower knowledge of sleep hygiene and poorer sleep quality. These authors suggested that poorer sleep quality could be explained by the phenomenon of ‘night-owl’ preference in college-students but could also be explained by lack of knowledge. It is important to investigate further on the cause of poor sleep and how educating people on sleep hygiene can be helpful. Voinescu and Szentagotai-Tatar (2015) reported that in many cases, it is difficult to say whether or not being aware of sleep hygiene practices actually increase quality of sleep but it is still important to work with people on modifying behaviors related to poor sleep.
Preference for late night studying. Students’ beliefs about their ability to be more effective during certain times of day can have an impact on overall performance in school (Hershner & Chervin, 2014). When college students gain freedom from a rigid schedule of high school, they tend to push off studying until later in the day or night. Those who consider themselves ‘night-owls’ and stay up longer studying have lower grade point averages; night owls had 0.132 lower grade point averages due to lack of sleep and erratic sleep (Hershner & Chervin, 2014). Students who stay up studying still have to get up in the morning for classes and ultimately end up not attaining adequate sleep and trying to make-up sleep on the weekends, which leads to irregular sleep patterns and also can lower academic performance. Those who prefer later bed times and wake times were associated with higher risk of infections, poor sleep quality, depression, and other psychiatric disorders (Concepcion et al., 2014).

Circadian clock. It is evident that behavior and sleep hygiene have a strong relationship, however, physiology can play a role too. The circadian clock regulates when a person’s body needs to sleep. Adolescence is associated with a biological delay in sleep patterns, resulting in later bedtimes (Micic et al., 2016). The longest delay is seen at 20 years old although this delay may remain into adulthood (Micic et al., 2016). College age students have a circadian clock of 24.27 hours compared to 24.10 hours in older adults (Hershner & Chervin, 2014). This increase results in delayed bedtimes that aggregate over time, with an outcome being a preference for late nights. As a result of this increase in the circadian clock, students tend to go to sleep later and tend to not get adequate sleep.

Impact on academic performance. Inadequate sleep can greatly impact school performance, so for college students, academic performance can be a large motivator to attain adequate sleep. Eighty-two percent of college students believe that sleepiness directly impacts
school performance and ranks only second to stress as the largest contributor to school performance (Hershner & Chervin, 2014). Students attaining greater than nine hours of sleep had higher grade point averages compared to students sleeping less than six hours, 3.24 and 2.74 respectively (Hershner & Chervin, 2014). However, 70% of college students report getting less than eight hours of sleep. Taylor, Vatthauer, Bramoweth, Ruggero, and Roane (2013) found that inadequate sleep and poor sleep behaviors were related to lower GPAs. These researchers found later bedtimes, wake times, and increased napping were related to lower GPAs.

**Sleep scheduling, arousing bedtime behaviors, and uncomfortable sleep environment.** The act of going to bed seems like a simple task, but for many, certain behaviors can disable and prevent adequate sleep. Many of these behaviors can actually lead to insomnia symptoms and result in chronic loss of adequate sleep (Gellis et al., 2014). Improper sleep scheduling is when someone does not maintain consistent sleep and wake times. Gellis, Park, Stotsky, and Taylor (2014) summarized two studies that showed improper sleep scheduling is significantly associated with increasing levels of insomnia symptoms.

Arousing behaviors at bedtime are behaviors that can excite or emotionally upset an individual, which can include; utilizing intense concentration, exercising within four hours of sleep, and worrying about important things. Arousing behaviors are strongly associated with decreasing sleep time and leading to insomnia symptoms (Gellis et al., 2014).

Uncomfortable sleep environment refers to anything that may cause someone to stay awake due to discomfort, such as an uncomfortable mattress, high or low temperatures, noise, or light. All of these factors are strongly associated with insomnia severity (Gellis et al., 2014). A well-lit environment can physiologically increase the amount of time it takes to fall asleep and affect the body’s ability to know when to go to sleep. As the day becomes evening and the sky
grows darker, our body naturally produces melatonin from the pineal gland to help trigger sleepiness. The presence of light can inhibit this response, decreasing the feeling of being sleepy, and resulting in being too alert at bedtime (Duffy & Czeisler, 2009).

**Napping.** Ye, Hutton- Johnson, Keane, Manasi, and Gregas (2015) studied college students, especially ‘night-owls’ who regularly do not get adequate sleep, often attempt to recover that sleep by napping. While short-term naps can sometimes be effective, utilizing napping frequently can have negative impact on overall nighttime sleep (Ye, Hutton- Johnson, Keane, Manasi, & Gregas, 2015). These researchers recommend napping 10 to 20 minutes mid-day or ‘power-napping’ which can improve alertness and cognitive functioning. They found that students who nap longer than 1 to 2 hours have sleep inertia, described as confusion, groginess, and cognitive deficits. They also found that students napping more than three times a week had very poor sleep quality. About 77% of nappers identify as night owls and 63% of these students report missing class due to oversleeping. Based on the Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman, & Kupfer, 2015), students napping longer than two hours had a two point higher PSQI, which indicates poorer sleep. Students sleeping later in the day also showed a two point increase in the PSQI and both length and timing of napping correlated with lower grade point averages (Ye et al., 2015).

**Sleep disorders.** College students are aware that not getting enough sleep can lead to short-term effects of sleep deprivation like decreased alertness and mental fogginess, but many are not aware of long-term effects of sleep deprivation (Dregan & Armstrong, 2010). College students who may have sleep disorders are often not aware that they meet criteria for a diagnosis and never seek help (Dregan & Armstrong, 2010). Sleep disorders refer to adverse changes in sleep that may ultimately affect overall health, safety, and quality of life (Mayo Clinic, 2014).
Having a sleep disorder impedes a person’s ability to achieve adequate sleep, despite intentions. In a study by Dregan and Armstrong (2010), 29% of participants who had sleep problems at age 16 had issues at age 23, suggesting that identifying sleep disorders early is crucial. Someone with a sleep disorder will be unable to achieve seven to nine hours of restful sleep most nights despite adequate sleep behavior. Sleep disorders often persist throughout life and can hinder students’ ability to achieve their full potential.

**Social relationships.** Positive social relationships can have a great impact on the quality of sleep (Kent, Uchino, Cribbet, Bowen, & Smith, 2015). Having strong positive relationships, those with good support and satisfaction, brings out emotions of happiness, security, and general well-being, and can promote peaceful sleep. Kent, Uchino, Cribbet, Bowen, and Smith (2015) found that positive relationships are significantly correlated with positive sleep quality using the PSQI.

Closeness of positive relationships is also related to achieving seven to nine hours of high quality sleep. According to Kent et al. (2015), “Better sleep quality was evident when one had supportive parents, a supportive significant other, supportive other family members, or supportive friends” (p. 914). In many ways having positive family ties and close relationships are positive reinforcements; having positivity leads to well-being and good sleep, which reinforces the behavior.

While positive relationships promote well-being and security, negative relationships and ‘aversive ties’ do the exact opposite. Kent et al. (2015) demonstrated that, while positive relationships improve and increase the likelihood of achieving seven to nine hours of sleep, aversive relationships hinder the ability to get good sleep. Understanding how relationships
impact sleep quality is important in considering how to educate people with sleep issues and better understand the cause behind those sleep issues.

**Psychological Distress and Sleep**

*Emotional distress.* Seixas et al. (2015) specifically examined emotional distress defined as those who feel sad, nervous, restless, hopeless, and burdened over a thirty-day period. The researchers defined healthy sleep duration as seven to eight hours of sleep and those reporting emotional distress had decreases in sleep amount, sleep quality, and sleep efficiency which were related to increased rates of depression, anxiety, and suicidal ideation. They found that people reporting emotional distress had 76% greater odds of reporting unhealthy sleep durations, with 55% greater odds after adjusting for sociodemographic and medical factors.

*Sleep quality.* Obtaining the recommended hours of sleep is important, but so is the quality of sleep, which determines how restful and energized someone feels after waking up can affect the rest of the day. Valerio et al. (2016) found that 20 to 60% of college students report poor sleep quality. The college student population is a vulnerable group due to their social maturity level and they have many stresses from schoolwork to social pressures. It is sometimes difficult to understand college students’ perception of physical health in relation to sleep because many with emotional health issues like stress, depression, and relationship problems often report overall health as good or excellent. Valerio et al. (2016) found that as students report poorer general health and increasing stress levels that sleep quality was significantly worse.

Concepcion et al. (2014) found that those reporting poor sleep quality and daytime sleepiness were more likely to have mental disorders that are related to psychological distress. Utilizing the PSQI, Suen, Hon, and Tam (2008) found that poor sleepers were more likely to bring worries to bed and display poorer sleep hygiene habits than good sleepers. Like other
researchers, they found that poor sleepers had later bedtimes, slept less total hours, had higher perceived fatigue, and had more daytime sleepiness. Poor sleepers slept 1.5 hours less than good sleepers and also went to bed later and woke up earlier than good sleepers. Those who habitually got less sleep had a significantly lower life satisfaction (Suen, Hon, & Tam, 2008). Poor sleep quality can lead to an increase in subjective fatigue. Depression and anxiety, which are symptoms of psychological distress, have a reciprocal relationship with sleep quality. Liffman, Thorsteinsson, Brown, and Hine (2012) found that psychological distress, specifically anxiety, and poor sleep predicted about half of the variance in fatigue severity. Those with psychological distress were more likely to have poorer sleep quality.

**Exercise.** Regular exercise can help promote well-being and can help combat cardiovascular disease, obesity, diabetes, and many other health issues. Some people may not know how important exercise is to overall sleep. Brand et al. (2014) demonstrated that greater exercise exertion leads to higher sleep efficiency, more deep sleep, and decreased time to fall asleep. Exercising increases tiredness and overall mood among young adults. This is an important finding for providers to utilize when discussing with patients on ways to improve overall sleep. Helgadottir, Ekblom, and Forsell (2014) studied how psychological distress was affected by both perceptions about exercise and those who participate in regular exercise. They found that those who regularly participated in exercise or had positive opinions on the positive effects of exercise both had lower distress levels than those who did not exercise or had negative opinions on exercise. This information indicates that engaging students with a positive outlook on the effects of exercise and encouraging students to get active can help decrease levels of distress.
**Caffeine.** Students may use caffeine to feel more energized during the day since it is a stimulant, which decreases the awareness of needing to sleep. Caffeine use is associated with a late-night preference behavior and ultimately a decreased amount of nighttime sleep (Tran et al., 2014). Those who drink caffeine typically have a much higher preference for staying up late. Caffeine drinkers had a 22% increase in daytime sleepiness as a result of inadequate sleep (Tran et al., 2014). Valerio et al. (2016) found that 60% of students used stimulants, including caffeine, which was associated with a marked reduction in sleep quality. According to Ogeil and Phillips (2015), caffeine dependence decreases sleep quality and increases daytime dysfunction. Those with higher caffeine use were shown to have higher psychological distress (Ogeil & Phillips, 2015).

**Alcohol use.** Drinking alcohol disturbs the physiology of sleep by disrupting the sleep architecture, especially in the second half of sleep, leading to increased daytime sleepiness, and decreased alertness (Singleton & Wolfson, 2009). These authors looked at how heavy alcohol use in college students affected sleep-wake schedules. In this study, 80% of college students had bedtimes past 12 am, but those who drank more alcohol had less nighttime sleep, went to bed later and slept more on the weekends than weekdays, which can also disturb weekday sleep (Singleton & Wolfson, 2009). Interestingly, the amount of alcohol consumed in a day was statistically significant, but not the frequency of alcohol use in a given week, which was assessed by asking how many times they had five or more drinks in a row within two hours.

When thinking about alcohol in relation to mental health, it is important to understand the reciprocal nature of both behaviors. Adolescence is a time of trying new things and is often when people start drinking, with harmful drinking peaking towards early adulthood (Pape & Norstrom, 2016). Problems with mood, emotion and anxiety tend to increase at this vulnerable stage in life,
and these risk factors may influence alcohol consumption (Pape & Norstrom, 2016). One difficulty with research in this topic is the directionality of the relationship between alcohol and psychological distress and mental health. It is often asked whether people drink and therefore are at a higher risk of distress, or do people with distress drink alcohol more. Pape and Norstrom (2016) found that those who have heavy episodic drinking were more likely to have depressive symptoms. Evidence examining the relationship between alcohol use and anxiety was much weaker. Valerio et al. (2016) found a dose-response relationship with alcohol consumption contributing to poorer sleep quality, increased nighttime awakenings, and decreased sleep durations. The authors also found that those who did not drink actually spent less time studying, socialized more, and reported better sleep quality than those who drank alcohol.

**Methods**

This project utilized a retrospective chart review. This project was reviewed and accepted by the Institutional Review Board (IRB) at Wright State University (Appendix A). Data were obtained from two sources; (1) A patient intake form used by the Counseling and Wellness Services (CWS) at Wright State University, also known as Standardized Data Set (SDS) (CCMH, 2016) (Appendix B), and (2) the Counseling Center Assessment of Psychological Symptoms-34 (CCAPS-34) (Appendix C). Students are asked at initial intake to complete both the SDS form and the CCAPS-34 before seeing a counselor.

**Standardized Data Set (SDS)**

The Center for Collegiate Mental Health (CCMH) created the SDS and was the product of collaboration between hundreds of university and college counseling centers in 2006 (CCMH, 2016). A student completes the SDS during their first contact for services at CWS and it is updated annually. In addition to the standard demographic data collected by CCMH, specific
items regarding sleep were added by CWS for clinical purposes. Validity or reliability statistics for these items are not available.

**Counseling Center Assessment of Psychological Symptoms (CCAPS-34)**

According to Youn et al. (2015), the CCAPS-34 (Appendix C) was created by University of Michigan counseling and psychological services in 2001 and donated to the University of Pennsylvania for the use in college counseling centers and housed under CCMH. Clinicians use this instrument to collect internally valid data for empirical analysis and to get information to assess a client’s needs. The CCAPS-34 is typically administered before each clinical visit and is used to track progress throughout the treatment process. It calculates a Distress Index (DI) that averages all questions in the CCAPS-34; higher index scores indicate higher distress. A Likert scale from zero (*not at all like me*) to four (*extremely like me*) is used by participants to describe thoughts and behaviors in the past two weeks. The survey typically takes two to three minutes to complete. There are seven subscales: depression, generalized anxiety, social anxiety, academic distress, eating concerns, hostility, and alcohol use. These subscales are standardized to a national average and categorized into three ranges: low, moderate, and high based on percentiles of raw scores. Low scores represent students who likely experience little-to-no distress. Moderate scores are viewed as potentially problematic with need for further assessment. High scores were determined using CCAPS and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) diagnostic data which represent high levels of distress indicating further assessment into the individual subscales for an appropriate diagnosis (Center for Collegiate Mental Health [CCMH], 2015). The Distress Index has demonstrated good concurrent and discriminant validity with other established measurements, test-retest two-week reliability score.
of 0.88, internal consistency score of 0.92, and a reliable change index score of 0.80 (Youn et al., 2015).

**Variables**

The variables analyzed were overall Distress Index (DI) standardized score from CCAPS-34 and the various sleep questions included in the SDS: During the past month; how would you rate your overall sleep quality, bedtime, wake time, amount of time to get to sleep, total hours of sleep, and how often have you used medicine/drugs/alcohol to help sleep. Exercise and caffeine consumption were also analyzed. The answers to these questions were analyzed and compared across distress level groups. ClientID and CasenoteID were numbers assigned to each student and were used to keep track of individual cases so the first CCAPS-34 submission for each student could be paired with their initial SDS submission.

**Data Management**

Data were retrieved from cases starting January 1, 2014, through December 31, 2015, and de-identified by the CWS director prior to investigators receiving data. There were initially 3,364 CCAPS-34 cases. All CCAPS-34 data that were not collected on initial intake, and therefore did not have corresponding SDS intake information, were removed. All other cases with missing data or incomplete responses were removed, resulting in 958 cases. All 1,282 SDS intakes from the given dates were retrieved. Cases from any client less than 18 years old were removed because the IRB approval was restricted to adults. All cases where two or more sleep questions were not answered were removed if one of the questions not answered was total hours slept. All cases with three or more sleep questions unanswered (regardless of which question) were removed. All remaining SDS and CCAPS-34 cases were merged via both ClientID and
CasenoteID and all cases missing either SDS or CCAPS-34 data were removed. After all cases meeting exclusion criteria were removed, 767 cases remained for analysis.

**Data Recoding Procedure**

All birthdates were converted to age in years. All self-reported times for ‘What time do you go to bed’ and ‘What time do you wake up’ were converted to military time and rounded to the nearest half-hour. Any time given as a range of times was averaged and reported as a single time. Responses to the question ‘How many minutes does it take to fall asleep’ were converted to minutes and the average was used for any answers given as a range. Any reported errors from students in reporting PM vs AM were changed by the researcher if it was evident that they meant AM. Most responses that were changed were those reporting bedtimes of 12:00PM instead of AM. Responses without a specific time were removed and classified as missing data.

Many question responses were converted to ordinal variables. Age was recoded based on ranges of 18 to 21, 22 to 25, 26 to 30, 31 to 40, 41 to 50, and 51 and older. GPA was recoded based on grade ranges: >3.5, 3.0 to 3.49, 2.5 to 2.99, 2.0 to 2.49, and below 2.0. Any unreported GPA was removed and classified as missing data. Total sleep hours were converted to categories of below 7 hours, between 7 and 9 hours (target behavior), and 9 hours or more of sleep. Time to fall asleep, bed times, and wake times were all collapsed into ordinal categories.

Cases were assigned and coded based on the *CCAPS Technical Manual* values for low, middle, and high distress (CCMH, 2012). Those reporting below 1.21 were categorized as being in low distress, between 1.22 to 2.14 as moderate distress, and 2.15 and above as high distress; these were then reported as three ordinal values. The total possible range of CCAPS Overall Distress values were 0 to 4.0.
Statistical Analyses

Analyses were conducted using SPSS 23.0 (IBM Corporation, 2015). Descriptive analyses were performed on all variables. The Distress Index raw scores and raw total hours of sleep per night were analyzed as dependent variables with all exposure variables relating to sleep as independent variables using an analysis of variance (ANOVA). A post-hoc Bonferroni adjustment was performed on all ANOVAs due to its conservative nature when conducting multiple post-hoc comparisons.

Results

The purpose of this project was to examine the relationship between sleep related behaviors and overall distress levels in college students. Data collected at Wright State University (WSU) Counseling and Wellness Services’ (CWS) intake, from the Standardized Data Set (SDS) the Counseling Center Assessment of Psychological Symptoms-34 (CCAPS-34), were analyzed to determine the nature of these relationships.

Sample Description

Seven-hundred sixty-seven (767) matched cases were analyzed for this study. The following sample information represents the demographic make-up of students presenting to the CWS office from January 1, 2014, to December 31, 2015. The students in this sample had an average age of 23.31 (SD = 5.67) with 80% between 18 and 25 years of age, were predominately female (59.7%), White (64.2%), and had an average GPA of 3.03 (SD = 0.71) (see Table 1). When compared to published descriptions of WSU’s student body (Forbes, 2015; Wright State University, 2016), the study sample is representative of the WSU student body, with a few exceptions; there were more females and undergraduates are represented in the sample.
Table 1

*Description of Sample Compared to Student Body*

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Student Body</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>18,059</td>
<td>767</td>
</tr>
<tr>
<td>Male</td>
<td>48%</td>
<td>39.80%</td>
</tr>
<tr>
<td>Female</td>
<td>52%</td>
<td>59.70%</td>
</tr>
<tr>
<td>Transgender</td>
<td>N/A</td>
<td>0.50%</td>
</tr>
<tr>
<td>Undergraduates</td>
<td>76%</td>
<td>86.40%</td>
</tr>
<tr>
<td>Graduate students</td>
<td>19%</td>
<td>12.40%</td>
</tr>
<tr>
<td>Doctoral/Professional Students</td>
<td>5%</td>
<td>1.20%</td>
</tr>
<tr>
<td>Mean age of all students</td>
<td>24 years</td>
<td>23.3 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Student Body</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>12.11%</td>
<td>18.50%</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
<td>0.20%</td>
<td>0.40%</td>
</tr>
<tr>
<td>Asian American</td>
<td>2.40%</td>
<td>6.60%</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>2.72%</td>
<td>2.40%</td>
</tr>
<tr>
<td>Native Hawaiian or Pacific Islander</td>
<td>0.13%</td>
<td>0.10%</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>3.79%</td>
<td>4.70%</td>
</tr>
<tr>
<td>White</td>
<td>71.64%</td>
<td>64.20%</td>
</tr>
<tr>
<td>Self-Identify/Unknown</td>
<td>0.95%</td>
<td>3.10%</td>
</tr>
<tr>
<td>Non-resident Alien</td>
<td>6.05%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Sources: Forbes, 2015; Wright State University, 2016
Descriptive Analysis: Sleep Characteristics and Behavior

Table 2 lists statistics regarding the various characteristics that were analyzed. The questions from the SDS and CCAPS-34 used to gain this information are in Appendix B and C.

Table 2

Description of Sleep Variables

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Values</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep Quality</td>
<td>Very Bad</td>
<td>13.7%</td>
</tr>
<tr>
<td></td>
<td>Fairly Bad</td>
<td>37.4%</td>
</tr>
<tr>
<td></td>
<td>Fairly Good</td>
<td>40.5%</td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>8.4%</td>
</tr>
<tr>
<td>Bedtime</td>
<td>3pm-9:30pm</td>
<td>3.7%</td>
</tr>
<tr>
<td></td>
<td>10pm-11:30pm</td>
<td>28.0%</td>
</tr>
<tr>
<td></td>
<td>12am-3am</td>
<td>63.0%</td>
</tr>
<tr>
<td></td>
<td>3:30am-12pm</td>
<td>5.3%</td>
</tr>
<tr>
<td>Wake Time</td>
<td>2am-6:30am</td>
<td>20.3%</td>
</tr>
<tr>
<td></td>
<td>7am-10am</td>
<td>69.7%</td>
</tr>
<tr>
<td></td>
<td>10:30am-12pm</td>
<td>10.0%</td>
</tr>
<tr>
<td>Time to Fall Asleep</td>
<td>0-10 minutes</td>
<td>18.5%</td>
</tr>
<tr>
<td></td>
<td>11-30 minutes</td>
<td>39.7%</td>
</tr>
<tr>
<td></td>
<td>31-60 minutes</td>
<td>26.3%</td>
</tr>
<tr>
<td></td>
<td>Over 60 minutes</td>
<td>15.6%</td>
</tr>
</tbody>
</table>
Table 2. *Description of Sleep Variables* (continued)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Values</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hours of Sleep</td>
<td>Below 7 hours</td>
<td>58.5%</td>
</tr>
<tr>
<td></td>
<td>Between 7-9 hours</td>
<td>38.5%</td>
</tr>
<tr>
<td></td>
<td>Above 9 hours</td>
<td>3.1%</td>
</tr>
<tr>
<td>Frequency of drug or alcohol use to help sleep</td>
<td>0 times</td>
<td>70.3%</td>
</tr>
<tr>
<td></td>
<td>Less than once per week</td>
<td>12.0%</td>
</tr>
<tr>
<td></td>
<td>Once or twice per week</td>
<td>7.9%</td>
</tr>
<tr>
<td></td>
<td>Three or more times per week</td>
<td>9.8%</td>
</tr>
<tr>
<td>Exercise</td>
<td>None</td>
<td>41.6%</td>
</tr>
<tr>
<td></td>
<td>Current</td>
<td>47.8%</td>
</tr>
<tr>
<td></td>
<td>Previous</td>
<td>10.6%</td>
</tr>
<tr>
<td>Caffeine</td>
<td>None</td>
<td>36.3%</td>
</tr>
<tr>
<td></td>
<td>Current</td>
<td>60.2%</td>
</tr>
<tr>
<td></td>
<td>Previous</td>
<td>3.5%</td>
</tr>
<tr>
<td>Grade Point Average</td>
<td>Below 2.0</td>
<td>7.2%</td>
</tr>
<tr>
<td></td>
<td>2.0-2.49</td>
<td>12.2%</td>
</tr>
<tr>
<td></td>
<td>2.5-2.99</td>
<td>20.5%</td>
</tr>
<tr>
<td></td>
<td>3.0-3.49</td>
<td>26.4%</td>
</tr>
<tr>
<td></td>
<td>3.5 and above</td>
<td>33.6%</td>
</tr>
<tr>
<td>Distress Levels</td>
<td>Low Distress</td>
<td>25.9%</td>
</tr>
<tr>
<td></td>
<td>Moderate Distress</td>
<td>32.6%</td>
</tr>
<tr>
<td></td>
<td>High Distress</td>
<td>41.5%</td>
</tr>
</tbody>
</table>
Slightly more than half (51.1%) of CWS clients reported poor sleep quality. CWS clients reported bedtimes ranging from 3pm to 12pm with the majority (90.9%) going to bed between 10pm and 3am, with the median value at 2am. Reported wake times ranged from 2am to 10pm, with a median wake time of 8am. The majority of students (96.6%) report waking up between 5am and noon. The average time to fall asleep was 44 minutes with 58.2% of students reporting less than 30 minutes to fall asleep. Only 38.5% of students met the recommended sleep amount of seven to nine hours of sleep with the average at 6.35 hours. The majority (70.3%) of students reported never using drugs or alcohol to help them sleep. Students were mostly even with their reported frequency of exercising with 41.6% reporting not exercising and 47.8% reporting current exercise. The majority (60.2%) of students reported current caffeine use. Most students (60%) reported a 3.0 (B average) GPA and better. A total of 74.1% of students reporting to the CWS had moderate to high distress levels.

**Inferential Analysis: Overall Distress and Sleep Characteristics**

Analysis of variance (ANOVA) with post hoc Bonferroni measures were performed to determine the relationship between Overall Distress index scores and sleep quality variables. The same inferential analyses were used to determine the relationship between achieving seven to nine hours of sleep and the sleep quality variables. Statistical significance was determined at a level of $\alpha \leq 0.05$.

**Do those participants indicating perceived poorer quality of sleep present with higher distress?** A one-way ANOVA compared the effect of perceived sleep quality (very bad, fairly bad, fairly good, and very good sleep) on overall distress scores. There was a statistically significant relationship between perceived sleep quality and overall distress $[F_{(3, 761)} = 96.3, p<0.0001]$. A post-hoc comparison revealed that overall distress was lower in those reporting
better sleep quality; very good (0.79 ± 0.88, p<0.0001), fairly good (1.54 ± 0.82, p<0.0001), and fairly bad (2.17 ± 0.72, p=0.001), compared to very bad (2.51 ± 0.78, p<0.0001). All four sleep quality categories showed statistically significant differences in post-hoc comparison analyses. The results suggest that those who report having poorer sleep quality were more likely to present with higher distress.

**Do those participants sleeping fewer hours of sleep per night present with higher distress?** A one-way ANOVA was conducted to compare the effect of total hours of sleep per night (less than seven hours, between seven and nine, and over nine hours of sleep) on overall distress scores. There was a statistically significant relationship of total hours of sleep on overall distress [F (2, 746) = 35.7, p<0.0001]. A post-hoc comparison revealed that overall distress is lowest in those reporting seven to nine hours of sleep (1.50 ± 0.91, p<0.0001) and highest in those sleeping less than seven hours of sleep (2.06 ± 0.86, p<0.0001). There was no statistically significant difference in overall distress for those sleeping less than seven hours and greater than nine hours (2.04 ± 0.87, p=1.000). Those sleeping between seven and nine hours showed less overall distress than those sleeping more than nine hours (p=0.016). The results suggest that those who self-report less than seven and more than nine hours of sleep were more likely to present with higher distress.

**Does average bed time affect overall distress?** A one-way ANOVA compared the effect of average bedtime (3pm to 9:30pm, 10pm to11:30pm, 12am to 3am, and 3:30am to12pm hours) on overall distress. There was a statistically significant relationship between bedtime and overall distress scores [F (3, 746) = 12.3, p<0.0001]. A post-hoc comparison revealed that overall distress was lower in those reporting bedtimes at 10pm to11:30am (1.62 ± 0.93), compared to 12am to 3am (1.91 ± 0.87, p=0.001) and 3:30am to 12pm (2.45 ± 0.76, p<0.0001). There was no
SLEEP BEHAVIORS, DISTRESS AND ADEQUATE SLEEP

statistically significant relationship between 10pm to 11:30pm bedtimes and 3pm to 9:30pm (1.61 ± 1.00, p=1.00). Those students reporting bedtimes past 3:30am had significantly higher distress than all other bedtime groups (3pm to 9:30pm, p=0.001; 10pm to 11:30pm, p<0.0001; 12am to 3:30am, p=0.001). It appears that those reporting bedtimes before midnight were less likely to have distress than those reporting bedtimes after midnight.

**Does average wake time affect overall distress?** A one-way ANOVA was conducted to compare the effect of average wake time (2am to 6:30am, 7am to 10am, and 10:30am to 12pm hours) on overall distress. There was not a statistically significant effect of wake time on overall distress \[F (2, 749) = 2.0, p=0.141\]. The time a person wakes up did not appear to predict whether or not he or she had higher levels distress.

**Do participants reporting longer time to fall asleep have higher distress?** A one-way ANOVA was conducted to compare the effect of time to fall asleep (0 to 10 minutes, 11 to 30 minutes, 31 to 60 minutes, and greater than 61 minutes) on overall distress. There was a statistically significant relationship between amount of time to fall asleep and overall distress \[F (3, 727) = 38.8, p<0.0001\]. A post-hoc comparison revealed that overall distress was lower in those who fall asleep in 0 to 10 minutes (1.37 ± 0.94) compared to 11 to 30 minutes (1.64 ± 0.90, p=0.020), 31 to 60 minutes (2.20 ± 0.76, p<0.0001), and greater than 61 minutes (2.23 ± 0.76, p<0.0001). The 11 to 30 minute group also showed statistically significant differences in distress from 31 to 60 minutes (p<0.0001) and greater than 61 minutes (p<0.0001). Differences in distress between those students taking 31 to 60 minutes to fall asleep and more than 61 minutes to fall asleep were not statistically significant (p=1.000). All groups taking longer than 30 minutes to fall asleep had similar distress scores. The results suggest that taking less than 30 minutes to fall sleep was associated with lower overall distress.
Does taking alcohol or other drugs to help sleep affect overall distress?
A one-way ANOVA compared whether the average frequency of drug/alcohol use to help fall asleep (zero times, less than once per week, once or twice per week, and more than three times per week) was related to overall distress. There was a statistically significant relationship between drug/alcohol use to help sleep and overall distress \( [F_{(3,754)} = 24.2, p<0.0001] \). A post-hoc comparison revealed that overall distress was lowest in those who reported never using drugs or alcohol to help them sleep \((1.64 \pm 0.89)\) compared to those who consumed drugs or alcohol less than once per week on average \((2.16 \pm 0.85, p<0.0001)\), once or twice per week on average \((2.42 \pm 0.77, p<0.0001)\), and three or more times per week on average \((2.38 \pm 0.73, p<0.0001)\). There were no statistically significant differences in distress between the other groups. The results suggest that those who never used drugs or alcohol to help them sleep were more likely to have lower distress.

Do those who exercise regularly present with lower distress? A one-way ANOVA was conducted to examine the effect of exercise (none, current, or previous) on overall distress. There was a statistically significant relationship between exercise and overall distress \( [F_{(2,731)} = 9.32, p<0.0001] \). A post-hoc comparison revealed that overall distress was lowest in those reporting that they currently exercise \((1.69 \pm 0.92)\) compared to those who reported that they do not exercise \((2.00 \pm 0.88, p<0.0001)\). There was not a statistically significant difference in distress between those who currently exercise and those who exercised previously \((1.80 \pm 0.91, p=1.00)\). The results suggest that those who reported current exercise were less likely to be distressed compared to those who reported not exercising at all.

Do those who consume caffeine regularly have higher distress? A one-way ANOVA was conducted to compare the effect of caffeine use (none, current, or previous) on overall
distress. There was a statistically significant relationship between caffeine use and overall distress \([F_{(2, 739)} = 7.23, p=0.001]\). A post-hoc comparison revealed that overall distress was lowest in those who reported that they do not consume caffeine (1.67 ± 0.98) compared to those who reported that they currently consume caffeine (1.93 ± 0.84, \(p=0.001\)). There were no statistically significant differences in distress between those who did not consume caffeine and previous caffeine consumption (2.04 ± 1.07, \(p=0.149\)). Results suggest that those who reported no caffeine consumption are more likely to have lower distress than those who consume caffeine currently.

**Do participants with lower grade point averages have higher distress?** A one-way ANOVA was conducted to assess the effect of grade point average on overall distress. There was not a statistically significant relationship between grade point average and overall distress \([F_{(4, 740)} = 1.79, p=0.130]\).

**Inferential Analyses: Total Sleep Hours and Sleep Characteristics**

**Do those participants indicating perceived poorer quality of sleep obtain less sleep than those with better quality sleep?** A one-way ANOVA was conducted to compare the effect of perceived sleep quality (very bad, fairly bad, fairly good, or very good sleep) on total hours of sleep. There was a statistically significant relationship between perceived sleep quality and total hours of sleep \([F_{(3, 743)} = 71.20, p<0.0001]\). A post-hoc comparison revealed that total hours of sleep were lowest in those reporting very poor sleep quality (5.12 ± 2.60) compared to fairly bad (5.82 ± 1.26, \(p<0.0001\)), fairly good (6.98 ± 1.27, \(p<0.0001\)), and very good (7.83 ± 1.20, \(p<0.0001\)). All four sleep quality categories showed statistically significant differences from each other in post-hoc comparison analyses. The results suggest that those who reported having poorer sleep quality were more likely to report sleeping less.
Do those participants with higher distress report sleeping fewer hours? A one-way ANOVA was conducted to compare the effect of overall distress (low, moderate, or high) on total hours of sleep. There was a statistically significant relationship of overall distress and total hours of sleep \[F (2, 746) = 20.68, p<0.0001\]. A post-hoc comparison revealed total hours of sleep was lowest in those with high distress (5.97 ± 1.99, p<0.0001) compared to moderate distress (6.38 ± 1.48, p=0.012), and low distress (6.94 ± 1.30, p<0.0001). The difference in sleeping hours for the moderate distress group and the low distress group was statistically significant as well (p=0.001). The results suggest that sleeping fewer hours per night was a predictor of higher levels of distress.

Is bedtime related to total hours of sleep? A one-way ANOVA was conducted to compare the effect of bedtime (3pm to 9:30pm, 10pm to 11:30pm, 12am to 3am, or 3:30am to 12pm) on total hours of sleep. There was a statistically significant relationship between bedtime and total hours of sleep \[F (3, 729) = 18.4, p<0.0001\]. A post-hoc comparison revealed that total hours of sleep was highest in those reporting bedtimes between 3pm to 9:30pm (7.55 ± 2.87) compared to 12am to 3am (6.18 ± 1.61, p<0.0001) and 3:30am to 12pm (5.15 ± 1.87, p<0.0001). There was no statistically significant difference in total hours of sleep between students going to be between 3pm and 9:30pm and those going to bed between 10pm and 11:30pm (6.81 ± 1.44, p=0.150). Students reporting bedtimes from 10pm and 11:30pm had more sleep than those whose bedtimes were between 12am and 3am (p<0.0001) or 3:30am and 12pm (p<0.0001). Those reporting bedtimes from 12am to 3am had more sleep than those whose bedtimes were 3:30am to 12pm (p=0.001). The results suggest that students who went to bed between 3:00pm and 9:30pm were more likely to achieve the adequate seven to nine hours of sleep, compared to
students who went to bed at all other times. The later someone reported going to bed, the more likely they were to get less sleep.

**Does average wake time affect total hours of sleep per night?** A one-way ANOVA was conducted to compare the effect of average wake time (2am to 6:30am, 7am to 10am, or 10:30am to 12pm hours) on total hours of sleep. There was a statistically significant relationship between wake time and total hours of sleep \( F (2, 732) = 11.5, p<0.0001 \). A post-hoc comparison revealed that total hours of sleep was lowest in those reporting wake times of 2am to 6:30am (5.80 ± 2.03) followed by those reporting wake times between 7am and 10am (6.44 ± 1.51, p<0.0001) and those who woke up between 10:30am and 12pm (6.93 ± 2.09, p<0.0001). There was no statistically significant difference in total hours of sleep between those waking up between 7am and 10am and those waking up between 10:30am and 12pm (p=0.230). The results suggest that those waking up earlier than 7am were more likely to report sleeping fewer hours than those waking up at 7am or later.

**Do participants reporting longer time to fall asleep sleep fewer hours?** A one-way ANOVA was conducted to compare the effect of time to fall asleep (0 to 10 minutes, 11 to 30 minutes, 31 to 60 minutes, or 61 minutes or greater) on total hours of sleep. There was a statistically significant relationship between amount of time to fall asleep and total hours of sleep \( F (3, 709) = 34.95, p<0.0001 \). A post-hoc comparison revealed that there was no statistically significant difference in total hours of sleep between those who took 0 to 10 minutes to fall asleep (7.00 ± 1.82) and those who took 11 to 30 minutes to fall asleep (6.73 ± 1.34, p=0.571); both groups had achieved more hours of sleep than those who fell asleep in 31 to 60 minutes (5.92 ± 1.49, p<0.0001), and those who took 61 minutes or longer to fall asleep (5.35 ± 1.57, p<0.0001). The 31 to 60 minute group also had a statistically significant lower difference in total
sleep hours from the students who took longer than 60 minutes (p=0.011). The results suggest that those taking longer than 30 minutes to fall asleep were more likely to report sleeping fewer hours.

**Does taking alcohol or other drugs to help sleep affect total hours of sleep?** A one-way ANOVA was conducted to compare whether the frequency of drug/alcohol use to help fall asleep (zero times, less than once per week, once or twice per week, or more than three times per week) was related to total hours of sleep. There was a statistically significant relationship between drug/alcohol use to help sleep and total hours of sleep \[F (3, 737) = 3.7, p=0.011\]. A post-hoc comparison revealed that total hours of sleep were highest in those reporting never using drugs or alcohol to help them sleep (6.47 ± 1.63) compared to those who reported using drugs or alcohol to fall asleep once or twice per week (5.73 ± 1.76, p=0.011). There were no statistically significant differences in total hours of sleep between those students who reported no drug or alcohol use and those who reported using drugs or alcohol to fall asleep less than once per week (6.18 ± 1.60, p=0.774) and three or more times per week (6.34 ± 2.26, p=1.000). There were no other statistically significant differences in total hours of sleep between the other groups. While these counterintuitive reports of no significance with increasing drug or alcohol use and increased sleep, these reports may be likely due to smaller sample sizes as drug or alcohol use increases. Overall, the results suggest that those who reported never using drugs or alcohol to help them sleep were more likely to sleep longer compared to those who used drugs or alcohol once or twice a week.

**Do those who exercise regularly achieve more total hours of sleep?** A one-way ANOVA was conducted to examine the effect of exercise (none, current, or previous) on total hours of sleep. There was no statistically significant relationship between exercise and total
hours of sleep \[F(2, 718) = 1.80, p=0.166\]. The results suggest that exercise did not affect total hours of sleep.

**Do those who consume caffeine regularly sleep less?** A one-way ANOVA was conducted to compare the effect of caffeine use (none, current, or previous) on total hours of sleep. There was a statistically significant relationship between caffeine use and total hours of sleep \[F(2, 726) = 3.43, p=0.033\]. A post-hoc comparison revealed that total hours of sleep was highest in those reporting that they did not consume caffeine (6.58 ± 1.67) compared to those who reported that they currently consume caffeine (6.24 ± 1.71, p=0.027). There were no statistically significant differences in total hours of sleep between those who reported no caffeine consumption and previous caffeine consumption (6.36 ± 1.56, p=1.000). Results suggest that those reporting no caffeine consumption were more likely to sleep longer than those who consumed caffeine currently, although results should be interpreted with caution given that the difference was only approximately 20 minutes.

**Do participants with lower grade point averages sleep less?** A one-way ANOVA was conducted to compare the effect of grade point average on total hours of sleep. There was not a statistically significant relationship between grade point average and total hours of sleep \[F(4, 722) = 1.38, p=0.239\].

**Discussion**

To the best of the researcher’s knowledge, this was the first study that used CCAPS-34 data in a college population in order to examine the relationship between overall distress levels and sleep hygiene behaviors.

The results from this study showed 51.1% of students report poor sleep quality. This result supports the findings of previous studies that have shown between 50 to 60% of college
students report lack of sleep and daytime sleepiness (Hershner & Chervin, 2014; Vargas et al., 2014), and 25 to 50% of 18 to 29 year olds in the 2011 *Sleep in America Poll* reported poor sleep quality (Valerio et al., 2016).

The results from this study also lend support to previous research findings (Knowlden et al., 2011; Lund et al., 2010) that U.S. adults and college students are not typically getting the recommended seven to nine hours of sleep per night. Vargas et al. (2014) found that one-quarter of college students reported that sleep difficulties were traumatic or difficult to handle.

Additionally, this study found evidence that a significant proportion (32.6%) of college students who utilize campus counseling services score in the moderate range for distress, meaning they had potentially problematic distress and further assessment was required, and even more (41.5%) could be classified as high distress which were more than likely to be evaluated and given a further diagnosis. The CCMH *2015 Annual Report* (CCMH, 2016) showed that average overall raw distress scores for college students have been slowly increasing over the last five years.

Higher levels of distress in college students could be due to the fact that these students are under a lot of stress and pressures from both education and social expectations. It is also reasonable that the high prevalence of distress is due to the fact that this sample and the mean reported from the *CCMH 2015 Annual Report* reports statistics from a group of college students who are presenting to collegiate mental health centers (CCMH, 2016). It is more likely that those who come to the CWS for evaluation for services have higher distress levels than the average college student. While this is important to consider, it is also important to consider that there may also be just as many students with high distress who do not seek services.
Several sleep behaviors are related to overall distress and not achieving the recommended number of hours of sleep in students presenting to CWS. Table 3 indicates whether or not a statistically significant relationship was found between predictors and increased distress and fewer hours of sleep. While the study methodology does not allow for the testing of causality, it is important to understand factors that contribute to distress and sleep problems, as it may allow for further education and treatment.

Table 3

*Relationship between Predictors, Overall Distress, and Total Hours of Sleep*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Variable Predicted Increased Distress?</th>
<th>Variable Predicted Fewer Hours of Sleep?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Distress level</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Fewer Hours of Sleep</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>Poorer Sleep Quality</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Later Bed Time</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Earlier Wake Time</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Longer Time to Fall Asleep</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>More Frequent Alcohol/Drug use to Fall Asleep</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Lack of Exercise</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Caffeine Consumption</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Grade Point Average</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
In this sample, perceived sleep quality was lower in those with higher levels of distress and those who were sleeping fewer hours per night. These findings are consistent with previous studies, such as Liffman et al. (2012) and Valerio et al. (2016) who found increasing levels of stress in those reporting worse sleep quality. While the results of this current study showed that distress levels were affected by perceived sleep quality, it is likely that there is a covariate relationship between the two variables. Individuals with higher levels of distress are probably more likely to have difficulty sleeping as a symptom of their psychological distress (Parekh, 2015) and those with poor sleep quality are more likely to have symptoms of distress (Concepcion et al., 2014). Similarly, those individuals who got less sleep on a regular basis were much more likely to have lower life satisfaction and perceived poor sleep (Suen et al., 2008). Therefore, it is important to address both concerns when working with a student who reports poor sleep and high distress.

It would make sense that those going to bed later than midnight may be more likely to sleep fewer hours and, as a result, have higher distress. This study found that those going to bed after 3:30am showed higher distress scores. This may be due to those students who may have trouble sleeping, or are choosing to stay up that late despite early classes and responsibilities, and therefore are not getting adequate sleep.

This study also examined whether the time someone wakes up is related to overall distress and found no statistically significant relationship. The lack of significance could be due to the wider variability in wake times compared to bedtimes. It is possible that as students’ schedules vary day to day, they wake up at variable times and report less accurate wake times on their intake form. Concepcion et al. (2014) suggested that those preferring both later bedtimes and later wake times tended to have poorer sleep quality, depression, and other psychiatric
disorders. It may be helpful to suggest regular bedtimes and wake times to students struggling with obtaining enough sleep or to those who have significant distress.

This study found a relationship between taking drugs or alcohol to help sleep and higher overall distress, as well as fewer hours of reported sleep. All groups that indicated using drugs or alcohol to aid sleep had high distress levels, whereas the one group indicating no drug or alcohol use had moderate distress. It was hypothesized that alcohol would be associated with higher levels of distress based on Pape and Norstrom’s (2016) finding that those who had heavy episodic drinking were more likely to have depressive symptoms. Singleton and Wolfson (2009) found that those who drank alcohol regularly had less sleep per night. A limitation to this question is that it combined both drugs (a non-specific description) and alcohol together into one question making it difficult to deduce if one has a stronger influence on distress levels than the other. It is also difficult to determine the directionality of this relationship because those who are not sleeping well and have higher levels of distress may be more likely to resort to drugs or alcohol to help them sleep. In general, education about the pros and cons for use of both alcohol and drugs for inducing sleep is important when working with a student population.

This study found that those who exercise regularly have lower distress. This finding supports results of previous studies that found individuals who exercise regularly had lower distress levels than those who did not (Helgadottir, Ekblom, & Forsell, 2014). While this analysis found a statistically significant relationship, it should be interpreted with caution due to the nature of the question asked on the intake form. The use of ‘previous’ exercise as a response option does not provide enough detail or insight into the person’s behavior and it is difficult to determine what is meant by ‘previous’ exercise. Additionally, the question does not provide detail about what ‘regular’ exercise means and how each person interprets the term; therefore, it
is difficult to determine how much exercise is necessary to lower distress levels based on this data. The question value is also weakened by the possibility that students may be more likely to report exercising regularly, as they may think that is the expected response, commonly referred to as social desirability bias (Fisher, 1992). This current study did not identify a relationship between exercise and total sleep hours although Brand et al. (2014) found exercising lead to better sleep efficiency and more deep sleep. This may be due to question wording or to the fact that achieving adequate sleep is dependent on so many different variables and exercise may be more weakly associated. The National Sleep Foundation (2009) suggests that exercising close to bedtime may lead to poor sleep at night and recommends avoiding exercise three hours before bedtime. It is possible that some students exercising regularly are working out late at night and therefore are reporting fewer hours of sleep.

This study also found that students who consume caffeine regularly have higher distress and sleep fewer hours per night. These findings were expected as Ogeil and Phillips (2015) showed that those with caffeine dependence had higher daytime dysfunction and had higher psychological distress and Tran et al. (2014) found that caffeine use led to decreased nighttime sleep. Like the question about exercise, this question does not indicate how much caffeine use was reported or what previous caffeine use meant. It is impossible to determine what level of caffeine use leads to higher distress levels. While the question format lacks specificity, the findings that caffeine use is associated with distress and fewer hours of sleep per night are consistent with previous studies. It is important to consider the impact that caffeine dependence may have on overall sleep and distress in college students.

This study found no relationship between whether those with lower grade point averages would have higher distress or lower amount of sleep. Notably, previous data found a significant
relationship between various sleep variables and GPA. Taylor et al. (2013) found that students with later bedtimes and wake times, and increased nap time were found to have lower grade point averages. They also found that the greater variability in bedtimes, wake times, total sleep time, and sleep efficiency were also related to lower GPAs. These findings highlight the importance of educating students on good sleep behaviors to help with academic success.

Public Health Implications

The *Healthy People 2020* goals include: Increase public knowledge of how adequate sleep and treatment of sleep disorders improve health, productivity, wellness, quality of life, and safety on roads and in the workplace (U.S. DHHS, DPHP, n.d.). This goal highlights many of the potential benefits of obtaining adequate sleep. Knowlden and Sharma (2014) provide evidence of the relationship between poor sleep and higher rates of morbidity and mortality and Perrier et al. (2014) demonstrate the dangers of drowsy driving. With only 30% of college students sleeping more than eight hours of sleep, 50% reporting daytime sleepiness and 10% meeting criteria for insomnia, poor sleep is a concern on many college campuses (Hershner & Chervin, 2014; Lund et al., 2010).

The college environment is often very different than the workforce or even high school. Classes may start at different times each day, which may lead to variable bedtimes and wake times. Brown, Buboltz, Walter, and Soper (2002) reported that those with earlier classes during the week had larger sleep-wake variations. For a student exhibiting high distress, recommending later class times or more consistent bedtimes and wake times may be helpful.

College students are under many different pressures, including social pressures to meet new people and academic pressures with assignments and exams ebbing and flowing throughout the year. For many students, academic success is important for career advancement, and further
education combined with the expectation to get involved with research, internships or student organizations which adds another layer of pressure to many students. Understanding the various sources of stress college students face, may help educators and counselors focus on causes of poor sleep and distress.

This study focused on possible relationships of both high distress and poor sleep in college students with many relating to sleep behaviors. The results highlight the importance of prevention and education about sleep hygiene in college students. Offices such as WSU’s Counseling and Wellness Services should consider the relationship between sleep behaviors, lack of adequate sleep and high distress. Oftentimes, students present to the counseling services with distress, and the data in this study would suggest that education regarding sleep hygiene could have significant potential to reduce this distress.

Health promotion and prevention is crucial in this population to help decrease the number of sleep-deprived students on college campuses. Brown et al. (2002) reported that knowledge of correct sleep behaviors and sleep hygiene were weakly positively correlated; education is key to improving good sleep hygiene. Although these findings were weak, they found a stronger correlation between those who practice good behaviors and sleep quality. This finding, using the Sleep Hygiene Awareness and Practice Scale (SHAPS) tool, highlights that although educating students on sleep hygiene may have a helpful impact, encouraging students to practice these behaviors has a larger impact. The SHAPS instrument may be useful in clinical settings. Brown et al. (2002) suggest that sleep-wake schedules should be emphasized more than most other sleep behaviors.

Sleep hygiene education and promotion should be emphasized on college campuses. Schools should consider creative ways to disseminate information on sleep hygiene and its
importance to student success. Many schools have first-year seminars and welcome week events where faculty have the chance to interact with students, having the counseling or health center provide valuable information regarding sleep hygiene could be useful. Providing information which is easily accessible on counseling or health center websites can be helpful. Students love free things, so giveaways like sleep masks with information on how to access sleep hygiene information may be helpful. Offering group sessions focused on sleep hygiene would be a good way to interact with those struggling with poor sleep. It may also be helpful academic advisors and staff who regularly interact with students are required to participate in training on how to talk to students about sleep.

Limitations

While this study provided valuable insight into sleep hygiene in a college student population, it has some limitations. The sample size was large enough to warrant significant results, but it is only a small sample from one Midwestern university and therefore does not represent all college students across the country. The sample also represents only those students presenting to the WSU Counseling and Wellness Services for services. Another limitation was the design of the SDS intake form used by participants. Some data had to be averaged or removed due to the ability of the instrument to allow free text responses. A more standardized instrument with set times and responses could have allowed for more useable data. It would also help to reduce researcher bias by preventing errors and misinterpretations of free text data. As discussed previously, the SDS intake form only asked about current, previous, or no use of caffeine and regular exercise without any quantified measures. Additionally, the SDS intake form and CCAPS-34 have potential for recall bias as many of the questions asked participants to think back to the past month.
Recommendations for Future Research

It would be beneficial to those working with students on wellness and academic success to conduct additional analysis of CCAPS-34 data to identify other possible factors that affect distress and sleep hygiene. It would be helpful to use advanced statistical models to examine factors related to distress and sleep hygiene and to allow for examination of covariates and multi-stage relationships between various factors and sleep. Broadening the analysis to include the other questions on the SDS intake form may elicit more information regarding the development of overall distress. Some interesting topics include; gender identity, religious preference, past trauma experience, housing modality, diagnosed mental illness, and certain medical illnesses.

Conclusion

There are many factors in college students’ lives that can affect overall distress. This study demonstrated that poor sleep quality, fewer hours of sleep, later bedtime, longer time to fall asleep, alcohol/drug use, lack of exercise, and caffeine consumption all have a relationship with higher levels of distress. Additionally, poor sleep quality, higher levels of distress, later bedtime, early wake time, longer time to fall asleep, alcohol/drug use, and caffeine use are all related to students reporting fewer hours of sleep. Understanding how sleep hygiene can help decrease the likelihood of distress is an important consideration when working with students. This data helps people working with distressed college students identify possible behaviors that can be addressed and modified to help students build resilience.
References


doi:10.1016/j.sleep.2014.05.016


doi:10.1080/07448480109596017


DATE: March 08, 2016

TO: Neil Knight, PI, Student Counseling and Wellness Services
    Valerie Houseknecht, M.D., Faculty Advisor

FROM: Robyn Wilks, CIM Coordinator, WSU-IRB

SUBJECT: SCF6119

'The Relationship Between Sleep Hygiene and Psychological Distress in College Students Upon Initial Presentation to a University Counseling Center'

This memo is to verify the receipt and acceptance of your response to the conditions placed on the above referenced human subjects protocol/amendment.

These conditions were lifted on: 03/08/2016

This study/amendment now has full approval and you are free to begin the research project. If this is a VA proposal, you must still receive a letter of approval from the Research and Development Committee prior to beginning the research project. If this is a MVH proposal, you must still receive a letter of approval from the Human Investigation and Research Committee (HIRC) prior to beginning the research project. This implies the following:

1. That this approval is for one year from the approval date shown on the Action Form and if it extends beyond this period a request for an extension is required. (Also see expiration date on the Action Form)

2. That a progress report must be submitted before an extension of the approved one-year period can be granted.

3. That any change in the protocol must be approved by the IRB; otherwise approval is terminated.

If you have any questions concerning the condition(s), please contact me at 775-4462.

Thank you!

Enclosure
RESEARCH INVOLVING HUMAN SUBJECTS

ACTION OF THE WRIGHT STATE UNIVERSITY
EXPEDITED REVIEW
Assurance Number: FWA00002427

Title: *The Relationship Between Sleep Hygiene and Psychological Distress in College Students Upon Initial Presentation to a University Counseling Center*

Principal Investigator: Neil Knight, Ph.D. Student
Valerie Houseknecht, M.D., Faculty Advisor

Department: Counseling and Wellness Services

Expedited Category: 5

The Institutional Review Board has approved the use of human subjects on this proposed project with conditions previously noted. The conditions have now been removed.

REMINDEER: FDA regulations require prompt reporting to the IRB of any changes in research activity, changes in approved research during the approval period may not be initiated without IRB review (submission of an amendment), and prompt reporting of any unanticipated problems (adverse events).

Signed Coordinator, WSU-IRB

Expedited Review Date: February 05, 2016
IRB Meeting Date: March 21, 2016

This approval is effective only through: February 4, 2017
To continue the activities approved under this protocol you should receive the appropriate form(s) from Research and Sponsored Programs (RSP) two to three months prior to the required due date. If you do not receive this notification, please contact RSP at 775-2425.
Appendix B: Wright State University Counseling and Wellness Services Client Form

CONFIDENTIAL RECORD
Counseling and Wellness Services
Wright State University

Basic Client Information Form

UID Number: ____________________

Last Name ____________________
First Name ___________ Middle Name ___________ Today's Date ___________

Telephone Number(s): 
( ) Current Home Phone: ____________________
( ) Permanent Address Phone: ____________________
( ) Cell Phone: ____________________

Contact Limitations: May we contact you (and leave a message) at your:
Current home telephone number: ____________________ Yes __ No
Permanent address telephone number: ____________________ Yes __ No
Cellular telephone number: ____________________ Yes __ No

Current Address: Street ____________________ City ____________________ State ___________ Zip Code ___________

Permanent Address: Street ____________________ City ____________________ State ___________ Zip Code ___________

Name of current physician: ____________________
Complete address (if known): ____________________

State in your own words your reason for seeking services (please be as brief and specific as possible):

__________________________

Emergency Contact Information

Emergency Contact Name One ____________________ Telephone Number ( ) ____________________ Other Phone Number ( ) ____________________ Relationship to you ____________________

Emergency Contact Name Two ____________________ Telephone Number ( ) ____________________ Other Phone Number ( ) ____________________ Relationship to you ____________________

How did you learn about or who referred you to CWS? ____________________

Are you required to receive assessment or therapy services by another office (e.g. Community Standards and Student Conduct, Parole and Probation, Municipal Court, etc.)? ______ Yes ______ No

Are you insured by the Wright State University Student Health Insurance Program? ______ Yes ______ No
(If yes, please provide the secretary your insurance card so that a copy may be placed in your file)

Have you ever received services at Counseling and Wellness Services? ______ Yes ______ No

Current medications: ____________________

Please list any ongoing medical conditions for which you regularly see a medical provider: ____________________

Date of Birth: ___/___/______ Gender: _____ Female _____ Male _____ Transgender ______

What was your sex at birth: _____ Female _____ Male _____ Intersex ______

Self-identify gender identity: ____________________
Are you registered, with the office for disability services on this campus, as having a documented and diagnosed disability?  
Yes  No

If you selected, "Yes" for the previous question, please indicate which category of disability you are registered for (check all that apply):
- ADHD
- Deaf or Hard of Hearing
- Learning disorders
- Mobility impairments
- Neurological disorders
- Physical/health related disorders
- Psychological disorder/condition
- Visual Impairments
- Other (specify: ___)

Religious or spiritual preference:
- Agnostic
- Atheist
- Buddhist
- Catholic
- Christian
- Hindu
- Jewish
- Muslim
- No preference
- Self-identify (please specify: ___)

Race/Ethnicity:
- African-American/Black
- American Indian or Alaskan Native
- Asian American/Asian
- Hispanic/Latino
- Native Hawaiian or Pacific Islander
- Multi-racial
- White
- Self-identify (please specify: ___)

Major: ___

Academic status:
- Freshman / First-year
- Sophomore
- Junior
- Senior
- Graduate/Professional Degree Student
- Non-student
- High-school student taking college classes
- Faculty or Staff
- Other (specify: ___)

If you are in a Graduate or Professional Degree program, please specify:
- Masters
- Doctoral
- Medical
- Other (specify: ___)

Year in program: 1 2 3 4 5+ 6+

Relationship status:
- Single
- Serious dating or committed relationship
- Civil union, domestic partnership, or equivalent
- Married
- Separated
- Divorced
- Widowed

Sexual orientation:
- Heterosexual
- Lesbian
- Gay
- Bisexual
- Questioning
- Self-identify (please specify: ___)

Do you live in on-campus housing?  
Yes  No

If yes, which residence community?

With whom do you live?
- Alone
- Spouse/partner/significant other
- Roommate(s)
- Children
- Parent(s)/guardian(s)
- Other Family
- Other (please specify: ___)

Are you the first generation in your family to attend college?  Yes  No

How would you describe your financial situation right now?
- Always stressful
- Often stressful
- Sometimes stressful
- Rarely stressful
- Never stressful

How would you describe your financial situation while growing up?
- Always stressful
- Often stressful
- Sometimes stressful
- Rarely stressful
- Never stressful

What is your GPA? ___

What is your country of origin:

International student?  Yes  No

Transfer student?  Yes  No
Do you participate on an athletic team that competes with other colleges/universities? ___Yes ___No

What is the average number of hours you work per week during the school year (paid employment only)?________

Are you a member of ROTC? ___Yes ___No

Have you ever served in any branch of the US military (active duty, veteran, national guard or reserves)? ___Yes ___No

Did your military experiences include any traumatic or highly stressful experiences which continue to bother you? ___Yes ___No

If yes, please describe:_________________________________________________________________

Have you ever experienced a traumatic event that caused you to feel intense fear, helplessness, or horror?

___Never ___ 1 time ___ 2-3 times ___ 4-5 times ___ 6+ times

Last time: ___Last 2 weeks ___Last month ___Last year ___Last 1-5 years ___ More than 5 years ago

Please select the traumatic event(s) you have experienced or witnessed: (check all that apply)

___Childhood physical abuse
___Childhood sexual abuse
___Childhood emotional abuse
___Physical attack (e.g., mugged, beaten up, shot, stabbed, threatened with weapon)
___Sexual violence (rape or attempted rape, sexually assaulted, stalked, abused by intimate partner, etc.)
___Military combat or war zone experiences
___Kidnapped or taken hostage
___Serious accident, fire, or explosion (e.g., an industrial, farm, car, plane, or boating accident)
___Terrorist attack
___Near drowning
___Diagnosed with life threatening illness
___Natural disaster (e.g., flood, quake, hurricane, etc.)
___Imprisonment or Torture
___Animal attack
___Other (please specify)_____________________________________________________

Have you ever:

- Attended counseling for mental health concerns: __ Never __ Prior to college __ After starting college __ Both ______________________

- Taken a prescribed medication for mental health concerns: __ Never __ 1 time __ 2-3 times __ 4-5 times __ 6+ times ______

- Been hospitalized for mental health concerns: __ Never __ 1 time __ 2-3 times __ 4-5 times __ 6+ times ______

- Felt the need to reduce your alcohol or drug use: __ Never __ 1 time __ 2-3 times __ 4-5 times __ 6+ times ______

- Received treatment for alcohol or drug use: __ Never __ 1 time __ 2-3 times __ 4-5 times __ 6+ times ______

Think back over the last two weeks, how many times have you had: five or more drinks in a row (for males) OR four or more drinks in a row (for females)? (A drink is a bottle of beer, a glass of wine, a wine cooler, a shot glass of liquor, or a mixed drink,.)

___None ___Once ___Twice ___3 to 5 times ___6 to 9 times ___10 or more times

Think back over the last two weeks. How many times have you smoked marijuana?

___None ___Once ___Twice ___3 to 5 times ___6 to 9 times ___10 or more times

Others have expressed concern about your alcohol or drug use:

___Never ___1 time __ 2-3 times __ 4-5 times __ 6+ times ______
Do you ever get annoyed at criticism of your drinking or drug use?  ___ Yes  ___ No

Have you ever felt you ought to cut down on your drinking or drug use?  ___ Yes  ___ No

Do you ever feel guilty about your drinking or drug use?  ___ Yes  ___ No

Do you ever take an early morning drink or use drugs first thing in the morning to get the day started or to eliminate a hangover or "the shakes"?  ___ Yes  ___ No

Do you take prescription medications that are not prescribed for you?  ___ Yes  ___ No

- Purposely injured yourself without suicidal intent (e.g., cutting, hitting, burning, hair pulling, etc.):  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

- Seriously considered attempting suicide:  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

- Made a suicide attempt:  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

- Considered seriously injuring another person:  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

- Intentionally caused injury to another person:  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

- Someone had sexual contact(s) with you without your consent (e.g., you were afraid to stop what was happening, passed out, drugged, drunk, incapacitated, asleep, threatened or physically forced):  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

- Experienced harassing, controlling, and/or abusive behavior from another person (e.g., friend, family member, partner, or authority figure):  ___ Never  ___ 1 time  ___ 2-3 times  ___ 4-5 times  ___ 6+ times

Please respond to each item by circling the appropriate response.

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Current</th>
<th>Previous</th>
<th>Headaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>___</td>
<td>___</td>
<td>___</td>
<td><strong>During the past month, how would you rate your overall sleep quality?</strong></td>
</tr>
<tr>
<td>Very Good</td>
<td>Fairly Good</td>
<td>Very Bad</td>
<td>___</td>
</tr>
</tbody>
</table>

| 12:___ am     | 12:___ pm |
| ___           | ___       |

**During the past month, what time have you typically gone to bed at night?**

| 12:___ am     | 12:___ pm |
| ___           | ___       |

**During the past month, what time have you typically gotten up in the morning?**

| ___ minutes   |
| ___          |

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

| ___ hours     |
| ___          |

**During the past month, how many hours of actual sleep do you typically get at night? (this may be different from the number of hours that you spent in bed)**

| ___ times     |
| ___          |

**During the past month, how often have you taken medicine or other drugs/alcohol to help you sleep?**

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Current</th>
<th>Previous</th>
<th><strong>Weight loss:</strong> Number of lbs: ___ ; in what period of time: ___</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Current</th>
<th>Previous</th>
<th><strong>Weight Gain:</strong> Number of lbs: ___ ; in what period of time: ___</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Current</th>
<th>Previous</th>
<th><strong>Tobacco use:</strong> Number of per day: ___ ; how long: ___</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Current</th>
<th>Previous</th>
<th><strong>Drink Caffeine:</strong> How much each day: ___</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Current</th>
<th>Previous</th>
<th><strong>Exercise Regularly:</strong> How often: ___ ; How long: ___</th>
</tr>
</thead>
</table>

BJS 11/14 Revised
Appendix C: CCAPS-34 Questionnaire

**INSTRUCTIONS:** The following statements describe thoughts, feelings, and experiences that people may have. Please indicate how well each statement describes you, during the past two weeks, from "not at all like me" (0) to "extremely like me" (4), by marking the correct number. Read each statement carefully, select only one answer per statement, and please do not skip any questions.

<table>
<thead>
<tr>
<th></th>
<th>Not at all like me</th>
<th>Extremely like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am shy around others</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>2. My heart races for no good reason</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>3. I feel out of control when I eat</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>4. I don't enjoy being around people as much as I used to</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>5. I feel isolated and alone</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>6. I think about food more than I would like to</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>7. I am anxious that I might have a panic attack while in public</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>8. I feel confident that I can succeed academically</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>9. I have sleep difficulties</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>10. My thoughts are racing</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>11. I feel worthless</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>12. I feel helpless</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>13. I eat too much</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>14. I drink alcohol frequently</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>15. I have spells of terror or panic</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>16. When I drink alcohol I can't remember what happened</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>17. I feel tense</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>18. I have difficulty controlling my temper</td>
<td>0 1 2 3 4</td>
<td></td>
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<tr>
<td>19. I make friends easily</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>20. I sometimes feel like breaking or smashing things</td>
<td>0 1 2 3 4</td>
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<tr>
<td>21. I feel sad all the time</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>22. I am concerned that other people do not like me</td>
<td>0 1 2 3 4</td>
<td></td>
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<tr>
<td>23. I get angry easily</td>
<td>0 1 2 3 4</td>
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</tr>
<tr>
<td>24. I feel uncomfortable around people I don't know</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>25. I have thoughts of ending my life</td>
<td>0 1 2 3 4</td>
<td></td>
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<tr>
<td>26. I feel self conscious around others</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>27. I drink more than I should</td>
<td>0 1 2 3 4</td>
<td></td>
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<tr>
<td>28. I am not able to concentrate as well as usual</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>29. I am afraid I may lose control and act violently</td>
<td>0 1 2 3 4</td>
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<tr>
<td>30. It's hard to stay motivated for my classes</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>31. I have done something I have regretted because of drinking</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>32. I frequently get into arguments</td>
<td>0 1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>33. I am unable to keep up with my schoolwork</td>
<td>0 1 2 3 4</td>
<td></td>
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<tr>
<td>34. I have thoughts of hurting others</td>
<td>0 1 2 3 4</td>
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</tr>
</tbody>
</table>
Appendix D: List of Competencies Met in CE

### Tier 1 Core Public Health Competencies

<table>
<thead>
<tr>
<th>Domain #1: Analytic/Assessment Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes factors affecting the health of a community (e.g., equity, income, education, environment)</td>
</tr>
<tr>
<td>Identifies quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) that can be used for assessing the health of a community</td>
</tr>
<tr>
<td>Applies ethical principles in accessing, collecting, analyzing, using, maintaining, and disseminating data and information</td>
</tr>
<tr>
<td>Uses information technology in accessing, collecting, analyzing, using, maintaining, and disseminating data and information</td>
</tr>
<tr>
<td>Selects valid and reliable data</td>
</tr>
<tr>
<td>Identifies gaps in data</td>
</tr>
<tr>
<td>Describes public health applications of quantitative and qualitative data</td>
</tr>
<tr>
<td>Uses quantitative and qualitative data</td>
</tr>
<tr>
<td>Describes assets and resources that can be used for improving the health of a community (e.g., Boys &amp; Girls Clubs, public libraries, hospitals, faith-based organizations, academic institutions, federal grants, fellowship programs)</td>
</tr>
<tr>
<td>Contributes to assessments of community health status and factors influencing health in a community (e.g., quality, availability, accessibility, and use of health services; access to affordable housing)</td>
</tr>
<tr>
<td>Explains how community health assessments use information about health status, factors influencing health, and assets and resources</td>
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<thead>
<tr>
<th>Domain #2: Policy Development/Program Planning Skills</th>
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<tbody>
<tr>
<td>Contributes to implementation of organizational strategic plan</td>
</tr>
<tr>
<td>Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community</td>
</tr>
<tr>
<td>Gathers information that can inform options for policies, programs, and services (e.g., secondhand smoking policies, data use policies, HR policies, immunization programs, food safety programs)</td>
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<thead>
<tr>
<th>Domain #3: Communication Skills</th>
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<tbody>
<tr>
<td>Solicits input from individuals and organizations (e.g., chambers of commerce, religious organizations, schools, social service organizations, hospitals, government, community-based organizations, various populations served) for improving the health of a community</td>
</tr>
<tr>
<td>Suggests approaches for disseminating public health data and information (e.g., social media, newspapers, newsletters, journals, town hall meetings, libraries, neighborhood gatherings)</td>
</tr>
<tr>
<td>Conveys data and information to professionals and the public using a variety of approaches (e.g., reports, presentations, email, letters)</td>
</tr>
<tr>
<td>Communicates information to influence behavior and improve health (e.g., uses social marketing methods, considers behavioral theories such as the Health Belief Model or Stages of Change Model)</td>
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<thead>
<tr>
<th>Domain #4: Cultural Competency Skills</th>
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<tbody>
<tr>
<td>Describes the diversity of individuals and populations in a community</td>
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<tr>
<th>Domain #5: Community Dimensions of Practice Skills</th>
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<tbody>
<tr>
<td>Recognizes relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)</td>
</tr>
<tr>
<td>Supports relationships that improve health in a community</td>
</tr>
<tr>
<td>Collaborates with community partners to improve health in a community (e.g., participates in committees, shares data and information, connects people to resources)</td>
</tr>
<tr>
<td>Provides input for developing, implementing, evaluating, and improving policies, programs, and services</td>
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<thead>
<tr>
<th>Domain #6: Public Health Sciences Skills</th>
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<tbody>
<tr>
<td>Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making</td>
</tr>
<tr>
<td>Recognizes limitations of evidence (e.g., validity, reliability, sample size, bias, generalizability)</td>
</tr>
<tr>
<td>Suggests partnerships that may increase use of evidence in public health practice (e.g., between practice and academic organizations, with health sciences libraries)</td>
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<tr>
<th>Domain #7: Financial Planning and Management Skills</th>
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</thead>
<tbody>
<tr>
<td>Adheres to organizational policies and procedures</td>
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</table>
Incorporates ethical standards of practice (e.g., Public Health Code of Ethics) into all interactions with individuals, organizations, and communities

Describes public health as part of a larger inter-related system of organizations that influence the health of populations at local, national, and global levels

Describes the ways public health, health care, and other organizations can work together or individually to impact the health of a community

Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)

Participates in professional development opportunities