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The Relationship Between Self-Compassion, Sleep Quality, and Perceived Stress Among Undergraduate and Graduate Students

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Philadelphia College of Osteopathic Medicine

Department of Psychology

THE RELATIONSHIP BETWEEN SELF-COMPASSION, SLEEP QUALITY, AND
PERCEIVED STRESS AMONG UNDERGRADUATE AND GRADUATE
STUDENTS

By Michael Unger

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Dissertation Approval

This is to certify that the thesis presented to us by Michael Unger
on the 16 day of November, 2015, in partial fulfillment of the
requirements for the degree of Doctor of Psychology, has been examined and is
acceptable in both scholarship and literary quality.

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Abstract

Research has indicated that sleep problems are prevalent in college students. Current studies show that over half of college students report that they are poor-quality sleepers. The consequences of poor sleep quality include increased stress, substance use, and mental health issues. Poor sleep hygiene is one of the many factors that contribute to poor sleep quality in college students. Although research has identified contributing factors and consequences of sleep problems in college students, less attention has been given to factors that may serve as a buffer against the effects of poor sleep quality. This study introduces and discusses self-compassion as an attitude that may serve as a protective factor for the consequences of poor sleep quality. The purpose of this study was to examine the relationship between self-compassion, sleep quality, perceived stress, and sleep hygiene. Another aim was to determine if self-compassion moderates the relationship between sleep quality and perceived stress. The results of this study indicate that there is a significant relationship between self-compassion and perceived stress. As self-compassion increases, perceived stress decreases, which is consistent with previous self-compassion research. However, self-compassion was not associated with sleep quality, and sleep quality was not associated with perceived stress. Therefore, it was not possible to explore self-compassion as a moderator of variables that are not associated with each other. A weak positive association between self-compassion and sleep hygiene was identified, signifying that greater self-compassion is associated with poorer sleep hygiene. This result was unexpected, and the direction of the relationship was likely influenced by the unique characteristics of the graduate and medical student sample.

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Chapter 1: Introduction

Statement of the Problem

Sleep is essential to human functioning and well-being. However, millions of people throughout the world are unable to sleep adequately, and the number of people who are diagnosed with chronic insomnia continues to rise each year (Rosekind & Gregory, 2010). The facts about the prevalence, consequences, and costs of insomnia to individuals and society are staggering. The *Sleep in America* poll found that 20% of Americans sleep fewer than 6 hours a night (National Sleep Foundation, 2009). The same poll reports that 40% of adults indicated that daytime sleepiness interferes significantly with their daily activities. Furthermore, 64% of the adult population had complaints of frequent insomnia symptoms, whereas only 15% had a diagnosis of insomnia, suggesting that it is underdiagnosed (National Sleep Foundation, 2009). Individuals with insomnia have been shown to have an average of 60% higher total healthcare costs, and the total direct and indirect costs of insomnia have been estimated to be between \$92 billion and \$107 billion annually (Rosekind & Gregory, 2010). Research has strongly suggested that insomnia maintenance is associated with a greater likelihood of developing a mental disorder (Breslau, Roth, Rosenthal, & Andreski, 1996).

Although insomnia has been shown to be associated with age, the relationship may not be linear. In their analysis of the 2002 National Health Survey data, Pearson, Johnson, and Nahin (2006) indicate that individuals report the highest degree of insomnia in middle age. Insomnia is experienced to a slightly lesser degree in older age until very old age, when it increases again. This analysis also indicated that insomnia is a significant problem with shift workers, perhaps due to the change in circadian sleep–wake patterns.

Although insomnia is prevalent throughout various developmental stages, research has indicated that college students are particularly vulnerable to sleep disturbance. College students frequently experience significant shifts in their sleep–wake cycle, leaving this population more at risk for significant health problems (Kloss, Nash, Horsey, & Taylor, 2010).

Studies have indicated that at least two thirds of college students report sleep disturbances, and one third of those report severe difficulties with sleep (Coren, 1994). Hicks, Fernandez and Pelligrini (2001) found that 68.3% of college students reported sleep problems. This was a significant increase from the early 1980s, when approximately 25% of college students reported sleep problems (Hicks, Mistry, Lucero, Rical, & Pellecrini, 1990). More recently, research has indicated that over 60% of college students report they are poor-quality sleepers (Lund, Reider, Whiting, & Pritchard, 2010). Research has also focused on the negative consequences of sleep problems for this population. Millman (2005) indicated that fatigue due to sleep problems is a significant problem for college students and young adults at large. Moreover, poor-quality sleep in college students has been associated with increased negative affect and stress (Galambos, Dalton, & Maggs, 2009).

The consequences of insomnia for college students are wide ranging, and the impact is often more distressing than fatigue and stress. Research has suggested that sleep problems significantly contribute to vulnerability for substance abuse and mental health issues within this population. For example, poor sleep quality in college students has been associated with significantly increased anger, depression, fatigue, confusion, tension, and stress than those with good-quality sleep (Lund et al., 2010; Orzech,

Salafsky, & Hamilton, 2011). In their review of sleep disturbance in college students, Kloss, Nash, Horsey, and Taylor (2010) indicate that consequences include increased mood problems and increased risk of drug and alcohol abuse as a coping strategy for poor sleep. The use of substances to promote sleep has been indicated as poor sleep hygiene (Mastin, Bryson, & Corwyn, 2006). Inadequate sleep hygiene refers to daily living activities that are incompatible with the maintenance of good-quality sleep and daytime alertness (American Sleep Disorders Association, 1990).

Purpose of the Study

To date, there is little research investigating personality factors that are associated with the relationship between poor sleep quality and stress in the college student population. Identifying personality variables that are related to the sleep-stress relationship may identify attitudes that may serve as a buffer to the distressing effects of poor sleep quality. This study proposed that self-compassion is a self-attitude that may be related to the sleep–stress relationship and investigated the relationship between sleep quality, self-compassion, and perceived stress, with sleep hygiene as a control variable. The primary purpose of the study was to investigate whether degree of self-compassion is associated with sleep quality and perceived stress in college students. The aim of the study was to begin to provide an empirical basis for further research exploring the potential benefits of self-compassion interventions for individuals struggling with sleep-related distress.

Chapter 2: Review of the Literature

The research clearly indicates that college students are susceptible to sleep disturbance (Nyer et al., 2013). Sleep disturbance manifests in a variety of ways, and poor sleep quality has been indicated to be a common concern within this population (Lund et al., 2010). In addition to the myriad of other stressors that college students face, poor sleep quality exacerbates college student's distress because it has been associated with increased stress and mental health problems.

Sleep and College Students

Sleep disturbance. There are different types of sleep disturbance (SD). Within the college population, SD has been observed as difficulty falling asleep and maintaining sleep, daytime sleepiness, poor sleep quality, and other sleep problems (Nyer et al., 2013). Negative consequences of disturbed sleep include effects on performance, health, and safety. For example, SD has been indicated as a risk factor for the onset of depressive episodes (Breslau et al., 1996). One study found that in a sample of 583 students, 13% reported symptoms of SD meeting the criteria for a diagnosis of clinical insomnia (Nadorff, Nazem, & Fiske, 2011). Another study in 1,845 college students found that 27% were at risk for SD (Gaultney, 2010).

Research has indicated that within the college population, the most common sleep disorders are inadequate sleep hygiene and insomnia (Kloss et al., 2010). Poor sleep hygiene has been found to significantly contribute to sleep disturbance within this population (Brown, Buboltz, & Soper, 2002). Additionally, college students are increasingly diagnosed with attention deficit hyperactivity disorder (ADHD) and treated with stimulant medications. These medications have been indicated to contribute to sleep

disturbance due to their sustained release effect (Millman, 2005). Research has indicated that specific behavioral factors, such as sleep hygiene habits, contribute to sleep problems in this population.

Sleep hygiene. Sleep hygiene is defined as behaviors that promote improved quantity and quality of sleep (Stepanski & Wyatt, 2003). Poor sleep hygiene has been found to be a significant factor in poor sleep quality in college students (Brown et al., 2002), and improper sleep hygiene is common among college students (Jensen, 2003). For example, increased alcohol and caffeine consumption are poor sleep hygiene habits that may partially account for sleep problems (Lund et al., 2010; Vail-Smith, Felts, & Becker, 2009). Poor sleep hygiene practices, such as variable sleep–wake patterns, alcohol and caffeine use before bedtime, and excessive worry before sleep contribute to poor sleep quality.

One recent study identified poor sleep hygiene as significantly associated with poor sleep quality in college students (Vail-Smith et al., 2009). Over 800 college students voluntarily participated in the online survey, which assessed health risk behaviors and general sleep difficulties, yielding a total sleep quality score. Over 75% of participants reported occasional sleep problems, and 12% reported poor sleep quality. Frequency of drug and alcohol consumption was also ascertained. The results suggested that poor sleep quality was associated with health risk behaviors, such as increased drug and alcohol use. This was a correlational study; therefore, the directionality of the relationships between factors is not known.

College students' poor sleep hygiene habits have wide-ranging negative consequences beyond diminished sleep quality. For example, these habits, coupled with

the resulting sleep disturbance, have been shown to negatively impact the ability to remain focused and engaged in the classroom. Jean-Louis, Gizycki, Zizi, and Nunes (1998) investigated the influences of a variety of factors on sleep and mood in college students. They investigated the differences in age, sex, duration of sleep, smoking, drug, and alcohol use between college students who self-reported that they fell asleep in class in comparison to those who did not. The results indicated that those who fell asleep in class reported significantly more alcohol use and more negative mood states than those who did not fall asleep in class.

Due to the substantial research indicating the prevalence and consequences of college students' poor sleep hygiene habits, investigators began to focus on the factors that contribute to these habits. For example, one study investigated the relationship between sleep hygiene knowledge, practice, and sleep quality (Brown et al., 2002). The purpose of the study was to examine the factors that led to poor sleep quality and guide clinicians in targeting effective intervention programs to improve sleep quality in college students. Participants were recruited from undergraduate psychology courses and completed the Pittsburgh Sleep Quality Index (PSQI) and the Sleep Hygiene Awareness and Practice Scale (SHAPS). The SHAPS was developed for a previous study, and published psychometric properties were not available. The scale assesses participants' knowledge of the impact of certain behaviors on sleep and includes questions with regard to presleep activities. Participants were required to complete the same self-report measures at the beginning of the study and again 4 weeks later. The results suggest that sleep practices are related to sleep quality. Specifically, good sleep hygiene habits have a stronger relationship than sleep hygiene knowledge to improved sleep quality.

Research suggests that poor sleep hygiene habits and poor sleep quality function in a bidirectional, cyclical manner. For example, Singleton and Wolfson (2009) found that students with greater alcohol consumption slept less, went to sleep later, and had more inconsistent sleep schedules. Students with poor sleep quality indicated that they consumed more alcohol and were twice as likely as better sleepers to use alcohol as a sleep aid (Lund et al., 2010). Although alcohol may facilitate relaxation and sleep in the short-term, alcohol consumption has been shown to affect sleep quality through rebound insomnia when blood alcohol levels have decreased (Millman, 2005). Caffeine consumption is another poor sleep hygiene habit common in this population. College students may underestimate the longer term consequences of using caffeine to promote wakefulness to complete a paper or study for an examination. It has been found that caffeine intake may lead to sleep disruption and daytime sleepiness, which leads to an increased need for caffeine to remain awake (Millman, 2005). Alcohol, caffeine consumption, and ADHD medication are all common and relevant to college students and have been shown to contribute to poor sleep quality (Carney, Edinger, Meyer, Lindman, & Istre, 2006; Millman, 2005). Therefore, college students' sleep hygiene should be considered when attempting to understand factors contributing to sleep disturbance within this population.

The relationship between sleep hygiene practices and sleep quality has also been investigated in medical students. Although both undergraduate and medical students engage in poor sleep hygiene habits, it is suggested that the specific behaviors differ. Brick, Seely, and Palermo (2010) investigated the relationship between sleep hygiene and sleep quality in medical students. They hypothesized that medical students would report

poorer sleep quality than healthy young adults not attending medical school and that poor sleep hygiene practices and lifestyle practices (i.e., increased alcohol and caffeine use, less exercise) would be associated with poorer sleep quality. Participants were over 300 medical students from a university in the Pacific Northwest of the United States. The majority of participants were White (81.9%) or Asian (12.5%). This was a web-based survey study with a cross-sectional design across all 4 years of medical school. Results indicated that over half of the participants were above the clinical cutoff for poor sleep quality. Poor sleep quality was related to infrequent exercise, watching television in bed, and studying in bed. Participants in earlier class years reported poorer sleep quality than those in later class years. One possible explanation for this finding is that students adjust to the medical student lifestyle and learn coping strategies as they progress through the program. The poor sleep hygiene factors indicated in this study, such as reduced exercise, may be associated with medical students' lifestyle. It seems reasonable to assume that the demanding course load limits time available for exercise. Another possibility is that alcohol consumption was not strongly related to poor sleep quality due to medical students' increased knowledge of the impact of alcohol on the body. The average age of this sample was older than the average medical student population and lacked racial/ethnic diversity. Self-report measures may be prone to reporter bias, and the cross-sectional design limits the ability to understand how sleep quality changes throughout the academic program.

Overall, research on sleep quality in college students strongly suggests that poor sleep hygiene is a contributing significant factor. Poor sleep hygiene habits contribute to mental health problems, such as substance abuse. Moreover, poor sleep hygiene, poor

sleep quality, and substance use may interact, contributing to problems with daily life functioning, such as remaining engaged in class and academic studies in general. It is clear that one of the most significant consequences of poor sleep hygiene habits for college students is poor sleep quality. Therefore, in order to investigate the relationship between sleep quality and stress in college students, it is important to further understand the nature and implications of poor sleep quality.

Sleep quality. Poor sleep quality is a significant problem for college students and has been associated with maladaptive behaviors and increased stress (Karacan, Thornby, & Williams, 1983; Lund et al., 2010; Vail-Smith et al., 2009). Pilcher, Ginter, and Sadowsky (1996) define sleep quality as sleep depth, mood upon awakening, and satisfaction with sleep. Although there is overlap between sleep quality and quantity, there are also significant differences. The quantitative components of sleep quality are number of awakenings, sleep latency, and sleep duration. The sleep factors that are unique to sleep quality are depth of sleep, the degree of energy an individual feels upon awakening, and satisfaction with sleep. Subjective sleep factors are important to investigate because it has been suggested that sleep quality is more closely associated with measures of health and well-being as compared with sleep quantity (Pilcher et al.).

In an attempt to measure and categorize sleep quality, Buysse, Reynolds, Monk, Berman, and Kupfer (1988) developed the Pittsburgh Sleep Quality Index (PSQI). This has become a widely utilized self-report measure that distinguishes between good and poor sleepers. The rationale for developing the index was based on the high prevalence of sleep quality complaints, as well as the established association between poor sleep quality and medical disorders (Karacan et al., 1983). Buysse et al. note that although

sleep quality is an accepted clinical construct, it is also complex and difficult to define. The researchers discuss sleep quality as a mostly subjective concept that accounts for factors such as depth and restlessness of sleep. The development of the PSQI contributed to additional research that investigated the relationship between sleep quality and factors related to well-being.

The relationship between sleep quality and sleep quantity on self-reported health, well-being, and sleepiness has been investigated in college students (Pilcher et al., 1996). In this study, 30 undergraduate student volunteers in a psychology class completed self-report measures that assessed sleep quality, sleepiness, subjective well-being and health, and mood. Participants completed the surveys on the day before their final examination for the semester. During the 7 days before the survey administration, each participant maintained a sleep log. Participants were instructed to make entries each morning and account for total sleep time, rating of sleep quality, time in and out of bed, and time spent napping. Correlational analyses were conducted in order to determine the degree of overlap between sleep quality and quantity and to assess the relationship to the outcome variables.

Within the same research study, a second study was conducted that differed from the first in that it included a larger group of subjects during a less stressful time in the semester. This change of timing in survey administration was important because responses in the first study may have been influenced by the stress associated with the final examination. Results of both studies indicated that health and well-being were more closely related to sleep quality than sleep quantity. Furthermore, poor sleep quality, as measured by the PSQI, was significantly correlated with increased feelings of tension,

anger, and fatigue and physical health complaints. Those with poor sleep quality also indicated a lower satisfaction with life, coupled with a decrease in positive affect. In contrast, sleep quantity was not significantly associated with measures of health and well-being. The research findings indicate that the relationships between sleep quality and health and well-being are independent of effects from sleep quantity. The investigators concluded that in nonclinical populations, the distinct components of sleep quality are the most significant factors that account for the relationships between sleep quality and measures of health and well-being. A limitation of the study was that this was a nonclinical population, with participants reporting 7 to 8 hours of sleep per night on average. It is possible that the relationships between sleep and well-being could change in a population that reported fewer hours of sleep. Another limitation is that the impact of final exams may have significantly contributed to poor sleep quality. Students may have changed their typical sleep schedules at this time, which may have negatively impacted their sleep quality.

More recently, Lund et al. (2010) conducted a study of over 1,000 college students. Results indicated that over 60% of the participants were poor-quality sleepers. The study investigated sleep patterns to determine the precipitating and perpetuating factors of poor sleep quality. There were three specific research questions: What are the sleep habits of college students? What are the behavioral outcomes associated with poor sleep quality? What physical, emotional, and psychosocial factors predict poor-quality sleep in college students? The results of this study highlight the significance of sleep quality in the college student population (Lund et al., 2010) and indicate an association between sleep quality, sleep hygiene, and stress within this population. More

specifically, the initial finding was that college students reported that they regularly obtained less sleep than recommended for young adults. In addition to low sleep quantity, the majority of participants also reported low sleep quality. Consistent with previous studies, poor sleep quality was associated with increased negative moods, increased physical illness, and higher levels of stress. Those with poor sleep quality were significantly more likely to use stimulant medications to promote wakefulness. Consistent with studies that investigated factors associated with sleep hygiene practices, poor-quality sleepers were twice as likely to report using alcohol to facilitate sleep as good-quality sleepers. Finally, the results indicated that stress is a contributor to poor sleep quality. For example, 68% of students reported that stress was the most significant factor interfering with initiating sleep (Lund et al., 2010). The researchers concluded that perceived stress may serve as predisposing, precipitating, and perpetuating factors for sleep problems in college students. It seems plausible that stress may both trigger and exacerbate poor sleep quality. For example, academic stress may contribute to trading sleep for study time. Furthermore, inadequate sleep may negatively impact mood and ability to focus leading to an increased degree of stress. This was a correlational study; therefore, the directionality of the relationship between poor sleep quality, mood, and stress is not clear. This study has limited external validity due, in part, to the homogeneity of the sample.

In summary, studies strongly suggest that poor sleep quality rather than poor sleep quantity is associated with factors related to well-being. Research has indicated that there is a relationship between poor sleep quality and mental and physical distress in college students. Perceived stress, defined as the degree to which an individual appraises a

situation as stressful, has been indicated as both a precipitating and perpetuating factor in poor sleep quality in college students. For example, Millman (2005) discusses a negative spiral that may occur in young adults struggling with sleep and mood problems. He posits that factors associated with the academic environment contribute to sleep disturbance, which in turn negatively impacts mood. Furthermore, low mood creates stress, which in turn inhibits sleep. Therefore, it is important to understand how individuals experience stress and the relationship between stress and sleep.

Perceived Stress

Cohen, Kamarck and Mermelstein define perceived stress as, “the degree to which situations are appraised as stressful” (1983, p. 385). The concept of perceived stress is derived from Lazarus’s (1977) theory of psychological stress and coping, which posits that the impact of stressful events is at least in part determined by one’s subjective perception of the event. Lazarus (1977) posits that the stressor is the objective event and the cognitive and emotional reaction is the subjective event. Therefore, one’s response to a stressor is significantly dependent on personal factors. It seems reasonable to state that one example of a personal factor could be the attitude with which an individual responds to a stressor. For example, when confronted with a stressor, an attitude of self-compassion may be more likely to promote effective coping strategies than an attitude of self-judgment.

The Perceived Stress Scale (PSS) was developed in order to accompany this theoretical perspective with an objective measure of perceived stress (Cohen et al., 1983). It is suggested that the PSS is a better predictor of health outcomes than an objective stress measure because perceived stress provides a direct measure of degree of

experienced stress. There are many potential uses for measuring perceived stress. For example, Cohen et al. note that the PSS could be utilized in conjunction with other scales to determine which personality factors buffer individuals from the effects and negative appraisal of stressful events. Additionally, perceived stress may be viewed as an outcome variable. That is, perceived stress provides an indication of the experienced degree of stress in relation to stressful events, coping mechanisms, and personality factors (Cohen et al., 1983).

Research has identified healthy sleep practices as one of the most significant protective factors associated with a reduction in perceived stress in college students (Myers et al., 2012). Myers et al. (2012) conducted a study to identify self-care practices that should be targeted to assist students with managing stress. Self-care was defined as behaviors that promote emotional and physical well-being. The research hypothesis was that self-care practices would be related to lower levels of perceived stress. This study focused on sleep, exercise, social support, emotion regulation strategies, and mindfulness as self-care practices. The study included nearly 500 clinical psychology graduate students, with the majority female (84%) and Caucasian (87%), from programs across the United States. Results indicated that healthy sleep practices and higher degree of social support were two of the most significant factors correlated with lower levels of perceived stress.

Given that research has suggested that there is a significant association between healthy sleep practices and reduced stress, it is important to examine which factors may be related to positive sleep habits and reduced stress. Higher self-compassion has been associated with behaviors related to health promotion and with adaptive coping strategies

when faced with distressing situations (Neely, Schallert, Mohammed, Roberts, & Chen, 2009; Neff, Hseih, & Dejitterat, 2005). Self-compassion is a personality factor and self-attitude that may be associated with healthy sleep hygiene and reduced stress.

Poor Sleep Quality and Stress

It is important to have an in-depth understanding of the relationship between sleep quality and stress in order to identify personality factors that may be associated with them. Karacan et al. (1983) indicated that stress is one of the most important factors associated with poor sleep quality. More recently, research has indicated an association between poor sleep quality and stress in college students (Fortunato & Harsh, 2006; Lund et al., 2010; Verlander, Benedict, & Hanson, 1999). In their synthesis of the literature on adolescent sleep and mental health issues, Roberts, Roberts, and Duong (2008) found that adolescents with chronic insomnia also experience significantly more problems with somatic, interpersonal, and psychological functioning. Mental health problems included depression, anxiety, inattention, and anger, as well as increased drug and alcohol use. In their review of the literature on college students and sleep, Kloss, Nash, Horsey, and Taylor (2010) identified increased mood problems as a significant negative consequence of poor sleep quality. Lund et al. found that poor-quality sleepers reported increased negative mood and higher levels of perceived stress throughout the week and the weekend than good-quality sleepers (2010).

Although studies have identified a myriad of consequences of poor sleep quality, Verlander et al. (1999) specifically investigated the stress and sleep patterns of college students. The results indicated that an individual's emotional response to stress is associated with sleep quality. One aim of the study was to assess stress incorporating

three stress domains. Another aim was to identify the specific domain of stress that is most closely related to sleep quality: a stimulus to which an individual is exposed; an affective, cognitive, and physiological response to a demand; and an interaction between the person and the environment. This study utilized a self-report measure, the Derogatis Stress Profile (Derogatis, 1984) that addressed all three domains. More specifically, the measure assesses environmental events, personality mediators that may be present, and emotional reactions to stress. A subjective sleep measure was utilized to measure components of sleep beyond sleep quantity: depth of sleep, sleep latency, dream recall and vividness, and sleep irregularity. Lastly, a demographic questionnaire asked questions on the presence of sleep disorders, the use of sleep medication, caffeine, and alcohol, and smoking.

Verlander et al. (1999) hypothesized that scores on one of the stress domains would predict scores on the sleep subscales. There were 227 college students who volunteered to participate in the study, and the majority (154) were women. Results indicated that the emotional response stress domain was the best predictor of sleep patterns because it predicted depth of sleep, sleep quality, sleep latency, difficulty waking up, negative affect in dreams, and sleep irregularity. This finding strongly suggests that an individual's emotional response to stressors may be associated with sleep patterns. It is suggested that the environmental events stress domain was not as strongly associated with sleep because it fails to include the individual's perception of and emotional reaction to stressors. Although personality factors did not predict or mediate the relationship between stress and sleep, this does not indicate that personality factors are insignificant in the relationship. This study selected personality mediators from a stress profile that was

not designed to specifically assess for issues pertaining to sleep. Therefore, it is possible that personality factors other than the traits selected for this study may serve as coping mechanisms for the stress–sleep interaction. It seems reasonable to suggest that personality attitudes such as self-compassion may contribute to an individual’s emotional response to stressors.

Personality factors have been proposed as influencing the relationship between stressors and sleep quality. One study investigated the influence of negative and positive affectivity and work-related stressors on sleep quality (Fortunato & Harsh, 2006). There were five hypotheses. The first was that work stressors would be negatively correlated with sleep quality. The second and third were that negative affectivity would relate negatively with sleep quality, and positive affectivity would be positively associated with sleep quality. The fourth and fifth hypotheses were that both negative and positive affectivity would moderate the relationship between work stressors and sleep quality. The study included 467 undergraduate college students, and the majority were female. The sample was somewhat diverse: 61% were Caucasian, 34% were African American, and 5% were of other races. Participants completed self-report measures that assessed affectivity, school stressors, and sleep quality. Overall, the results supported the hypotheses. Stressors and negative affectivity correlated negatively with sleep quality, whereas positive affectivity was positively associated with sleep quality. The findings in regard to the moderating role of affectivity were more complex. For individuals high in negative affectivity and low in positive affectivity, poor sleep quality was associated with increased interpersonal stressors. Sleep quality was unaffected by interpersonal stressors for participants low in negative affectivity and high in positive affectivity. There were

several limitations of this study. Objective measures were not used to evaluate job/school stressors and sleep quality. Self-report measures were utilized, which are prone to subjective bias. Data were collected from university students, and therefore, it is not possible to generalize findings to individuals in work settings. College students' responses may be sensitive to the specific demands of the school environment, such as the ambiguity that often accompanies group projects. Finally, the variance explained by the stressor variables was between .01 and .06, which is low. This may be due to the design of the study. Measures of organizational work stressors were utilized, which may not have applied to students' experiences.

In summary, it is not possible to conclude that poor sleep quality causes increased stress in college students. However, a review of the research strongly suggests that poor sleep quality is associated with a variety of negative consequences such as poor sleep hygiene practices, as well as a variety of psychological and physical consequences, including increased stress. Research has investigated factors that are associated with these relationships in order to understand potential moderators and mediators. For example, individual personality characteristics may contribute to increased vulnerability or resilience to perceived stress after experiencing poor sleep quality. Indeed, research has suggested that the emotional response to stressors is related to sleep patterns. It has been indicated that affectivity is associated with sleep quality. Therefore, identifying personality factors related to sleep quality and stress may benefit clinicians working with college students. With additional empirical research support, clinicians may be able to identify practices that cultivate personality factors that serve as a buffer against the distress associated with poor sleep quality and perceived stress. Self-compassion is an

empirically researched personality variable and self-attitude that has been associated with moderating reactions to negative events and with effective coping strategies when faced with stressful situations (Leary et al., 2007; Neff et al., 2007).

Self-Compassion

Compassion is the experience of sharing the pain of another and the wish for alleviation of their suffering. *Self-compassion* refers to compassion that is directed to one's own suffering. Neff (2003) defines self-compassion as "being open to and moved by one's own suffering, experiencing feelings of caring and kindness toward oneself, taking an understanding, nonjudgmental attitude toward one's inadequacies and failures, and recognizing that one's experience is part of the common human experience" (p. 224). Self-compassion is facilitated by unidentified awareness of one's own experience in order to connect one's experience with the experiences of others. This process leads to less personal or egocentric identification of one's inadequacies while increasing feelings of interconnectedness. Cultivating self-compassion facilitates a greater perspective of one's experience and suffering. Self-compassion allows individuals to face their distressing thoughts and emotions without suppressing or exaggerating them (Neff, 2003). Raes states, "Growing evidence suggests that self-compassion is related to psychological well-being and it is considered a potentially important protective factor, promoting emotional resilience" (2010, p. 757). Therefore, it seems logical that self-compassion may serve as a protective factor when coping with distress related to poor sleep quality.

Research has indicated that self-compassion is a critically significant attitudinal factor in the mindfulness and well-being relationship (Hollis-Walker & Colosimo, 2011).

In one study Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) found that self-compassion partially mediated the relationship between mindfulness and happiness. They concluded that self-compassion is a key component of mindfulness, which serves to counter negative feelings such as guilt and self-criticism while facilitating well-being.

Neff (2003) proposes that there are three aspects of self-compassion. The first is self-kindness. This refers to approaching oneself with understanding rather than self-criticism. The second component is common humanity. This involves recognition that one's personal experience is also part of a larger human experience. There is an awareness of an interconnection with others, which counters a feeling of isolation. The third component is mindfulness. Mindfulness is the practice of purposefully paying attention to one's experience in the present moment and without judgment (Kabat-Zinn, 1994). Mindfulness is characterized by an open and receptive relationship to one's own thoughts and feelings. Whatever arises in one's experience is attended to without trying to change or suppress the experience in any way. Through mindful awareness, it becomes possible to acknowledge thoughts and feelings without becoming overidentified with them.

Neff (2003) also proposes that self-compassion is an effective emotional-approach coping strategy. Self-compassion promotes a mindful relationship to one's own emotions characterized by kindness, understanding, and awareness of one's connection with humanity. It is proposed that self-compassion applied to negative emotions has the power to transform those emotions into a more positive state. This positive state of mind will allow the individual to take constructive action to make changes in oneself and the environment that will serve to promote well-being. Therefore, it seems reasonable to

propose that individuals with a higher degree of self-compassion may engage in more effective coping strategies when experiencing sleep-related distress.

Self-compassion as a moderator of reactions to negative events. Leary et al. (2007) conducted five studies to investigate the role of self-compassion in moderating individuals' reactions to stressful events. The researchers hypothesized the moderation effect would serve as a buffer against negative events because those high in self-compassion will respond to their own limitations with kindness rather than self-criticism. The first study included 117 undergraduate students with a nearly equal proportion of women and men. Participants completed the Self-Compassion Scale at the beginning of the semester. Throughout the following 3 weeks, they received e-mail messages directing them to a website to complete questionnaires about events that occurred within the past 4 days. They were asked to remember and report on two events that were their fault and two events that were not their fault. Participants selected reactions associated with self-compassion, such as *I tried to be kind to myself*, or other reactions that were not related to self-compassion, such as *I expressed my emotions to let off steam*. Participants then indicated the degree to which they had each of several preselected thoughts about the event. For example, participants were asked how often they had the self-compassionate thought *I've had a bad day, and I need to do something nice for myself*. Finally, participants rated how well they coped with the situation on a 6-point scale.

The results of this study indicated that self-compassion was positively associated with having fewer negative and self-critical thoughts and with maintaining a perspective on one's problems. Individuals with a higher degree of self-compassion expressed a strong inclination to be kind to themselves and self-soothe following negative events.

Those with higher self-compassion were more likely to endorse items such as *I tried to be kind to myself* when faced with a stressor. Those higher in self-compassion also provided a more positive rating of the day that the stressful event occurred and rated that they handled the situation better than those who reported lower self-compassion. Self-compassion was negatively associated with anxiety, sadness, fixing problems, and distraction from problems. Individuals lower in self-compassion tended to respond to stressors with statements such as *I was really hard on myself*.

The overall results of the research conducted by Leary et al. (2007) supported the research hypotheses. The findings indicated that self-compassion is a significant factor that moderates reactions to negative events. Studies strongly suggest that those high in self-compassion are less likely to ruminate about negative evaluations or experience negative affect when faced with their own failures. Therefore, self-compassionate people are more likely to accept their own shortcomings without obsessing and feeling depressed about them. There are limitations of these studies. First, the stressors that participants encountered during these studies may be characterized as mild and may not adequately represent the degree of distress that individuals actually experience in their daily lives. The question then arises whether self-compassion would serve as a protective factor when faced with more challenging stressors. Another limitation is that it is not clear if those higher in self-compassion have fewer self-evaluative thoughts than those lower in self-compassion. The data are based on self-report measures, which may be particularly vulnerable to response bias. Participants may hold an idealized view of themselves in regard to their degree of self-compassion. Finally, the external validity of the study is limited by the small sample of college students.

In addition to being a self-attitude that helps individuals cope with distress, self-compassion has also been found to be a significant protective factor against self-evaluative anxiety when faced with one's weaknesses. Neff et al. (2007) investigated the relationship between self-compassion and adaptive psychological functioning. In one study, participants were confronted with a situation that elicited self-evaluative anxiety. The results indicate that self-compassion helped to moderate the effect of the anxiety when personal weaknesses were brought into awareness. The authors note that self-compassion serves to lessen anxiety related to one's own shortcomings due to the ability to recognize that imperfection is human. In a second study, participants were involved in an intervention with the purpose of increasing self-compassion. The results indicate that increased self-compassion was associated with a decrease in self-criticism, depression, rumination, thought suppression, and anxiety. These studies did not rely completely on the use of self-report scales. For example, in the second study, therapists' self-compassion ratings of participants were associated with participant self-compassion scale scores within a context that participants believed were unrelated to the therapy exercise. This methodology prevents response bias and therefore supports the self-compassion scale as a valid measure of self-compassion (Neff et al., 2007). It seems plausible that these findings may be applied to individuals with sleep problems. That is, when experiencing the shortcoming of poor-quality sleep and stress, self-compassionate individuals may be less susceptible to increased distress.

Other studies investigated the role of self-compassion in college students and stress (Neely et al., 2009). The purpose was to investigate how individuals cope with negative emotions such as disappointment. More specifically, the aim was to understand

how individuals regulate their emotions when unable to achieve their goals. The research hypothesis was that self-compassion would be as important as or more important than goal regulation when faced with stressors. The first study included 203 undergraduate students; 141 participants were men and 53% were White. Participants completed self-report measures that assessed purpose in life, self-mastery, perceived stress, intrusive thoughts, satisfaction with life, well-being, goal disengagement and reengagement, student stress, and self-compassion. The results indicated that self-compassion is a factor in predicting well-being. They found that students with greater self-compassion were more adept at managing negative emotions when faced with a disappointing situation in which they needed to readjust their academic goals. The model that included self-compassion as a predictor of well-being accounted for significantly more variance than the model that predicted well-being in relation to goal disengagement and reengagement. The purpose of the second study was to better understand how self-compassion influenced well-being by comparing it with social support predictors. Results indicated that goal reengagement rather than disengagement predicted well-being, with self-compassion as a significant correlate. The findings suggest that self-compassion was a significant factor in helping students manage negative emotions and contributing to overall well-being. In summary, studies strongly suggest that self-compassion appears to be an important personality factor that promotes healthy coping strategies. Additional studies have explored the mediating factors that promote adaptive coping.

Self-compassion and coping. Research suggests that those high in self-compassion are less likely to become overwhelmed by stressors. These effective emotional coping strategies allow them to have more energy for adaptive coping

responses rather than excessive worry about the problem (Neff et al., 2005; Neff et al., 2007). Indeed, self-compassion has correlated positively with proactive approaches such as benevolent self-talk and health promotion and has correlated negatively with negative emotions and ruminations about the perceived negative impact of illness.

Allen and Leary (2010) investigated coping strategies of those high in self-compassion. They found that self-compassion is strongly related to positive cognitive restructuring and least associated with problem-solving techniques. Positive restructuring requires reframing one's perception of a stressful situation in order to view it in a more manageable and positive way. Therefore, when faced with a stressful situation, those high in self-compassion are likely to positively reframe their relationship to the event without trying to change the situation itself. Leary et al. (2007) suggest that self-compassionate people may be more accurate than others in their self-perceptions. This is due to the fact that those high in self-compassion tend to self-evaluate free from the distorted perception of self-criticism. Leary et al. (2007) found that self-compassion protects against becoming overwhelmed with negative affect when thinking about negative past experiences or receiving negative feedback. Self-compassion has been found to predict less emotional distress during times of transition, such as starting college (Terry, Leary, Mehta, & Henderson, 2013).

Overall, research has strongly suggested that when faced with stressors, those higher in self-compassion are likely to experience less distress than those lower in self-compassion. Therefore, it seems possible that self-compassion may be an important personality variable to consider in individuals experiencing poor sleep quality.

Self-Compassion, Poor Sleep Quality, and Perceived Stress

Research suggests that increased levels of self-compassion are associated with a proactive approach to addressing health issues (Terry & Leary, 2011). Studies have indicated that self-compassion is associated with general well-being and effective coping strategies for negative life events, and those higher in self-compassion are more adept at regulating their negative affect when coping with illness (Allen & Leary, 2010; Leary et al., 2007; Neff et al., 2005; Terry & Leary, 2011). The researchers suggest that those higher in self-compassion promote health and well-being by fostering an attitude of kindness and concern toward themselves. They are better able to care for themselves and seek medical attention, when necessary (Terry et al., 2013). Those with higher degrees of self-compassion are less likely to experience distress when thinking about illness and approach their issues in a proactive manner that promotes health. Therefore, those with higher self-compassion may be less likely to have poor sleep hygiene and engage in behaviors that compromise sleep.

Although research has not investigated the association between self-compassion, poor sleep quality, and perceived stress, this study hypothesized that a relationship exists. As previously discussed, research has indicated that individuals with poor sleep quality often experience negative mood, anxiety, and stress after losing sleep. Research has also indicated that self-compassionate individuals are better able to manage negative emotions, accept their own shortcomings, hold accurate self-perceptions, and employ effective coping strategies in stressful situations (Allen & Leary, 2010; Leary et al., 2007; Neff, 2003; Raes, 2010). Research has indicated that those higher in self-compassion are better able to manage negative emotions when faced with situations in which they needed

to readjust their expectations (Neely et al., 2009). Therefore, it seems logical to suggest that individuals higher in self-compassion may experience less perceived stress after poor-quality sleep. Thus, it is hypothesized that self-compassion may significantly influence the relationship between sleep quality and perceived stress. This proposed moderation effect is based on self-compassion research findings that indicate that individuals with higher levels of self-compassion cope with stressors more effectively than those with lower levels of self-compassion (Neff et al., 2005; Neff et al., 2007).

It was also hypothesized that there would be significant associations between sleep quality as measured by the Pittsburgh Sleep Quality Index (PSQI), and self-compassion as measured by the Self-Compassion Scale (SCS), and perceived stress as measured by the Perceived Stress Scale (PSS). Additionally, there would be a significant association between self-compassion and sleep hygiene as measured by the Sleep Hygiene Index (SHI). On the PSQI, the higher the global score, the poorer the sleep quality. On the SCS, the higher the score, the higher the self-compassion. On the PSS, the higher the score, the higher the perceived stress. On the SHI, the higher the score, the poorer the sleep hygiene.

It was hypothesized that high levels of self-compassion would moderate the effect of sleep quality on perceived stress because research has indicated that those higher in self-compassion respond to their own limitations with kindness rather than self-criticism when faced with a difficult stressor (Leary et al., 2007). Research strongly suggests that those high in self-compassion are less likely to ruminate about negative evaluations or outcomes when faced with their own failures (Leary et al. 2007). Neff (2003) discusses self-compassion as an effective emotional-approach coping strategy. Self-compassion

promotes a mindful relationship to one's emotions, characterized by kindness and understanding, allowing the individual to make changes in oneself and the environment that will serve to promote well-being. Sleep hygiene was accounted for as a control variable in this study because it was hypothesized that it influences the relationship between sleep quality and perceived stress. The rationale for including sleep hygiene as a control variable is the significant association with sleep quality, which is also associated with perceived stress (Brown et al., 2002; Singleton & Wolfson, 2009). Therefore, it seems plausible that sleep hygiene may account for some of the variance in the relationship between sleep quality and perceived stress.

Chapter 4: Method

The overarching aim of this study was to investigate whether self-compassion influences the relationship between sleep quality and perceived stress. Data were collected from undergraduate and graduate students who were interested in participating in a study on sleep quality. Participants were recruited through Facebook and by an e-mail message to health professions students on both the Philadelphia and Georgia campuses of Philadelphia College of Osteopathic Medicine.

Design

This study utilized a single group, cross-sectional, correlational/regression design. Control variables were age, gender, race, education status (undergraduate or graduate student) and major (science or nonscience), employment status (part-time, full-time, or unemployed), sleep hygiene, alcohol use, use of current psychotropic medication, and mental health diagnosis. The independent variable was sleep quality. The dependent variable was perceived stress. The moderator to be tested was self-compassion. Participant data was excluded if more than 10% of questions were not answered.

Participants

Participants were recruited nationwide. The power analysis to calculate sample size was conducted with an a priori sample size calculator for multiple regression analysis. The effect size was .15, the power level was .8, the number of predictors was 9, and the probability level was .05. All participants who met the following criteria were included in the study: undergraduate or graduate student, 18 years of age or older, self-reported literacy of at least an eighth grade reading level in English; access to the Internet.

Measures

The Self-Compassion Scale (SCS; Neff, 2003) is a 26-item self-report measure consisting of six subscales: (a) self-kindness, sending kindness and understanding to oneself, (b) self-judgment, being judgmental and critical of oneself, (c) common humanity, recognizing one's experience as part of the wider human condition, (d) isolation, viewing oneself as separate and isolated from others, AND (e) mindfulness, the ability to be present with one's painful experiences without becoming overwhelmed and over identified with them. Items include *I'm kind to myself when I'm experiencing suffering* (self-kindness) and *I try to see my failings as part of the human condition* (common humanity). Items are rated on a 5-point Likert scale from 1, *almost never*, to 5 *almost always*. Greater scores on the self-kindness, common humanity, and mindfulness subscales reflect greater self-compassion. Greater scores on the self-judgment, isolation, and overidentified subscales reflect lower self-compassion. In this study, participants' scores on subscales were not examined. Each participant's degree of self-compassion was determined by their overall score. The SCS has demonstrated good internal consistency reliability (.92) and good test-retest reliability ($r = .93$). The SCS has demonstrated adequate construct validity, as Pearson's correlation coefficients indicated a significant negative correlation with dissimilar constructs such as self-criticism ($r = -.65$) and significant positive correlations with similar constructs such as social connectedness ($r = .41$)

The Pittsburgh Sleep Quality Index (PSQI) distinguishes between poor- and good-quality sleepers by measuring seven areas: subjective sleep quality, sleep latency, sleep

duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over the past month. Scoring is on a 0 to 3 Likert scale, and a score of 3 indicates the negative extreme. A total, global score of 5 or higher indicates a poor-quality sleeper. A score of 4 or less indicates a good-quality sleeper (Buysse & Reynolds, 1989). The PSQI reliability coefficient (Cronbach's alpha) is .83, indicating high internal consistency (Buysse & Reynolds, 1989). The PSQI has been shown to be a valid measure of sleep quality as global PSQI scores have differed significantly between participant groups. Group differences have resulted in unique component and global score profiles. Differences have been confirmed with a MANCOVA for scores across groups (Hotelling's $T = 2.62, p < 0.001$). Validity was examined by comparing PSQI estimates of sleep factors with those derived from polysomnography; t -tests indicated that there were no differences between PSQI estimates and laboratory results for sleep latency, although the PSQI indicated a greater estimate of the previous month's sleep duration and efficiency than polysomnography ($t = 9.98$ and $4.50, p < 0.001$). Pearson correlations indicated no significant positive correlations between PSQI estimates and polysomnographic results with the exception of sleep latency ($r = .33, p < 0.001$).

The Perceived Stress Scale (PSS) was used to measure perceived stress. The PSS is a 10-item questionnaire that measures the degree to which situations are evaluated as stressful (Cohen et al., 1983). One half of the items are in positive form (e.g., *In the last month, how often have you felt that things were going your way?*). The other half of the items are in negative form (e.g., *In the last month, how often have you found that you could not cope with all the things that you had to do?*). Item responses range from *never* (0) to *very often* (4). The PSS takes approximately 2 to 4 minutes to complete (Cohen et

al., 1983). The PSS has demonstrated good coefficient alpha reliability ($r = .85$). Test-retest reliability is .85 after 2 days and .55 after 6 weeks. The PSS has demonstrated adequate convergent validity with health-related outcome measures, as well as adequate divergent validity with measures of depressive symptoms (Cohen et al., 1983).

The Sleep Hygiene Index is a 13-item self-administered measure designed to assess the presence of behaviors that impact sleep hygiene (Mastin, Bryson, & Corwyn, 2006). Participants are asked to indicate how frequently they engage in specific behaviors (*always, frequently, sometimes, rarely, never*). Items were derived from the diagnostic criteria for inadequate sleep hygiene in the International Classification of Sleep Disorders (American Sleep Disorders Association, 1990, pp. 73-77). Item scores are summed to provide a global assessment of sleep hygiene. Higher scores are indicative of more maladaptive sleep hygiene. The index has demonstrated good test-retest reliability ($r = .71$). Chronbach's alpha is .66. It has been found to be positively associated with other measures of sleep hygiene (Pearson r values from .37 to .45). The Sleep Hygiene Index has also been positively correlated with all PSQI component scores (Mastin et al., 2006).

Procedure

All questions were entered in Survey Monkey. Survey Monkey was set up so that participants were allowed to participate once and were not permitted to reenter data. In the Facebook post or e-mail message, a link was provided that directed participants to the study on Survey Monkey. Screening included the inclusion/exclusion criteria, a statement that participation was voluntary, and an explanation that the purpose of the study was to examine the relationship between personality variables and sleep problems.

The approximate time to complete the self-report measures (20 minutes) was also explained. Participants were informed that after they completed the study, they would be eligible to win one of five \$100 prizes. This allowed student responses to be separated from their names. Participants were informed that they would not be identified by name, their scores would be completely anonymous, and they could discontinue at any time. Students who completed the questionnaires were directed to an e-mail to participate in the raffle.

Participants provided demographic information after completing the self-report measures. This included gender, age, race/ethnicity, undergraduate or graduate student, science or non-science major, and employment status. Participants were asked if they had a mental health diagnosis and to indicate if they had depression, anxiety, ADHD, or no diagnosis. Participants were asked if they were currently taking medication for a mental health condition. They were also asked to indicate on how many of the 30 days prior to survey administration they consumed at least some alcohol and how much alcohol they consumed per day on average. Participants were also asked to indicate on how many of the 30 days prior to survey administration they consumed at least some caffeine and how much caffeine they consume per day on average.

Individuals who did not meet the inclusion criteria received a message explaining this. They then received a message thanking them for their interest and explaining that they would not be eligible to participate in the raffle.

All data were entered and analyzed using Software Package for Statistical Analysis (SPSS) version 22.

Chapter 5: Results

Demographics

The table provides the demographic information for the 396 of participants in this study; 154 participants had missing data. The majority were females between the ages of 18 and 25; 71.5% identified as Caucasian. Most were science majors who were not working and had no mental health diagnosis. Approximately 16% reported no alcohol use in the 30 days prior to survey; approximately 49% used at least some caffeine during this period.

Table

Demographic Data

Characteristic	<i>n</i>	%
Gender		
Male	136	34.3
Female	258	65.2
Transgender	2	0.5
Age		
18 to 25	192	48.5
26 to 30	142	35.9
31 to 35	35	8.8
36 to 73	27	6.8

(continued)

Characteristic	<i>n</i>	%
Race/Ethnicity		
White	283	71.5
Asian	69	17.4
Black/African American	20	5.1
Latino	10	2.5
Other	14	3.5
Education Status		
Undergraduate	25	6.3
Graduate	371	93.7
Type of Major		
Science	345	87.1
Nonscience	51	12.9
Employment Status		
Full-Time	76	19.2
Part-Time	137	34.6
Unemployed	183	46.2
Mental Health Diagnosis		
Depression	33	8.3
Anxiety	37	9.3
Attention deficit hyperactivity disorder	18	4.5
No diagnosis	308	77.8

Characteristic	<i>n</i>	%
Taking Medication for Mental Health		
Yes	74	18.7
No	322	81.3
Alcohol consumption in 30 days prior to survey		
Yes	8	2.1
No	65	16.3
Caffeine consumption in 30 days prior to survey		
Yes	193	48.7
No	134	33.9

To test the hypothesis that there would be a significant positive relationship between sleep quality and perceived stress, as measured by the PSQI and the PSS, a correlational analysis was conducted. In order to calculate a Pearson's product-moment correlation coefficient, the data must be interval in nature and there must be a linear relationship between variables. The variables must be normally distributed, and one of the variables may be categorical, with a maximum of two categories. Overall, the scores of the PSS were not correlated with scores on the PSQI. The correlation coefficient between the PSS and the PSQI was not statistically significant, $r(448) = -.041, p > .05$.

The hypothesis was therefore not supported by the results, which indicated that the degree of perceived stress as measured by the PSS was not associated with sleep quality.

To test the hypothesis that there would be a significant negative relationship between self-compassion and perceived stress, as measured by the SCS and the PSS, a correlational analysis was conducted. Overall, the scores of the SCS were negatively correlated with scores on the PSS. The correlation coefficient between the SCS and the PSS was statistically significant, $r(397) = -.372, p = 0.01$; 13.8% of the variability in perceived stress was associated with differences in self-compassion. This hypothesis was supported by the results, which indicated that the greater the self-compassion participants had, as measured by the SCS, the less perceived stress they experienced, as measured by the PSS.

To test the hypothesis that there would be a significant negative relationship between sleep quality and self-compassion, as measured by the PSQI and the SCS, a correlational analysis was conducted. The correlation between the PSQI and the SCS was not statistically significant, $r(243) = .045, p > .05$. This hypothesis was not supported by the results, which indicated that sleep quality, as measured by the PSQI, was not associated with degree of self-compassion.

To test the hypothesis that there would be a significant negative relationship between self-compassion and sleep hygiene, as measured by the SCS and the SHI, a correlational analysis was conducted. Overall, the scores of the SCS were positively correlated with scores on the SHI. The correlation coefficient between the SCS and the SHI was statistically significant, $r(397) = .207, p = 0.01$; 4.3% of the difference in sleep hygiene was associated with or attributable to differences in self-compassion. Although a

significant relationship was found, it was the opposite of what was predicted. Thus, this hypothesis was not supported by the results; rather, a higher degree of self-compassion was associated with poorer sleep hygiene.

The hypothesis that self-compassion is a moderator of the relationship between sleep quality and perceived stress was not tested due to the lack of a significant relationship between self-compassion and sleep quality.

Chapter 6: Discussion

This is the first known study to investigate the relationship between sleep quality, sleep hygiene, self-compassion and perceived stress. The primary purpose of the study was to investigate whether degree of self-compassion is associated with factors related to sleep and perceived stress. The study sought to identify if self-compassion served as a protective factor against perceived stress related to poor sleep quality. In order to evaluate the effect of self-compassion between those factors, a relationship between sleep quality and perceived stress had to be found.

Perceived Stress and Sleep Quality

The first goal of the study was to test the hypothesis that there is a significant positive relationship between perceived stress and sleep quality. Higher scores on the PSS, indicating a higher degree of perceived stress, were predicted to be associated with higher scores on the PSQI, indicating poorer sleep quality. Results of the correlational analysis did not support the hypothesis and indicated that there is no relationship between perceived stress, as measured by the PSS, and sleep quality, as measured by the PSQI.

The results of the study are, then, inconsistent with previous research indicating an association between stress and sleep in college students (Lund et al., 2010). These studies indicated that those with poor sleep quality also reported increased perceived stress. Research has also indicated that emotional response to stress predicts sleep quality (Verlander et al., 1999). There are significant demographic differences between previous studies and the current study. For example, previous studies included undergraduate college students, whereas graduate students comprised the majority of the sample in the present study. Therefore, the current study had older participants. The additional life

experience of graduate students may have been a factor in lower reported degrees of perceived stress because they have developed more effective coping strategies. For example, graduate students may then be less likely to use alcohol and drugs and may be more likely to engage in healthier coping strategies, such as exercise. Due to their demanding schedule, graduate students may become habituated to being sleep deprived and therefore experience less perceived stress related to the effects of poor sleep quality. The Perceived Stress Scale was constructed to be sensitive to an individual's subjective perception of events, which is dependent on individual differences. Therefore, this scale would account for individual coping strategies, which in turn would weaken the association between sleep quality and perceived stress.

Given that there were many graduate students in this sample, perhaps there are other variables more closely related to sleep quality and stress that are more relevant in this population. As previously discussed, one study found that poor sleep quality was most closely associated with lack of exercise in the medical student population (Brick et al., 2010). It is possible that poor sleep quality is not one of the most significant stressors for graduate students. For example, it seems logical to hypothesize that a stressor such as academic performance could be more closely associated with perceived stress within this population. Although no relationship was indicated between perceived stress and sleep quality, there was a significant relationship between perceived stress and self-compassion.

Self-Compassion and Perceived Stress

The second goal of the study was to test the hypothesis that there is a significant negative relationship between self-compassion and perceived stress. Results of the

correlational analysis supported the hypothesis and indicated that there is a moderate relationship between self-compassion, as measured by the SCS, and perceived stress, as measured by the PSS. Higher levels of self-compassion were associated with lower reported levels of perceived stress.

The results of the study are consistent with self-compassion theory and research. Self-compassion involves nonjudgmental understanding of one's inadequacies and hardships (Neff, 2003). That is, according to self-compassion theory, when faced with difficulties, those higher in self-compassion will be less prone to self-criticism and more accepting of their imperfections (Neff et al., 2007). For example, research has suggested that when confronted with stressors, individuals higher in self-compassion are better able to cope with distress. Therefore, self-compassion has been found to moderate reactions to negative events. The current findings are consistent with previous research indicating that those higher in self-compassion are less likely to experience negative affect when faced with failure (Leary et al., 2007). The results of the current study are consistent with previous studies in college students. For example, one previous study indicated that college students with higher self-compassion had a higher distress tolerance and more effectively managed distress when confronted with academic disappointment and needed to readjust their academic goals (Neely et al., 2009). The present study differs from previous studies in that it primarily included graduate student participants. It is possible that graduate students have learned a variety of coping skills when faced with stressful situations. Self-compassion may be one of many coping strategies employed by medical students.

There are important implications associated with this finding. This result provides additional support for previous studies suggesting a relationship between higher self-compassion and lower perceived stress in college students. It is also noteworthy that most of the previous studies that investigated this relationship only included undergraduate students as participants. Therefore, this is one of the few studies that indicates that higher self-compassion is associated with lower perceived stress specifically within graduate students. This implies that graduate students with higher self-compassion may be less susceptible to increased distress associated with stressors. For example, consistent with research on self-compassion and coping in undergraduates (Neely et al., 2009), it would be logical to hypothesize that self-compassionate graduate students would cope with negative emotions more effectively when confronted with academic disappointment. Rather than focusing on academic stressors, this study investigated whether self-compassion is associated with sleep quality within college students.

Sleep Quality and Self-Compassion

The third goal of the study was to test the hypothesis that there is a significant negative relationship between sleep quality and self-compassion. Results of the correlational analysis did not support the hypothesis and indicated that there is no relationship between sleep quality, as measured by the PSQI, and self-compassion, as measured by the SCS.

Although previous research had not investigated this relationship, studies have indicated a relationship between higher levels of self-compassion and increased well-being. More specifically, self-compassion has been associated with effective coping

strategies for stressors, as well as an increased ability to manage negative affect when coping with illness (Allen & Leary, 2010; Leary et al., 2007; Neff et al., 2005; Terry & Leary, 2011). Previous research indicated that those higher in self-compassion more effectively manage distress when faced with situations that differ from their expectations (Neely et al., 2009). Given these previous research findings, it seemed logical to hypothesize that those higher in self-compassion would report better sleep quality.

There may be many reasons for a lack of an association between these variables in the present study. First, sleep quality is comprised of many components, some of which may not be associated with self-compassion. Factors such as genetics, work schedule and sleep hygiene practices are among the many factors that may contribute to sleep quality. Another possibility is that due to the complexity of sleep problems, self-compassion may not have a significant impact on the quality of sleep. That is, an individual may have a high degree of self-compassion, but still have poor sleep quality. Indeed, the results suggest that an individual's sleep quality may be independent of their degree of self-compassion. This finding suggests that self-compassion and sleep quality are unrelated. However, given the significant association between self-compassion and perceived stress, it is possible that self-compassion may be associated with sleep factors that are more closely related to stress. For example, it seems logical to posit an association between self-compassion and dysfunctional beliefs and attitudes about sleep. Drawing on research suggesting that self-compassion is associated with health promotion (Neff et al., 2005) it seems plausible that degree of self-compassion may be associated with behaviors that either promote or inhibit sleep.

Self-Compassion and Sleep Hygiene

The fourth goal of the study was to test the hypothesis that there is a significant negative relationship between self-compassion and sleep hygiene. Results of the correlational analysis did not support the hypothesis and indicated that there is a positive relationship between self-compassion, as measured by the SCS, and sleep hygiene, as measured by the SHI.

The results of the study are not consistent with self-compassion theory, and previous research that has suggested an association between increased levels of self-compassion and a proactive approach to addressing health issues. Self-compassion theory has indicated that those higher in self-compassion are more likely to relate to themselves with kindness, care, and concern (Neff, 2003). Due to this self-compassionate attitude, theory suggests that when faced with stressors, those higher in self-compassion are more likely to respond in ways that promote their health and well-being (Terry & Leary, 2011, such as caring for themselves and seeking medical attention, when necessary (Terry et al., 2013). Therefore, it seemed logical to predict that individuals higher in self-compassion would be proactive with engaging in behaviors that promote sleep.

The direction and degree of the association indicated in this study was possibly impacted by the large number of graduate students in the study. There are many factors that contribute to sleep hygiene practices in medical students. For example, irregular schedules, test anxiety, and environmental stressors may significantly compromise sleep hygiene practices (Brick et al., 2010). Therefore, given the myriad of stressors faced by medical students, it is understandable that self-compassion may have only a small

association with sleep hygiene practices. Poor sleep hygiene may serve as an adaptive function to cope with academic stressors. For example, although consuming caffeine at night is considered a poor sleep hygiene practice, it may be a necessary at times for academic success. Therefore, it is plausible that graduate students higher in self-compassion give themselves the permission to engage in poor sleep hygiene habits in order to cope with their rigorous academic demands.

Limitations

There are a number of limitations of this study. The findings in this study are correlational and, therefore, determination of the directionality of effects between variables is not possible. This was a cross-sectional study and, therefore, it is not possible to draw conclusions about the relationship or influence of variables over time. The associations that have been indicated do not predict that there will be relationships between variables in the future. The study relied on self-report measures in undergraduate and graduate students, which limits generalizability beyond these groups. The sample was comprised largely of graduate students, further reducing the ability to generalize the results. Participants self-selected; those who volunteer for a study on sleep may not be representative of those who do not. Volunteers may be individuals who have more free time than others and therefore may differ on demographic variables such as race, ethnicity, and income level. These demographic characteristics may also be associated with differences in self-compassion, sleep quality, and perceived stress in comparison with individuals who did not volunteer. For example, it is possible that volunteers with a higher income level may report less perceived stress than those with a lower income level who did not have the time to volunteer for the study.

Some of the limitations of this study may have had a significant impact on the results. For example, it was the large percentage of medical and graduate student participants may have produced unique responses characteristic of this specific population. Medical and graduate students may represent the most intelligent and highest achieving sample within the student population at large. Therefore, participants in this study may have different skills and qualities than undergraduates. Graduate students' lifestyles may be demanding because many students work while attending school, and some have children. These lifestyle factors may have also influenced responses on self-report measures.

Future studies should include a more balanced sample by enrolling participants from a variety of academic programs. One way to obtain a more academically diverse sample is to proactively target and advertise to students from different programs. Finally, students' specific lifestyle factors, such as academic pressures, may have influenced the results. Future studies should consider broadening the sample beyond college and graduate students in order to assess the relationships between these variables with a sample more representative of the population at large.

Future Directions

The results of this study indicate that there is a significant relationship between self-compassion and perceived stress. Future studies should continue to investigate this relationship and the mechanisms by which self-compassion may moderate this relationship. Although this study did not provide support for an association between self-compassion and sleep-related variables, it is still possible that a relationship exists. Although self-compassion may not be directly associated with sleep quality or sleep

hygiene, self-compassion may be associated with more indirect stress related cognitive variables, such as dysfunctional attitudes and beliefs about sleep. Future studies should investigate whether a self-compassionate attitude may counter unhelpful beliefs about sleep and whether self-compassion serves to decrease the increased physiological arousal associated with insomnia.

The results of this study have implications for mental health professionals working with college and graduate students. Self-compassion practices may complement therapeutic approaches such as acceptance and commitment therapy (ACT). One of the main tenets of ACT is to promote psychological flexibility and reduce experiential avoidance when confronted with stressors. A self-compassionate attitude facilitates acceptance and tolerance of unwanted thoughts and emotions when faced with difficult situations. Self-compassion cultivates mindful awareness of one's reactions. A mindful relationship with one's internal experience is consistent with the ACT core process of defusion which promotes detachment from unhelpful thoughts and feelings. Moreover, self-compassion, mindfulness, and defusion practices cultivate increased distress tolerance. This allows individuals to respond creatively and authentically to stressors while continuing to pursue valued activities.

In sum, it is widely known that graduate students often confront a myriad of stressors such as relationship issues, academic problems, peer pressure, and financial difficulties. When faced with multiple stressors that tax coping resources, individuals may become more vulnerable to mental health issues, such as depression and anxiety disorders. Therefore, when counseling college or graduate students who are feeling overwhelmed by stressors, utilizing self-compassion practices may serve as a protective

factor against further distress. Drawing on self-compassion research, guiding students in cultivating a self-compassionate attitude may reduce self-criticism and rumination, broaden their perspective on the stressor, facilitate acceptance of imperfection, and promote academic goal readjustment (Leary et al., 2007; Neely et al., 2009; Neff et al., 2007). Thus, cultivating a self-compassionate attitude is likely to promote a relationship to stressors that minimizes additional, unnecessary distress while promoting adaptive behavior, allowing the individual to effectively address these challenges.

References

- American Sleep Disorders Association (1990). *International classification of sleep disorders: Diagnostic and coding manual*. Rochester, MN: American Sleep Disorders Association.
- Allen, A., & Leary, M. R. (2010). Self-compassion, stress, and coping. *Social and Personality Psychology Compass*, 4(2), 107-118.
- Baer, R., Smith, G., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, 13(1), 27-45.
- Breslau, N., Roth, T., Rosenthal, L., & Andreski, P. (1996). Sleep disturbance and psychiatric disorders: A longitudinal epidemiological study of young adults. *Biological Psychiatry*, 39(6), 411-418.
- Brick, C. A., Seely, D. L., & Palermo, T. M. (2010). Association between sleep hygiene and sleep quality in medical students. *Behavioral Sleep Medicine*, 8(2), 113-121.
- Brown, F. C., Buboltz Jr., W. C., & Soper, B. (2002). Relationship of sleep hygiene awareness, sleep hygiene practices, and sleep quality in university students. *Behavioral Medicine*, 28(1), 33.
- Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193-213.
- Carney, C., Edinger, J., Meyer, B., Lindman, L., & Istre, T. (2006). Daily activities and sleep quality in college students. *Chronobiology International: The Journal of Biological and Medical Rhythm Research*, 23(3), 623-637.

- Cohen, S. S., Kamarck, T. T., & Mermelstein, R. R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396.
- Coren, S. (1994). The prevalence of self-reported sleep disturbances in young adults. *International Journal of Neuroscience, 79*, 67-73.
- Fortunato, V., & Harsh, J. (2006). Stress and sleep quality: The moderating role of negative affectivity. *Personality and Individual Differences, 41*(5), 825-836.
- Gaultney, J. F. (2010). The prevalence of sleep disorders in college students: Impact on academic performance. *Journal of American College Health, 59*(2), 91-97.
- Hicks, R. A., Mistry, R., Lucero, K., Rical, C., Pellecrini, R. J. (1990). Self-reported sleep durations of college students: Normative data for 1978-79 and 1988-89. *Perceptual and Motor Skills, 70*, 370.
- Hicks, R., Fernandez, C. C., & Pellegrini, R. J. (2001). Self-reported sleep durations of college students: Normative data for 1978-79, 1988-89, and 2000-01. *Perceptual and Motor Skills, 93*(1), 139-140.
- Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality and Individual Differences, 50*(2), 222-227. doi:10.1016/j.paid.2010.09.033
- Jean-Louis, G., Von Gizycki, H. H., Zizi, F. F., & Nunes, J. J. (1998). Mood states and sleepiness in college students: Influences of age, sex, habitual sleep, and substance use. *Perceptual and Motor Skills, 87*(2), 507-512.
- Jensen, D. R. (2003). Understanding sleep disorders in a college student population. *Journal of College Counseling, 6*(1), 25.

- Karacan, I., Thornby, J.I., & Williams, R.L. (1983). Sleep disturbance: A community survey. In: C. Guilleminault & E. Lugaresi (Eds.), *Sleep/Wake disorders: Natural history, epidemiology, and long-term evolution* (pp.37-60). New York, NY: Raven Press.
- Kloss, J. D., Nash, C. O., Horsey, S. E., & Taylor, D. J. (2011). The delivery of behavioral sleep medicine to college students. *Journal of Adolescent Health, 48*(6), 553-561.
- Lazarus, R. S. (1974). Psychological stress and coping in adaptation and illness. *International Journal of Psychiatry in Medicine, 5*(4), 321-333.
- Leary, M. R., Tate, E. B., Allen, A. B., Adams, C. E., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: The implications of treating oneself kindly. *Journal of Personality and Social Psychology, 92*(5), 887-904. doi:10.1037/0022-3514.92.5.887
- Li, Y., & Lindsey, B. J. (2013). An association between college students' health promotion practices and perceived stress. *College Student Journal, 47*(3), 437-446.
- Lund, H., Reider, B., Whiting, A., & Prichard, J. (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. *Journal of Adolescent Health, 46*(2), 124-132.
- Mastin, D., Bryson, J., & Corwyn, R. (2006). Assessment of sleep hygiene using the Sleep Hygiene Index. *Journal of Behavioral Medicine, 29*(3), 223-227.
- Millman, R. P. (2005). Excessive sleepiness in adolescents and young adults: Causes, consequences, and treatment strategies. *Pediatrics, 115*(6), 1774-1786.

- Morrison, D. N., McGee, R. R., & Stanton, W. R. (1992). Sleep problems in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*(1), 94-99.
- Myers, S. B., Sweeney, A. C., Popick, V., Wesley, K., Bordfeld, A., & Fingerhut, R. (2012). Self-care practices and perceived stress levels among psychology graduate students. *Training and Education In Professional Psychology, 6*(1), 55-66.
- Nadorff, M. R., Nazem, S. S., & Fiske, A. A. (2011). Insomnia symptoms, nightmares, and suicidal ideation in a college student sample. *Sleep, 34*(1), 93-98.
- National Sleep Foundation (2009) Sleep in America poll 2009. Washington, DC: National Sleep Foundation. Retrieved from:
www.sleepfoundation.org/article/sleep-america-polls/2009-health-and-safety
- Neely, M., Schallert, D., Mohammed, S., Roberts, R., & Chen, Y. (2009). Self-kindness when facing stress: The role of self-compassion, goal regulation, and support in college students' well-being. *Motivation and Emotion, 33*(1), 88-97.
doi:10.1007/s11031-008-9119-8
- Neff, K. (2003). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85.
- Neff, K. (2004). Self-compassion and psychological well-being. *Constructivism in the Human Sciences, 9*(2), 27-37.
- Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*(1), 139-154.
doi:10.1016/j.jrp.2006.03.004

- Neff, K. D., Hsieh, Y.-P., & DeJitterat, K. (2005). Self-compassion, achievement goals, and coping with academic failure. *Self & Identity, 4*(3), 263-287.
doi:10.1080/13576500444000317
- Nyer, M. M., Farabaugh, A. A., Fehling, K. K., Soskin, D. D., Holt, D. D., Papakostas, G. I., & Mischoulon, D. D. (2013). Relationship between sleep disturbance and depression, anxiety, and functioning in college students. *Depression and Anxiety, 30*(9), 873-880.
- Pearson, N., Johnson, L., & Nahin, R. (2006). Insomnia, trouble sleeping, and complementary and alternative medicine: Analysis of the 2002 National Health Interview Survey data. *Archives of Internal Medicine, 166*(16), 1775-1782.
- Okun, M. L., Kravitz, H.M., Sowers, M. F., Moul, D. E., Buysse, D. J., & Hall, M. (2009). Psychometric evaluation of the Insomnia Symptom Questionnaire: A self-report measure to identify chronic insomnia. *Journal of Clinical Sleep Medicine, 5*(1), 41-51.
- Orzech, K. M., Salafsky, D. B., & Hamilton, L. (2011). The state of sleep among college students at a large public university. *Journal of American College Health, 59*(7), 612-619.
- Pilcher, J., Ginter, D., & Sadowsky, B. (1997). Sleep quality versus sleep quantity: Relationships between sleep and measures of health, well-being and sleepiness in college students. *Journal of Psychosomatic Research, 42*(6), 583-596.
- Raes, F. F. (2010). Rumination and worry as mediators of the relationship between self-compassion and depression and anxiety. *Personality and Individual Differences, 48*(6), 757-761.

- Roberts, R., Duong, H., & Roberts, C. (2009). Sleepless in adolescence: Prospective data on sleep deprivation, health and functioning. *Journal of Adolescence*, *32*(5), 1045-1057.
- Roberts, R., Roberts, C., & Duong, H. (2008). Chronic insomnia and its negative consequences for health and functioning of adolescents: A 12-month prospective study. *Journal of Adolescent Health*, *42*(3), 294-302.
- Rosekind, M. R., & Gregory, K. B. (2010). Insomnia risks and costs: Health, safety, and quality of life. *American Journal of Managed Care*, *16*(8), 617-626.
- Singleton Jr., R. A., & Wolfson, A. R. (2009). Alcohol consumption, sleep, and academic performance among college students. *Journal of Studies on Alcohol and Drugs*, *70*(3), 355-363.
- Stepanski, E., & Wyatt, J. (2003). Use of sleep hygiene in the treatment of insomnia. *Sleep Medicine Reviews*, *7*(3), 215-225.
- Terry, M. L., & Leary, M. R. (2011). Self-compassion, self-regulation, and health. *Self and Identity*, *10*(3), 352-362.
- Terry, M. L., Leary, M. R., Mehta, S., & Henderson, K. (2013). Self-compassionate reactions to health threats. *Personality and Social Psychology Bulletin*, *39*(7), 911-926.
- Vail-Smith, K., Felts, W., & Becker, C. (2009). Relationship between sleep quality and health risk behaviors in undergraduate college students. *College Student Journal*, *43*(3), 924-930.
- Verlander, L. A., Benedict, J., & Hanson, D. P. (1999). Stress and sleep patterns of college students. *Perceptual and Motor Skills*, *88*(3), 893-898.