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Sleep quality of college students and its relationship to coping styles and well-being

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SLEEP QUALITY OF COLLEGE STUDENTS AND ITS RELATIONSHIP TO COPING STYLES AND WELL-BEING

by

Cathy Alison Word, M. A.

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
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We hereby recommend that the dissertation prepared under our supervision by Cathy A. Word entitled Sleep Quality of College Students and its Relationship to Coping Styles and Well-Being be accepted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy

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ABSTRACT

College students suffer from more sleep disturbances than the general population. Sleep difficulties in college students can lead to lower levels of performance, memory, and cognitive ability, as well as increased levels of anxiety and decreased levels of well-being. Sleep quality is known to impact individuals' physical and psychological health, which are indicators of well-being. Sleep also appears to influence individuals' choices of coping strategies. Sleep quality is also highly correlated with college students' emotional response to stress. The relationships between and among sleep quality, well-being, and coping style have not been fully examined. The purpose of this study was to further delineate the relationships between and among sleep quality, coping styles, and well-being in order to increase understanding of how each variable impacts the others.

Participants of this study were introductory psychology students at a medium-sized southern United States university. Using the Sleep Quality Index, the Pittsburgh Sleep Quality Index, the Coping Styles Questionnaire, and the General Well-Being Schedule, the relationships between and among sleep quality, coping style, and well-being were examined. Results found significant relationships between reported sleep quality and coping and sleep quality and well-being. Additionally, coping moderated the relationship between sleep quality and well-being for males but not for females.

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ACKNOWLEDGEMENTS

While writing this dissertation during the year of my internship at the University of Kansas, I often heard the statement, "The only good dissertation is a 'done' dissertation". Now that *my* dissertation is "done", I understand all aspects of what that statement really means. This has been a challenging yet rewarding year; however, I certainly did not make the journey alone. I have many people to acknowledge for helping me through this process.

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CHAPTER 1

Introduction

Sleep is an important aspect of human life. Disturbed sleep can lead to lower levels of performance, memory, and cognitive ability, as well as increased levels of anxiety and decreased levels of well-being (Dinges, 1988; Pilcher, Ginter & Sadowsky, 1997; Pilcher & Walters, 1997; Smith & Lapp, 1991). Recent research has shown college students suffer from more sleep difficulties than the general population (Brown, Soper, & Buboltz, 2001; Buboltz, Brown, & Soper, 2001; Coren, 1994; Lack, 1986; Yang, Wu, Hsieh, Liu, & Lu, 2003). The newfound independence and autonomy of college students contribute to a lifestyle that promotes sleep difficulties. Contributing factors such as irregular sleeping patterns, academic and social demands, and use of certain drugs and alcohol impact college students' sleep (Kleeman & Richardson, 1985; Lack, 1986; McCann & Stewin, 1987; Pilcher et al., 1997; Russell & Petrie, 1992). While few studies have examined sleep and coping, sleep appears related to individuals' choices of coping strategies (Hicks, Marical, & Conti, 1991; Morin, Rodrigue, & Ivers, 2003). Gray and Watson (2002) found sleep quality related consistently to indicators of long-term well-being.

While most research into sleep has focused on sleep quantity, evidence points to sleep quality as being related more significantly to detrimental effects of sleep disturbances (Pilcher et al., 1997; Pilcher & Ott, 1998). Sleep quality consists of the

components related to a good night's sleep (e.g. time taken to fall asleep, number of awakenings, and subjective rating of feeling rested in the morning). Poor sleep quality is related to health, life satisfaction, increased levels of tension and depression, and decreased psychological well-being in college students (Pilcher et al., 1997).

The human sleep-wake cycle is based on a circadian rhythm that when desynchronized causes an increase in stress (Wever, 1998) which can affect well-being. There is evidence that disruption in the circadian rhythm of shift workers is associated with decreased physical and mental well-being (Tucker, Smith, Macdonald, & Folkard, 1998). Research has demonstrated that college students exhibiting excessive daytime sleepiness report significantly greater negative mood states than those not excessively sleepy (Jean-Louis, von Gizychki, Zizi, & Nunes, 1998). More specifically, a clear relationship between poor sleep quality and negative mood states has been previously established (Bonnet, 1985; Gau, 2000; Gray & Watson, 2002; Lacks & Morin, 1992; Pilcher & Huffcutt, 1996). It has been shown that sleep deprivation of only one night is related to increased anxiety, excitability, sensitivity, and impulsiveness (Sicard Jouve, & Biln, 2001; Vein, Dallakyan, Levin, & Skakun, 1983). Insomnia has been related to an increased risk for major depression, alcohol abuse, and panic disorder (Weisman, Greenwald, Nino-Murcia, & Dement, 1997). In fact, sleep disturbances in general appear to play a physiological role in the development of major depression (Ford & Cooper-Patrick, 2001). While sleep difficulties are associated with psychopathology, they also impact college students in other ways.

Poor sleep can have detrimental effects on college students' adjustment, academic success, and physical and psychological health. One recent study found that of all health

related behaviors examined, sleep habits were the most predictive of academic performance of college students (Trockel, Barnes, & Egget, 2000). These effects potentially impact their lives after college. Lack of academic success may translate into lower earnings over a person's lifetime. Decreased physical and mental health in college may continue throughout life.

Little research has been done in the area of sleep and coping style. Hicks et al. (1991) found that short sleepers used more emotion-focused coping than long sleepers. Insomnia patients have been found to rely more on emotion-oriented coping strategies and perceived their lives as more stressful (Morin et al., 2003). It has been suggested that coping styles moderate the effect of stress on sleep (Sadeh, Keinan, & Daon, 2004). Another study found that students with higher levels of self-control, self-acceptance, and confidence in other people had significantly better sleep quality (Brown, Buboltz, & Jenkins, 2001).

The purpose of this study was to define further the possible relationship between and among sleep quality, coping styles, and well-being in order to increase understanding of how each variable influences the others. To date, this study is the only one known to address these three areas of research concurrently. Looking at these variables simultaneously may lead to developing interventions to improve sleep in college students.

Statement of the Problem

Although most sleep research has focused on sleep quantity, it is sleep quality that has been found more salient to health, satisfaction with life, levels of tension and depression, and psychological well-being in college students (Pilcher et al., 1997) as well as general cognitive performance (Pilcher & Walters, 1997). Little research has been

done to determine how coping is related to sleep quality or how sleep quality is related to well-being. This has resulted in an insufficient understanding of the problem and what to do about it.

Though little research has been done on sleep quality and subjective well-being, at least one study found that as college students adapted to the social and academic demands of a semester and felt less stress, their perceived quality of sleep increased but their subjective well-being remained stable (Pilcher & Ott, 1998). Subjective well-being is discussed in two categories: physical well-being and mental well-being. Both categories of well-being may be impacted by an individual's coping style. Avoidance coping has been correlated positively with psychological distress (Aldwin & Revenson, 1987; Billings and Moos, 1981; Felton, Revenson, & Hinrichsen, 1984; Fleishman & Fogel, 1994; McCrae & Costa, 1986; O'Conner & O'Conner, 2003; Pearlin & Schooler, 1978) and physical illness (Nowack, 1991). Coping has been found related to symptom severity and treatment in depressed patients (Ravindran, Matheson, Griffiths, Merali, & Anisman, 2002). Positive reappraisal and planful problem-solving have been linked to less deterioration in physical health, but coping in general was not found to be associated with changes in psychological well-being in a study of first year medical students (Park & Adler, 2003). Problem-focused coping was negatively correlated with psychological symptoms in married adults (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986) as well as physical symptoms, accidents, and skin problems (Epstein &Katz, 1992). Emotion-focused coping was related to decreased levels of well-being in mothers of adult children with mental illness or an intellectual disability (Kim, Greenberg, Seltzer, & Krauss, 2003).

There is a dearth of research on coping styles and sleep. To date only two studies were found that focused on coping styles and sleep quality. There is evidence to suggest that coping styles moderate the effect of stress on sleep (Sadeh et al., 2004). Additionally, students with higher levels of self-control, self-acceptance, and confidence in other people have reported significantly better sleep quality (Brown et al., 2001).

The relationship between and among sleep quality, well-being, and coping style has not been fully examined. Sleep quality is known to impact individuals' physical and psychological health (Pilcher et al., 1997) and indicators of well-being (Pilcher & Ott, 1998). Sleep quality was also found to be highly correlated with college students' emotional response to stress (Verlander, Benedict, & Hanson, 1999). Sleep difficulties are associated with emotion-focused coping and the self-perception of individuals' lives being more stressful (Morin et al., 2003). No studies to date have investigated possible relationships between and among the variables of sleep quality, well-being, and coping styles. More research is needed to delineate clearly the relationship between and among these three variables. This study will add to the existing sleep quality literature and initiate new knowledge of associations with coping styles and well-being.

Justification

Research on the relationships between and among sleep quality, coping style, and well-being is important in order to understand the dynamics involved. As the dynamics between and among these variables are better understood, sleep quality interventions can be developed that may decrease the negative effects of sleep disturbances on college students. One possible outcome of sleep quality interventions may be increased student grade point averages (GPA), which may in turn increase their lifetime earning potential.

While sleep quality interventions may have a direct impact on sleep disturbances experienced by college students, they may also impact coping strategies chosen by college students to deal with social and academic stress. This research may lead to the development of interventions that will increase the effectiveness of coping strategies. For example, students who are well-rested and thinking more clearly may be able to choose to problem-solve rather than avoid the problem. Additionally, coping strategies found to be more effective for college students could be taught in courses such as adjustment to college seminars, taken by all university freshmen.

Subjective feelings of well-being also may be impacted positively through the development of sleep quality interventions and more effective coping strategies. This may lead to more positive outcomes for the duration of the college experience and beyond. If better coping and better sleep quality lead to increased well-being in college, it is safe to assume individuals may continue to experience more positive outcomes throughout their adult lives.

Better sleep quality, more effective coping strategies, and an increased sense of well-being may lead to more positive outcomes in adulthood. Adults with these positive outcomes may find more job satisfaction. Another positive outcome may be increased marital satisfaction which may lower the rate of divorce. When couples are more satisfied in their marital relationships, children produced from these marriages may also be more psychologically healthy. These children may grow up to be productive members of society rather than spend time in prisons or on welfare where they drain the resources of society.

Other societal effects of this research are also likely. For instance, adults getting better sleep quality, using more effective coping strategies, and experiencing an increased sense of well-being may also tend to be more productive employees in the workforce. As universities become more aware of the impact of sleep disturbances on college students, they may want to explore more effective class scheduling for students experiencing disturbed sleep. For example, universities may want to offer more afternoon or evening classes to accommodate students who function better by waking later in the day. All the issues mentioned previously are ones potentially addressed by this preliminary study on the relationship between and among sleep quality, coping styles, and well-being.

Since there has been no research on the relationship between sleep quality, coping styles, and well-being, it is important to initiate studies in this area. This research will help extend the knowledge base about college students' sleep quality, which in turn may assist university counselors and administrators in developing interventions to impact not only students' sleep quality but perhaps coping skills and well-being. Such results could lead to more positive outcomes for students during their college years which may continue into adulthood.

Literature Review

Sleep is a deceptively complex behavior. While sleep appears to be a simple process in which individuals lie down, close their eyes, and merely go to sleep, instead it can be laden with difficulty. Humans may have trouble falling asleep or staying asleep. Numerous factors affect human sleep quantity and quality and may make it difficult for individuals to get optimal sleep. Most humans require an average of eight hours of sleep every twenty-four hours. This means that most humans sleep approximately one-third of

their lifetimes. Therefore, sleep is an important human behavior that ultimately may affect many other areas of life. Although sleep may appear to be a quiet activity, our brains remain in an active state during sleep.

Stages of Sleep

Although sleep has been studied for centuries, modern sleep research began early in the 20th century. Scientists have studied electrical activity in the human brain during sleep since German psychiatrist Hans Berger invented the electroencephalogram (EEG) in 1928 (Hobson, 1995). By attaching electrodes to the scalp and recording electrical impulses, scientists note that higher frequencies (indicated by less space between EEG waves) exhibit high levels of brain activity. When awake, an individual's brain activity is characterized almost exclusively of alpha and beta waves (Carlson, 2002). Alpha waves consist of regular, medium frequency waves (8-12 Hz) produced by the brain when an individual is resting quietly. Beta waves, mostly low amplitude (13-30 Hz) and irregular, are produced when a person is physiologically aroused or engaged in mental processing.

Stage 1 sleep usually begins when individuals become sleepy and close their eyes. The EEG begins to note a different pattern of electrical activity. At this time some theta waves (3.5-7.5 Hz) are indicated on the EEG (Carlson, 2002). This is a period of transition between wakefulness and sleep. Research has shown that individuals with insomnia often spend more time in Stage 1 sleep than those without insomnia. Consequently, they commonly obtain more sleep than they acknowledge (Carskadon & Dement, 2000).

Individuals enter Stage 2 sleep after spending about 10 minutes in Stage 1 (Carlson, 2002). They are sleeping soundly and if aroused during Stage 2 may deny having been asleep. Stage 2 sleep is discernible by the presence of sleep spindles and K complexes. Sleep spindles are short bursts of EEG waves occurring between two and five times per minute during the first four stages of sleep. K complexes, commonly found only in Stage 2, are abrupt, sharp waves. Research has associated these two types of wave bursts with keeping an individual in a state of sleep (Bowersox, Kaitlin, & Dement, 1985; Steriade, 1992).

A normal healthy adult spends approximately 10-25 minutes in Stage 2 sleep before entering Stage 3 (Carskadon, & Dement, 2000). Stage 3 is characterized by the surfacing of slow, high amplitude waves (less than 3.5 Hz) called delta waves (Carlson, 2002). Stage 3 usually lasts only several minutes before individuals enter Stage 4 which is differentiated by more than 50% delta waves. Stages 3 and 4, also known as slow wave sleep, are the deepest levels of sleep. If individuals are awakened in Stage 4 sleep, they will likely be disoriented and fall easily back to sleep without remembering the incident (Bonnet, 2000; Caldwell, 2003).

After spending approximately 45 minutes in Stage 4 sleep, individuals begin ascending back through Stages 2 and 3 (Carlson, 2002). At this time the EEG appears very similar to that of Stage 1 sleep with a scattering of theta waves. Beta waves, seen in wakefulness, are also present. The eyes can be seen darting about rapidly indicating the individuals have entered a special stage called REM sleep, named this because of the rapid eye movements that characterize it. During REM sleep individuals can be aroused

by meaningful stimuli, such as someone's calling their names. When awakened, they appear alert and will almost always report they have been dreaming. REM sleep is also known as paradoxical sleep since beta activity is present yet the brain paralyzes muscular activity by inhibiting neural activity in the brain stem. It is hypothesized that muscle paralyzation occurs in order to protect individuals from acting out dreams that might cause them to become injured.

As the night progresses, adults cycle through non-REM (Stages 1-4) and REM sleep about every 90-100 minutes (Caldwell, 2003; Carlson, 2002). REM sleep in each cycle lasts approximately 20-30 minutes. A typical 8-hour sleep will contain approximately four or five cycles of REM sleep. The first half of the night is characterized by more slow wave or deep sleep. The second half of the night is characterized by more Stage 2 sleep, less Stage 3 and 4 sleep, and longer periods of REM sleep. In addition to the various stages, sleep is also defined by its 24-hour pattern or rhythm.

Circadian Rhythms

Much of human behavior follows a regular rhythm. Our natural environment provides external stimuli that cue our behaviors in a rhythmic manner (e.g. daily, seasonal, and yearly patterns of solar activity) (Carlson, 2002). These patterns are predictable, and it is hypothesized that animals have adapted their physiology to these environmental changes in stimuli (Strubbe & Woods, 2001). Like other animals, humans are regulated by a number of biological rhythms serving as internal clocks. These

biological rhythms can vary in length but many of them follow a 24-hour cycle known as circadian rhythms. Sleep follows a circadian rhythm; however, the internal rhythms of most mammals tend to be longer than a 24-hour cycle (Carlson, 2002; Hobson, 1995; Lavie, 2000). For this reason, our internal clock must be reset on a daily basis. External cues such as the natural light-dark cycle serve to re-synchronize our internal clock. These external cues are known as zeitgebers (German for "time givers") (Aschoff, 1979). Research has shown that with many animals a brief period of bright light will reset their circadian rhythm after a period of constant darkness. Humans have adjusted to a 24-hour cycle of sleep-wakefulness using natural sunlight as a zeitgeber.

The suprachiasmatic nucleus (SN) located in the hypothalamus appears to be responsible for maintaining circadian rhythms (Refinetti & Menaker, 1992). The pineal gland secretes melatonin which is involved in controlling seasonal rhythms (Bartness, Powers, Hastings, Bittman, & Goldman, 1993; Moore, 1995). The SN regulates the secretion of melatonin by the pineal gland by becoming less active a few hours before an individual's bedtime. This signals the pineal gland to release melatonin which causes the person to become sleepy within an hour (Cajochen, Kraeuchi, & Wirz-Justice, 1997; Zhdanova & Wurtman, 1997). Toward morning, melatonin production decreases causing the individual to become more alert. Ralph and Lehman (1991) found that the SN follows a seasonal pattern by signaling the pineal to secrete larger amounts of melatonin during winter months. This corresponds to the longer periods of darkness during winter months. Individuals sustaining damage to the SN have difficulty maintaining alertness during

daytime hours due to the fact that the SN no longer regulates the secretion of melatonin properly (Cohen & Albers, 1991).

The circadian rhythm regulating the sleep-wake cycle does not appear to be restricted to visual zeitgebers. Campbell and Murphy (1988) conducted a study in which participants were subjected to dim light for several days. They were treated then with a bright light focused behind the knee without any contact with the eyes. Participants treated with the bright light had their circadian rhythms reset. The circadian rhythms of the control group participants who did not receive the light treatment were not reset. In addition to the sleep-wake pattern, there are other circadian rhythms which impact sleep.

Body temperature is also related to sleep. Campbell and Zulley (1989) found that when body temperature is near the bottom of its curve, individuals find it easiest to fall asleep. Once asleep, the body's heat production decreases since muscular activity comes to a standstill (Hobson, 1995). Yet body cooling continues due to an inactive shivering response to cooler temperatures during sleep and a maintained sweating response which further promotes cooling. In addition, during REM sleep the body's ability to control its temperature is lost due to the inhibition of body heat regulation. Individuals then must rely on the environment or arousal to maintain a stable body temperature. Parmeggiani's research (1977) suggested that heat control neurons in the hypothalamus rest during REM sleep which enables them to control temperature variations more effectively during wakefulness. Sleep deprivation studies conducted with rats suggest that an animal will die of complications related to an inability to conserve body heat if deprived of sleep long enough (Rechtshaffen, Gilliand, Bergman, & Winter, 1983). It is apparent that sleep and

thermoregulation are interrelated, with body temperature associated with the sleep-wake cycle and thermoregulation partially dependent on sleep.

Sleep disturbances can result when circadian rhythms become disrupted with changes in individuals' daily routines (Caldwell, 2003; Carlson, 2002; Hobson, 1995). Often society demands daily routine modifications that conflict with our circadian rhythms. Shift workers who work nights and sleep during the day are affected by a circadian rhythm disruption. When night workers drive home during daylight hours, they are impacted by a natural zeitgeber (i.e. sunlight). This tends to cause sleep difficulties. Further sleep difficulties may result if night workers shift back to a daytime schedule when not working. Circadian rhythm disruptions and poor daytime sleep have been correlated with fatal traffic accidents, industrial and engineering disasters, job performance errors, high levels of stress, fatigue, and health complications (Akerstedt, 1988; Akerstedt, Kecklund, & Hoerte, 2001; Garbarino et al., 2002; Monk, Folkard, & Wedderburn, 1996). Jet lag is another example of a sudden circadian rhythm disruption (Carlson, 2002). Jet lag is caused by flying across several time zones in one day. It often causes insomnia and decreased alertness, a significant concern for airline crews and businesspeople who frequently fly across many time zones (Ariznavarreta et al., 2002).

A natural circadian rhythm disruption, such as the change in seasons, can impact sleep. Some individuals are particularly sensitive to light and may be affected by the change in seasons. They may be more susceptible to Seasonal Affective Disorder (SAD) (Rosenthal & Wehr, 1987; 1992) causing them to become depressed during months of the year when days are shorter. When sunrise occurs later in winter months, the resetting of their internal clocks may be pushed back causing them to remain sleepy for longer

periods in the morning. SAD tends to be more prevalent in higher latitudes where changes in light/dark are more extreme (Avery, Dahl, Savage, & Brengelmann, 1997; Mersh, Middendorp, Bouhuys, Beersma, & ven den Hoofdakker, 1999).

Circadian rhythms and sleep stages, such as those mentioned here, play an important role in individuals' sleep patterns and sleep quality. Another aspect of sleep to be explored is sleep function, or why humans sleep.

Sleep Function Theories

A number of sleep function theories have been posited. The restoration model suggests we sleep in order to rest our bodies from the physical activity of the day. If this were true, it would follow that the more energy humans use, the more sleep is needed. With the exception of extreme exercise (i.e. ultramarathon) (Shapiro, Bortz, Mitchell, Bartel, & Jooste, 1981), changes in physical activity have not been found to impact significantly the amount of sleep individuals need (Horne, 1988; Youngstedt, O'Conner, & Dishman, 1997). Yet sleep has been found to have some restorative properties. It is thought that during sleep, neurotoxins are neutralized and tissue restitution occurs (Adam & Oswald, 1977; Hartmann, 1973). In addition, it is known that metabolic rate during sleep is about 9-25 percent lower than it is during wakefulness (McGinty, 1993; Reich, Geyer, & Karnovsky, 1972). It may be that sleep evolved as a way for the body to conserve energy during the night to aid in thermoregulation during the coldest part of the day (Hobson, 1995).

The neurotransmitter replenishment model posits that during sleep aminergic neurons stop firing to allow a regeneration of their neurotransmitter supply (Hobson, 1995). Since neurons continuously fire when individuals are awake, it may be that

neurotransmitters can be depleted if there is a limited supply. Most neurons in the body show decreases in activity during sleep. Aminergic neurons that release norepinephrine and serotonin stop firing altogether which provides a resting period so that these neurotransmitters can regenerate. It is hypothesized that aminergic neurons continue to generate norepinephrine and serotonin while resting. This allows these neurotransmitters, believed to be involved in learning and memory (Siegel & Rogawski, 1988), to create a reserve necessary to assist in cognitive activities the next day.

The developmental model purports that sleep has a vital role in brain development (Carlson, 2002; Hobson, 1995). Current theories focus on REM sleep because of its prominence in utero and in infancy (Hobson, 1995). The fetus spends up to 80 percent of its time in REM sleep (Inoue et al., 1986; Petre-Quadens & DeLee, 1974; Roffwarg, Muzio, & Dement, 1966). This falls to 70 percent during early infancy and further declines to 30 percent at six months of age. This corresponds to the most active period of brain development. It is hypothesized that the activation during REM sleep provides an opportunity for the brain to practice future behaviors (Roffwarg et al., 1966). When fetal lambs were observed through Plexiglas windows implanted in the uterine wall, they were seen making chest breathing movements during REM sleep despite the fact there was no air to breathe. While developmental theories note the prominence of REM sleep during brain development, they fail to explain why REM sleep is present in adults.

The learning model posits that the main function of sleep is to facilitate memory consolidation and integration (Carlson, 2002; Greenberg & Pearlman, 1974). Animal studies have suggested that REM sleep aids learning (Carlson, 2002). Animals deprived of REM sleep during training were found to learn tasks more slowly (Smith, 1996).

Daytime learning in humans also appears to be hindered by lack of sleep (Hobson, 1995). Steriade and McCarley (1990) found that as neural pathways are strengthened, a new protein structure is created, which in turn allows new information to be stored in the brain. Hence, a new memory is formed. Due to the instability of the new protein structure, it must be refreshed. The new neural pathways formed by learning information appear to be activated during REM sleep. This could be a reason REM sleep is crucial to learning and memory. It has been suggested that during REM sleep the brain is aroused and begins to process information stored in memory which may reinforce both new and old memories (Antrobus, 1986). Students who demonstrated a significant increase in REM sleep following a period of intensive learning were found to perform significantly better on an examination than students who did not show an increase in REM sleep (De Koninck, Lorrain, Christ, Proulx, & Coulombe, 1989).

The relationship between REM sleep and the integration of new information into long-term memory is not limited to the period immediately following learning. Research suggests this relationship extends well beyond the night the information was originally integrated (Buboltz, Loveland, Jenkins, Brown, Soper, & Hodges, 2005). Smith and Lapp (1991) found that after students studied for final exams, during the five-day period following the exams, REM sleep actually increased. As REM sleep increased, there was no concomitant increase in amount of sleep, nor was there an increase in number of REM sleep periods. These findings suggest that information was being integrated into long-term memory well after the exam. Since the increases in REM density occurred later in the evening, those individuals getting a full night of sleep profited from the increase in memory consolidation occurring after the initial learning period (Buboltz et al.; Smith &

Lapp). Therefore, students who cram for exams (i.e. study for long periods immediately prior to an exam) may miss out on the potential benefits of several nights of increased REM sleep.

In addition to the potential benefits of several nights of increased REM sleep, students who cram for exams by staying up all night also suffer a complete lack of REM sleep and the consequence this has on memory integration. Research suggests that lack of REM sleep coupled with sleep loss and/or poor sleep quality, are associated with significant impairments in cognitive functioning (Buboltz et al., 2005). Logical reasoning and decision-making in adults were demonstrated to be impacted by a single night of sleep loss (Harrison & Horne, 1999; Blagrove & Akehurst, 2001). Sleep deprivation also appears to have a negative effect on working memory (short-tem memory used for thinking and problem-solving). Sleep loss due to poor sleep quality is also linked to poor cognitive functioning, false recall of recently learned words, and decreased visuomotor skill (Roediger & McDermott, 1995).

Sleep and Health

While the function of sleep remains to be determined, the effects of poor sleep on human health have been demonstrated. The human sleep-wake cycle is known to be based primarily on an endogenous circadian system (Monk, 2000). Without this system, humans could sleep at will and society would probably be much less day-oriented. Since humans are a diurnal species governed by a circadian rhythm, desynchronizing these rhythms increases stress (Wever, 1998). There is evidence that disruption in the circadian rhythm of shift workers is associated with decreased physical and mental well-being (Tucker et al., 1998).

Insomnia, a subjective complaint of inadequate sleep, is a symptom of underlying problems related to sleep loss. The timing of insomnia is significant and defines three classifications: (a) delayed sleep onset, (b) impaired sleep continuity, and (c) early-morning awakening (Aldrich, 2000). It has a prevalence rate between 10% and 50% depending on the survey question asked and the time frame involved (Balter & Uhlenhuth, 1992; Mellinger, Balter, & Uhlenhuth, 1985; National Sleep Foundation, 2005). Insomnia is known to be related to various medical conditions including disorders of the cardiovascular, gastrointestinal, renal, respiratory, and musculoskeletal systems. Specifically, in a survey of 10,778 men and women 35-59-years-old, poor male sleepers were more than twice as likely to have ischemic heart disease in the next 6 years (Hyyppa & Kronholm, 1989). Sleep loss has also been linked to impaired immune function (Irwin, Lacher, & Caldwell, 1992; Irwin, McClintick, & Costlow, 1996). Specifically, in individuals who obtain less than six hours of sleep, natural killer T-cells crucial to immune function have been shown to be reduced by up to 50% (Irwin et al., 1996). In addition to links to physiological health, insomnia is also known to impact relationships, mood, and overall psychological well-being (Lacks, 1987; Sloan & Shapiro, 1993).

A condition known as sleep disordered breathing (SDB) often causes sleep disturbances. It is generally associated with sleep apnea, an episode or episodes lasting 10 or more seconds in which breathing stops during sleep (Aldrich, 2000). Children as young as five-years-old who have mild SDB, experience significantly more bodily pain complaints (Rosen, Palermo, Larkin, Emma, & Redline, 2002). Mild SDB was linked to lower scores on a measure of health-related quality of life for children ages 5-17, with increased effects for more severe SDB. A notable result of a study involving adults

30-60 years old was that the magnitude of decrements on a health survey resulting from SDB was comparable to chronic conditions including arthritis, angina, hypertension, diabetes, and back problems (Finn, Young, Palta, Fryback, & Dennis, 1998).

A link was found between sleep quality and physical health in a study of junior high students (Tanaka et al., 2002). Adolescents who reported inferior sleep quality also reported lower scores on a measure of general health as well as increased incidences of illness. The geriatric population may be particularly affected by inadequate sleep. Two large studies of men and women over the age of 65 demonstrated links between insufficient sleep and decreased physical health, including cardiovascular disease and limitations in activities of daily living (Asplund, 2000; Newman, Enright, Manolio, & Haponik, 1997).

Psychological health also has been found related to inadequate sleep. In pre-adolescent children, poor sleep quality was found associated with poor mental health (Meijer, Habekothe, & Van Den Wittenboer, 2001). In two studies of adolescents, poor sleep was linked to emotional disturbance traits and may have been suggestive of severe personal or family disruption (Marks & Monroe, 1976; Vignau et al., 1997). Female high school students who reported going to sleep two or more hours later on weekends than their typical weeknight bedtime also reported feeling more depressed than those who did not stay up late on weekends (Wolfson & Carskadon, 1998). Studies have linked sleep loss with a decreased ability to control, inhibit, or change emotional responses (Dahl, 1999).

Jean-Louis, von Gizychki, Zizi, and Nunes (1998) found that college students who exhibited excessive daytime sleepiness experienced significantly greater negative

mood states than those not excessively sleepy. In addition, they exhibited a greater propensity toward increased tobacco and alcohol use. Research has shown that sleep deprivation of only one night is associated with increased anxiety, excitability, sensitivity, and impulsiveness (Sicard et al., 2001; Vein et al., 1983). Insomnia has been related to a greater risk for panic disorder, alcohol abuse, and major depression (Weisman et al., 1997). In fact, sleep disturbances in general appear to have a physiological role in the development of major depression (Ford & Cooper-Patrick, 2001). Individuals with insomnia plus hypersomnia (i.e. sleeping longer than 10 hours on a regular basis combined with excessive daytime sleepiness) were found to have a greater risk for developing psychiatric disorders (Breslau, Roth, Rosenthal, & Andreski, 1996). In a study of urban police officers with posttraumatic stress symptoms, only officers reporting poor sleep also reported somatic health problems (Mohr et al, 2003). Thus, sleep was a mediating factor between traumatic stress symptoms and health functioning.

Young adults were found to have fewer tendencies toward achievement potential, intellectual efficiency, sociability, and self-control when they reported irregular sleeping schedules (Taub & Hawkins, 1979). More recently college students reporting fewer sleep difficulties also reported fewer mental and social health difficulties (Jenkins, Buboltz, Fowler, & Rosielle, 2002). It appears that poor sleep quality, commonly reported by college students, and adverse outcomes in physical, psychological, and social health are linked significantly.

Outcomes of Inadequate Sleep

While most early sleep research focused on sleep quantity, more recent evidence points to sleep quality as being related more significantly to detrimental effects of sleep

disturbances (Pilcher et al., 1997; Pilcher & Ott, 1998) and a more consistent predictor of mental and physical health (Moore, Adler, Williams, & Jackson, 2002). Sleep quality is generally understood as consisting of the components related to a good night's sleep (e.g. time taken to fall asleep, number of awakenings, and subjective rating of feeling rested in the morning). Regardless of the underlying reason for inadequate sleep, humans experience consequences of poor sleep beyond fatigue and sleepiness. Research has demonstrated that humans of all ages experience negative physiological, psychological, and cognitive outcomes as a result of inadequate sleep.

Children and adolescents when deprived of adequate sleep show signs of reduced cognitive performance (Mitru, Millrood, & Mateika, 2000). When children with sleep disorders, such as narcolepsy and sleep apnea, are tested on tasks related to visual attention, auditory attention, and general memory, they tend to score significantly lower than children without these sleep disorders (Hansen & Vandenberg, 2001). Cognitive performance improves significantly in these children when treated for the sleep disorders. High school students who report reduced total sleep time, later bedtimes, and later weekend sleep schedules have been found to have lower grades (Allen, 1992; Wolfson & Carskadon, 1998).

A recent national survey of Americans age 18 and over found that 71% report getting less than 8 hours of sleep a night on weekdays while 40% report getting less than 7 hours of sleep nightly (National Sleep Foundation, 2005). Bonnet and Arand (1995) found that as many as 86% of young adults are chronically sleep deprived when using a sleep propensity figure of 8.2 hours. One night of partial sleep deprivation, consisting of sleep reduced to 5 hours, results in poorer performance on a reaction time task (Dinges et

al., 1997), which is notable since driving a car or operating machinery requires prompt reaction time. Even one night of sleep deprivation can result in decreased logical reasoning and decision making in adults (Blagrove & Akehurst, 2001; Harrison & Horne, 2000). Sleep deprivation has been shown to increase suggestibility as well (Blagrove, 1996). Specifically, sleep deprived individuals were shown to have reduced cognitive ability to detect discrepancies between original and misleading information. Additionally, sleep deprivation negatively impacts short-term memory used for problem-solving and psychomotor reactivity (Kim et al., 2001; Sagaspe, Charles, Taillard, Bioulac, & Phillip, 2003). Impaired sleep quality leading to sleep loss has been linked to decreased visuomotor skill, poor cognitive functioning, and false recall of recently learned words (Maquet, Schwartz, Passingham, & Frith, 2003; Roediger & McDermott, 1995). Sleep loss is also associated with cardiovascular disease and changes in mood and personality (Blagrove & Akehurst; Boland et al., 2003; Taylor & McFatter, 2003).

Sleep research on the non-clinical population of college students has yielded interesting results. The poor sleep habits and patterns of college students are associated with lower life satisfaction, increased tension, decreased psychological well-being, and depression (Pilcher et al., 1997). Delayed Sleep Phase Disorder (DSPS; Baker & Zee, 2000; Brown et al., 2001; Lack, 1986) may occur when sleep onset and wake times are delayed by 3-6 hours. Students meeting the criteria for DSPS while still sleeping 8 hours nightly experience difficulty concentrating, reduced sociability, and increased feelings of depression (Taub & Berger, 1978). These students may also develop chronic psychomotor slowing in addition to concentration problems (Taub, 1978). Of all the possible negative outcomes of inadequate sleep, the most salient to college students is

likely the decreased ability to learn and consolidate new material and decreased cognitive performance in general. Academic performance has been shown to be impaired significantly by sleep disturbances such as DSPS (Lack, 1986). In a recent study of the impact of health-related variables on grade point averages (GPA) of first-year college students, Trockel, Barnes, & Eggert, (2000) found sleep habits accounted for the largest amount of variance in GPA. This was further corroborated by Jenkins, Salter, and Buboltz's (2002, March) study assessing the relationship between GPA and sleep quality among college students at a mid-sized southern university. Specifically, students identified as having poor sleep quality reported lower GPA's than those students with moderate or good sleep quality. Medical students who reported an irregular sleep-wake schedule and shorter sleep length also demonstrated lower academic performance when compared to students reporting a regular sleep-wake cycle and longer sleep length (Medeiros, Mendes, Lima, & Araujo, 2001).

When students were deprived of sleep for 24 or more hours, significant declines in cognitive performance were noted (Dinges, 1988; Pilcher & Huffcutt, 1996; Pilcher & Walters, 1997). Pilcher and Walters found that although students deprived of sleep for one night performed significantly lower than non-sleep-deprived students on an examination requiring critical thinking, they estimated their performance as significantly higher and rated their concentration on cognitive tasks as higher than the non-sleep-deprived students. Another study suggested that sleep-deprived students who demonstrated increased sleepiness, fatigue, and slower reaction time, selected tasks requiring less effort on a Math Effort Task (Engle-Friedman et al., 2003). It appears that when students deprive themselves of sleep in order to study for an examination, they may

put forth less effort on the examination while believing they are performing cognitive tasks efficiently and effectively.

When there is a reduction of REM sleep, learning and memory in general are clearly impacted by sleep loss, although several studies failed to show a connection (Siegel, 2001; Vertes & Eastman, 2000). DeKoninck et al. (1989) found students who displayed a significant increase in REM sleep during and immediately following a six-week language course, demonstrated learning substantially more than those with less or no increase in REM sleep. Another similar study of English-speaking students taking a six-week French language immersion course, found students making significant progress in learning also incorporated the French language into their dreams earlier and more prominently than those who made little progress (DeKoninck, Christ, Heber, & Rinfret, 1990). Increases in percentage of REM sleep and language learning efficiency were shown to be correlated highly in both these studies.

Atienza and Cantero (2001) suggested that information in long-term memory can be activated during REM sleep. Previous research findings that poor sleep habits and sleep difficulties impair memory task performance supported this theory (Grosvenor & Lack, 1984; Karni, Tanne, Rubenstein, Askenasy, & Sagi, 1994; Taub, 1980; Webb & Agnew, 1974). Karni et al. found that when college students' REM sleep was disrupted, they demonstrated little or no improvement on visual discrimination task performance as opposed to students obtaining a normal night of sleep who demonstrated significant improvement. Slow wave sleep (SWS) may also be important in memory consolidation. Stickgold, Whidbee, Schirmer, Patel, and Hobson (2000) found that the overnight

improvement of a visual discrimination task was proportional to the amount of SWS in the first quarter of the night and the amount of REM sleep in the last quarter of the night.

REM sleep has also been shown to play a prominent role in memory maintenance several days after learning. In a study by Smith and Lapp (1991), REM sleep was found to increase memory from baseline levels for up to five days after learning new material. The greatest increase in REM activity was noted in the fourth and fifth REM periods of the nights. Since the proportion of REM sleep increases as the night goes on, it appears that the last half of a full eight hours of sleep may be the most important to learning and memory consolidation. In the case of students with sleep difficulties resulting in the loss of the last two hours of sleep nightly (as in the case of DSPS), they likely are impairing their ability to learn new material and incorporate it into memory.

Sleep Interventions

Individuals experiencing poor sleep quality probably are more aware of the effects on their daily functioning. Thus, they are likely motivated to find ways to alleviate their sleep difficulties. Pharmacological treatments for sleep difficulties are commonly used by those experiencing sleep problems. There are over-the-counter (OTC) treatments and prescription medications that must be obtained from a physician. Regrettably, pharmacological options have not demonstrated effectiveness in treating long-term sleep difficulties (Morin & Wooten, 1996). In fact, pharmacological treatments often aggravate sleep problems, particularly in the case of OTC medications. Psychological treatments, on the other hand, have been shown to be effective in treating sleep disturbances in 60% to 80% of individuals (Morin, Culbert, & Schwartz, 1994; Morin & Wooten, 1996; Murtaugh & Greenwood, 1995). Therefore, when well-being and coping issues that are

related to sleep difficulties are identified, mental health professionals can assist college students in circumventing potentially destructive problems.

Non-pharmacological treatments for sleep disturbances can be divided into two types, non-clinical treatments and formal psychological interventions (Buboltz, Soper, Brown, & Jenkins, 2002). Non-clinical treatments include sleep hygiene instruction, exercise, and bright light therapy. Sleep hygiene instruction is designed to be educational in nature. It imparts information regarding the nature of sleep and healthy sleep habits. Zarcone (2000) noted the importance of sleep hygiene counseling at times of physiological changes in sleep (e.g. over age 40). Sleep hygiene instruction can be equally important to college students who experience lifestyle changes when they attend college for the first time. Sleep hygiene education may include information regarding the nature of sleep, detrimental effects of poor sleep, the importance of maintaining a consistent sleep-wake cycle, food and drugs to avoid at night (e. g. caffeine and more than one alcoholic drink), regular exercise, and a proper sleep environment (e. g. decreased light and noise). Hicks, Lucero-Gorman, & Bautista (1999) found that individuals tend to overestimate their knowledge about sleep hygiene practices and how they use that knowledge in their own lives. Hauri (1993) demonstrated that after only one session of sleep hygiene instruction, individuals reporting sleep difficulties showed improvements at one, three, and twelve month follow-ups. In fact, a majority of individuals with mild to moderate non-chronic sleep difficulties will show improvement when using sleep hygiene practices (Buboltz et al., 2002).

Another non-clinical treatment for disturbed sleep is regular exercise. Exercise has been shown to decrease the amount of time it takes for individuals to fall asleep,

decrease the reporting of sleep disturbances (Duncan, Bomar, Nicholson, & Wilson, 1995; Matsumoto, Saito, Abe, & Furumi, 1984; Youngstedt, Kripke, & Elliot, 1999), and increase the amount of time spent in stages 3 and 4 sleep (Dement, 1999). While it appears that any exercise practiced regularly has a positive effect on sleep, certain types of exercise seem to have greater effects than others. Exercises with a large cardiovascular component have greater effects than exercises with a small or no cardiovascular component (Trinder, Paxton, Montgomery, & Fraser, 1985).

Bright light therapy is another non-clinical intervention demonstrated to be effective in treating sleep difficulties, particularly those with disturbed sleep schedules who have shifted their sleep-wake cycle out of phase (Campbell & Murphy, 1998; Rosenthal, Joseph-Vanderpool, & Levandosky, 1990; Terman & Terman, 2000). In general, the application of bright light therapy involves individuals placing a broad spectrum light in a position where they will get full exposure to the light for 30-60 minutes each day while going about their daily activities. The timing of the light application depends on the direction of the phase shift the individual has experienced. The repeated exposure to bright light enables the individual's circadian rhythm to shift back a more normal sleep-wake cycle.

Clinical treatments for sleep disturbances may be used when non-clinical treatments such as sleep hygiene education, exercise, and bright light therapy fail to improve sleep. Clinicians should look at both physiological and psychological possible causes for sleep difficulties. Viable clinical treatments include relaxation therapy,

stimulus control therapy, sleep restriction therapy, cognitive therapy, and paradoxical intent (Bootzin & Perlis, 1992; Buboltz et al., 2002; Morin & Wooten, 1996; Stepanski, 2000).

Relaxation therapy is an umbrella term describing therapies designed to decrease physiological arousal in order to assist in obtaining faster sleep onset. Progressive muscle relaxation (PMR) teaches individuals to recognize and control physical tension (Stepanski, 2000). Deep breathing is another relaxation technique that is often combined with PMR. Cognitive imagery is a technique that decreases cognitive arousal (i.e. racing thoughts or worrying) by visualizing a specific scene that is associated with a calm, relaxed state. An example might be an individual visualizing being on a warm beach while hearing undulating ocean waves or another equally pleasant situation for that particular individual. Behavioral techniques work well when individuals are physically restless, while mental imagery tends to work when individuals are both physically and mentally restless (Morin & Wooten, 1996). Psychologists often either audio tape instructions or instruct the client in how to make a tape for use while engaging in relaxation therapy, since listening to a tape requires less cognitive effort on the part of the client which encourages further relaxation (Buboltz et al., 2002).

Stimulus control therapy entails giving sleep disturbed individuals a set of instructional procedures involving the context of sleep and the bedroom (Buboltz et al., 2002). These instructions might include going to bed only when sleepy, using the bedroom only for sleep and sex, and maintaining a consistent rising time each morning regardless of sleep onset time and sleep duration. According to Morin and Wootin

(1996), the purpose of these instructions is to encourage the individual to associate the bed and bedroom with rapid sleep-onset and a consistent circadian sleep-wake cycle.

Sleep restriction therapy, developed by Spielman, Saskin, and Thorpy (1987), is designed to improve sleep ability by limiting the amount of time in bed to actual sleep time or increasing the proportion of sleep time to time in bed (Buboltz et al., 2002). For example, if an individual complains of sleeping only 4 hours at night, the amount of time in bed is then reduced to 4 hours. When sleep efficiency (i.e. the percentage of time in bed spent actually sleeping) exceeds 85% to 90%, the amount of time in bed is increased by 15-20 minutes. Conversely, if sleep efficiency falls below 80%, time in bed is reduced by 15-20 minutes. Continual adjustments are made until the individual can sleep through the night. A common complaint of many suffering from sleep disturbances is that they are unable to control their sleep habits. Therefore, a crucial component of both sleep restriction and stimulus control therapies is helping individuals learn to control their own sleep habits. This is important in maintaining long-term sleep improvement.

Cognitive therapy often focuses on client expectations about sleep and has been demonstrated effective in helping those with sleep problems (Bootzin & Perlis, 1992). Refuting irrational thoughts and thought stopping have been particularly successful in treating sleep difficulties. When clients experience small successes in controlling sleep, this facilitates further expectations of success. Through the help of the therapist, the client learns that the therapist is a legitimate source of help for sleep problems and larger sleep control successes are logical and can be anticipated.

Paradoxical intent is another way to change the way clients view their sleep difficulties. This consists of instructing clients to do the opposite of what they have been

doing. When clients try very hard to fall asleep, they may become anxious when they are unable to do so. This anxiety results in further declines in sleep quality. A paradoxical prescription might be to ask the client to wake up at least three times per night for the next seven nights. Upon returning to the therapist, clients reporting success would be reminded that they do indeed have control over their sleep habits and can begin to adjust them accordingly. Clients who report failure would be reminded that their failure to wake at least three times a night might be a significant improvement. Interestingly, a meta-analysis of over 100 sleep treatments found that paradoxical intent, while appearing counter-intuitive, is slightly more effective than other psychological treatments for reducing unwanted night time awakenings (Murtaugh & Greenwood, 1995).

Sleep and College Students

The effects of poor sleep on college students have been demonstrated in several areas. Graduating from high school and entering college is a major life transition for young adults. For many, going away to college represents the first time that they, away from family and friends, are responsible for their own behavior. No one is there to tell them to get up in the morning, go to class, eat right, or go to bed at night. Many choose to alter life-style habits after entering college, and one of the most frequently altered habits is that of sleep (Pilcher et al., 1997).

Adjustment to college life can be a difficult transition for some students. The absence of the support and structure of family life can make separation from home particularly difficult, especially if students have not been adequately emotionally prepared by their parents (Hoffman & Weiss, 1987; Lopez, Campbell, & Watkins, 1988). Although most enjoy their new freedom and autonomy, they nonetheless are exposed to

significant academic and social demands (Kleeman & Richardson, 1985; Russell & Petrie, 1992). College consists of a variety of scheduling opportunities for students. Students may have an early class three days a week alternating with later classes two days a week. Some may even schedule a night class. Then there are social opportunities such as clubs, Greek organizations, residence hall activities and many others. Students on scholarship for activities such as athletics and band encounter further scheduling challenges. Choices must be made regarding times to eat, study, and sleep. In addition, students must adjust to new conditions, such as living in a residence hall for the first time, making new friends, and adjusting to college academic demands. With all the new challenges of college life, it is little wonder that students may suffer from sleep difficulties. In fact, research has shown that college students tend to suffer from sleep problems more often than the general population (Brown et al., 2001; Buboltz et al., 2001; Coren, 1994; Lack, 1986; Yang et al., 2003).

Although there have been few studies conducted on sleep difficulties of college students, the findings have been significant. In a survey of Australian college students, Lack (1986) found the two most common sleep problems were difficulty falling asleep (18%) and difficulty staying asleep (9%). Coren (1994) found only 36% of a college student sample reported being free of sleep disturbances, while over 30% reported sleep difficulties occurring *"frequently"* or *"always"*. Similar results were found by Buboltz, Brown, and Soper (2001) with over 70% of college students reporting some type of regularly occurring sleep disturbance. Difficulty falling asleep was one of the most frequently reported problems. Yang and associates (2003) found that 44% of a sample of

Taiwanese college freshmen reported sleep difficulties with insufficient sleep being the most common complaint (24%).

Stress and worry were found by McCann and Stewin (1987) to be linked to poor sleep. Social and academic demands are among the many stressors college students experience and are associated with irregular sleep-wake patterns (Pilcher & Ott, 1998). In a study looking at 40 potential stressful situations faced by college students including academic, environmental, interpersonal, and intrapersonal stressors, Ross, Neibling, and Heckert (1999) found that change in sleeping habits was identified as one of the top five sources of stress.

Class scheduling most often determines wake times (Machado, Varella, & Andrade, 1998; Valdez, 1996). Machado and associates found students with morning classes tended to have greater changes in wake times from weekdays to weekends with less time spent sleeping during the week. Students may stay up late at night to socialize or to study. Some students report staying up for 24-48 hours in order to study for exams (Hawkins & Shaw, 1992). Unfortunately, this may backfire on students since sleep deprivation significantly impacts psychomotor performance (Bonnet, 2000). Even partial sleep deprivation, in which individuals sleep 5 hours or less, produces functional impairment. When students spend less time sleeping during the week, they may try to "catch up" on their sleep by sleeping later on the weekends (Machado et al., 1998; Pilcher & Walters, 1997). This type of sleep pattern may lead to a circadian rhythm disorder known as DSPS (Baker & Zee, 2000; Brown et al., 2001; Lack, 1986) and can occur when sleep onset and wake times are delayed by 3 to 6 hours. Students may sleep later on Saturday morning to "catch up" on sleep lost during the week. Then they may

stay up later Saturday night to socialize or simply because they find it difficult to fall asleep due to the late wake time that morning. They may follow a similar pattern on Sunday and by Monday morning they likely experience a sleep phase shift. When they return to a regular schedule of getting up for morning classes on Monday, they may experience excessive morning sleepiness and difficulty falling asleep at night. DSPS is more common in adolescents and young adults with a reported prevalence of 7% (Pelayo, Thorpy, & Govinski, 1988). Lack found that 17% of a sample of Australian college students reported symptoms severe enough to meet the criteria of DSPS. This is more than twice the occurrence reported in the general population (American Psychiatric Association, 1994). Brown and associates found 11.5% of a sample of American college students met the criteria for DSPS. Lack also reported that students meeting the criteria for DSPS had significantly lower grades and experienced greater sleepiness and irritability.

Since DSPS may seem like insomnia (Baker & Zee, 2000), students may take sleep medications to induce sleep. Unfortunately, sleep medications may only aggravate the problem. Hypnotics are used to treat the symptoms of insomnia but do nothing to correct the underlying problem (Roehrs, & Roth, 1997; Roehrs & Roth, 2000). In the case of DSPS, hypnotics do not help relieve the underlying problem because they have no circadian phase-shifting properties. They can also produce adverse residual effects such as excessive drowsiness and impaired psychomotor performance. When discontinued, hypnotics frequently trigger rebound insomnia which is worsened sleep relative to the user's baseline for 1 to 2 nights after discontinuation. Most OTC sleep medications also inhibit REM sleep in addition to leaving the user feeling drowsy due to the residual

effects of the drug. Though sleep medications may help the user fall asleep or maintain sleep, pharmacological treatments have failed to demonstrate effectiveness in treating long-term sleep difficulties (Morin & Wooten, 1996).

Alcohol is another drug used by college students that impacts sleep. Alcohol use is heaviest within the age range of 18-24 years. College students have been found to consume more alcohol than their nonstudent peers (O'Malley & Johnston, 2002). Over 40% of college students misuse alcohol by engaging in heavy episodic drinking (Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998; Wechsler, Lee, Kuo, & Lee, 2000). Alcohol is likely the most commonly used sleeping aid in the general population (Gillin & Drummond, 2000). Johnson and colleagues (1998), in a survey of 18-45- year-olds in the general population, found that 13% reported using alcohol to sleep in the previous year. Students who drink alcohol may think it has positive benefits because they fall asleep faster and may sleep longer; however, alcohol inhibits REM sleep (Roehrs & Roth, 1997). Students who admit to drinking more alcohol, also fall asleep in class more often than those who drink less (Jean-Louis, von Gizycki, Zizi, & Nunez, 1998).

Instead of taking sleep medications to obtain better sleep, some students use stimulants to stay awake during the day. Caffeine is the stimulant most commonly used. Mathieson, Faris, Stam, & Egger (1992) found that 42% of a sample of college students drank coffee, while 29% drank tea on a regular basis. One cup of brewed coffee contains about 100-150 mg. of caffeine. Tea contains around 60-75 mg./cup. A 12-oz cola contains 40-75 mg. (Gillin & Drummond, 2000). Caffeine has been shown to cause sleep disturbances even in low doses. Sleep disturbances include delayed sleep onset, reduced sleep time, increased amounts of light sleep, and increased number of spontaneous

awakenings (Caldwell, 2003; Pressman & Orr, 1997). The normal duration of caffeine effects in adults is 3-5 hours; however, some people experience caffeine effects for up to 14 hours. The timing of caffeine intake and individual differences in sensitivity are salient when determining the effects of caffeine (Nehlig, Daval, & Debry, 1992). Individuals who use caffeine frequently tend to have more sleep disturbances than those who do not use caffeine (Roehrs & Roth, 1997).

Illegal stimulants are also used by some college students. In a sample of students at a small liberal arts college, 35% reported using prescription amphetamines without a prescription at least once during the past year (Low & Gendaszek, 2002). Cocaine or methylenediosymethamphetamine (MDMA) were reported used by 34% of the same sample. Illicit stimulants have a longer half-life than caffeine; therefore, the effects last longer. Stimulant abusers are known to use alcohol or sedatives to promote sleep after going days without sleep when using stimulants (Gillin & Drummond, 2000).

Nicotine is also a stimulant that students may be unaware has an effect on their sleep. Research results are mixed. Light smoking has been associated with insomnia (Riedel, Durrence, Lichstein, Taylor, & Bush, 2004), while heavier smoking of more than 15 cigarettes per day does not appear to affect sleep. Other studies with transdermal nicotine found sedating effects at low doses and arousal at higher doses (Gillin & Drummond, 2000). Active smokers reported difficulty falling asleep and difficulty remaining asleep when compared with non-smokers. In a survey of college students, Wechsler, Rigiotti, Gledhill-Hoyt, and Lee (1998) found 28% of college smokers reported they began smoking on a regular basis after reaching college age. Though results are mixed, evidence seems to suggest that those who smoke likely experience some

degree of sleep disturbance. College students who experience insomnia may be unaware of the stimulant effects of nicotine and may benefit from drug education.

While sleep is known to be a significant problem for college students, another area for concern is college student coping strategies. That coping may be related to sleep intuitively seems likely and is a second area of focus for this research.

Coping

While the tremendous effect of poor sleep on college students seems clear, the impact of ineffective coping strategies utilized by students can be equally great. Numerous definitions have been used to describe coping, coping styles, and coping strategies. Lazarus and Folkman (1984) defined coping as a behavioral or emotional response to internal or external stressors or demands. This definition is encompassed by what is known as the transactional model of coping. This model highlights a process that includes cognitive appraisal, emotional response, and an attempt or attempts to cope with the stressor (Raffety, Smith, & Ptacek, 1997). Different appraisals of the stressor and one's ability to deal effectively with it result in different emotional responses. Events labeled as stressful are usually associated with anxious emotional responses. These responses can be experienced as cognitive events, such as worry, or as bodily arousal. When coping responses are directed toward reducing anxiety, they are labeled as emotional-focused responses. When responses are directed toward dealing with the stressor, they are labeled as problem-focused.

Pearlin and Schooler (1978) defined coping as behaviors that individuals use to protect themselves from challenging social and psychological harm. McGrath (1970) referred to coping as overt or covert behavior patterns used in attempts to actively lessen,

prevent, and/or respond to stressful conditions. Lazarus (1983) defined coping as a process in which individuals appraise a situation and decide how to best protect themselves from the negative effects of stressors while taking advantage of any positive outcomes. Monat and Lazarus (1985) added that current stressful situations must be met with modified behavioral solutions in order to face the changing demands placed on individuals. Coping generally refers to individuals' efforts to manage demands, regardless of the effectiveness of the efforts.

When coping is discussed, several different terms are used. As previously mentioned, problem-focused coping refers to changing the source of the stressor (Lazarus & Folkman, 1984). Problem-focused coping is generally thought to be a positive coping response. It may include strategies intended to change or improve the stressful situation possibly by removing the threatening event or by diminishing its impact (Carver & Scheier, 1994). For example, individuals coping with a stressful situation may seek to confront the one(s) responsible for creating the stressful situation (Folkman & Lazarus, 1980). They may seek helpful information and are careful not to act impulsively. Problem-focused coping strategies work best in situations where the stressor can be changed. Problem-focused coping strategies include planning, problem-solving, information seeking, and active coping (Lazarus & Folkman, 1984).

Another type of coping strategy described by Lazarus and Folkman (1984) is known as emotion-focused coping. This coping strategy is directed at relieving or decreasing the emotional impact of the stressful situation or stressor. Emotion-focused coping is often intended to decrease the anxiety involved in a stressful situation by changing the way the individual views or feels about the situation. Emotion-focused

coping does not attempt to change the situation itself as in problem-focused coping. It is simply intended to make the individual feel better without changing the situation (Folkman & Lazarus, 1980). Endler and Parker found emotion-focused coping related to psychological distress (1990) and basic dimensions of psychopathology (1993). Examples of emotion-focused coping include denying that there is a problem, venting of feelings, blaming oneself, and making excuses for another's stress-inducing behavior. Behaviors and thoughts that focus attention on oneself and symptoms is sometimes called ruminative coping and has been found to increase the severity and duration of depressive episodes (Nolen-Hoeksema, Parker, & Larson, 1994). The use of ruminative coping can also interfere with more adaptive coping strategies (Lyubormirsky, Tucker, Caldwell, & Berg, 1999; Vickers et al., 2003).

Some researchers have further defined emotion-focused coping into two different types, approach and avoidant coping. Approach or engaging coping strategies, described by Aspinwall and Taylor (1992), are effectively used when the identified stressor is viewed as controllable (Park, Folkman, & Bostrom, 2001) and the individual coping is high in self-efficacy. Examples of approach coping strategies include meaning making, diverting focus to more pleasant aspects of a situation, or positive reappraisal in which the meaning of a problem is changed by allowing a more benign or palatable interpretation (Park & Adler, 2003; Park & Folkman, 1997). Avoidant or disengaging strategies, such as denying or avoiding distress through distancing oneself or behavioral avoidance (Taylor, 1992), work best when an individual views a stressor as highly threatening and uncontrollable. Endler and Parker (1990) described avoidant coping as either task-oriented behaviors (e.g. distracting oneself by engaging in other tasks) or

person-oriented behaviors (e.g. social diversion and seeking the company of others). Problem-focused and approach emotion-focused coping are generally viewed as more positive coping strategies and are related to better adjustment to stress. Avoidant emotion-focused strategies are usually related to poor adjustment to stress, although they initially may be helpful (Berghuis & Stanton, 2002; Roth & Cohen, 1986; Suls & Fletcher, 1985). Two studies of first year medical students found use of avoidant strategies was related to higher levels of depression and anxiety, whereas active coping and positive reappraisal were related to less distress (Stewart et al., 1997; Vitaliano, Maiuro, Russo, & Mitchell, 1989). Park and Adler found positive reappraisal and planful problem-solving were also associated with less deterioration in physical health in medical students over the period of a year. This is consistent with previous research demonstrating that coping can affect health in generally healthy and patient populations (Kelly, Carter, Guarnaccia, & Ennis, 1996; Vitaliano, Russo, & Niaura, 1995; Vitaliano, Russo, Paulsen, & Bailey, 1995).

Individuals may develop habitual ways of managing stress called dispositional coping styles (Carver & Scheier, 1994). For example, gender differences emerge during adolescence with females seeking social support more often than males (Ebata & Moos, 1994; Seiffge-Krenke, 1995). Generally women are found to use emotion-focused coping more often than men, and they tend to be less depressed and more satisfied with their lives when using emotion-focused coping while the opposite is true of men (Nelson, Dell'Oliver, Koch, & Buckler, 2001; Ptacek, Smith, & Dodge, 1994). Coping styles are thought of as person variables that likely moderate antecedent stressful events and potential psychological and physical consequences (Billings & Moos, 1981; Pearlin &

Schooler, 1978). According to Endler's interactional model of stress, anxiety, and coping (1988), person variables act in transaction with situational stressors to activate biochemical, physiological, and coping reactions. Although a particular style of coping may be used predominately, Folkman and Lazarus (1980) indicate that individuals may use a variety of multifaceted combinations of coping strategies to cope with everyday stressors. Other researchers suggest that the style of coping individuals use in stressful situations may influence their adaptation and adjustment (Roth & Cohen, 1986; Suls & Fletcher, 1985). This is particularly important in college students who may be trying a number of new coping methods since they are away from the influence and support of their parents. Additionally, some researchers have suggested that coping style may moderate psychotherapy treatment outcomes (Beutler, Brookman, Harwood, Alimohamed, & Malik, 2001). Other studies have noted that individuals coping most effectively have larger repertoires of coping strategies (Brooks, Morgan, & Scherer, 1990; Morris, Brooks, & May, 2003).

Coping and College Students

College students often report experiencing anxiety and depression as symptoms of increased stress (Arthur, 1998). In one study 40% of a group of 457 entering freshmen reported significant levels of distress on the Brief Symptom Inventory during the first semester of college (Sher, Wood, & Gotham, 1996). College is a time when many students may question their identity, goals, and self-worth. For some this may result in inner turmoil, which can manifest in personal crisis taking the form of psychological distress, anxiety, low self-esteem, or depression (Gerdes & Mallinckrodt, 1994). College counseling centers across the country have reported an increase in overall distress level in

students presenting for counseling (Gallagher, 1992). Research has shown that students engaging in ineffective coping strategies (e.g. avoidance and substance abuse) are less likely to be successfully integrated into social and academic life on campus (Bray, Braxton, & Sullivan, 1999). By engaging in ineffective coping strategies, these students may find their problems exacerbated. For instance, depressed students who use avoidance coping may less successfully integrate into university life and may be more likely to leave the university without achieving their academic goals (Gerdes & Mallinckrodt, 1994).

Alcohol and drug use are also ineffective coping strategies used by college students. Over 40% of college students misuse alcohol by engaging in heavy episodic drinking (Wechsler et al., 1998; Wechsler et al., 2000). Kassel, Jackson, and Unrod (2000) found problem drinking in college students often was related to an inability to regulate emotions.

Kariv and Heiman (2005) found that college students' perceptions of stress, appraisals of academic stress, and age were predictors of coping style. In a study of 330 college students, Sheilds (2001) found that active coping was strongly related to retention through the end of the academic year. Her findings suggest that social support is an active form of coping used by college students. Brooks, Morris, and May (2003) found that nontraditional college students utilized a wider range of coping strategies, including adaptive task-oriented coping, than did younger more traditional college students.

Well-Being

Diener, Oishi, and Lucas (2003) defined subjective well-being as individuals' cognitive and emotional evaluations of their lives. These evaluations include judgments

about fulfillment and life satisfaction, emotional reactions to events, moods, and satisfaction with specific life domains. It also includes what most people refer to as happiness (Andrews & Robinson, 1991; Diener et al., 2003). General well-being is usually verified by assessing its distinct components: negative affect, positive affect, and life satisfaction (Chamberlain, 1988; Diener, 1984). Subjective well-being has been shown to be stable over time in a variety of populations including college students (Argyle, 1987; Diener & Larsen, 1984; Diener et al., 2003; Pavot & Diener, 1993; Yardley & Rice, 1991). It is influenced by personal goals, cultural values (Diener, Suh, Lucas, & Smith, 1999), personality characteristics, and life events (Diener et al., 2003).

Recent research on well-being has revealed that individuals who are married are happier than those who are single, divorced, or widowed (Diener, Gohm, Suh, & Oishi, 2000). Individuals who are optimistic (Taylor & Armor, 1996) and extroverted (Lucas, Diener, Grob, Suh, & Shao, 2000) reported higher levels of well-being. Additionally, Ellison (1991) found religiosity accounted for some well-being variance. Studies citing gender differences in subjective well-being are inconsistent. Lee, Seccombe, and Shehan (1991) found women were happier than men, while Haring, Stock, and Okun (1984) found men were happier than women. Diener et al. (1999) reported no significant gender differences. Recent research found no significant decline in life satisfaction as age increases (Diener & Suh, 1998), or that life satisfaction increases with age (Horley & Lavery, 1995).

Components of well-being. Diener and colleagues (1999; 2000) suggested that subjective well-being is a broad class of occurrences comprised of several components

including positive and negative affect, life satisfaction, and satisfaction with specific domains.

Positive and negative affect are not merely opposites (Watson, Clark, & Tellegen, 1988) but are distinct dimensions separate from one another (Diener et al., 1999). Positive affect refers to the extent to which individuals feel active, alert, and enthusiastic (Watson et al., 1988). According to Watson and colleagues, high levels of positive affect are characterized as a state of high energy, full concentration, and pleasurable engagement. Low positive affect is indicated by sadness and lethargy. Negative affect is a dimension of unpleasurable engagement and distress and includes aversive mood states including fear, anger, and guilt. Low negative affect is characterized by a sense of serenity and calmness.

A separate and distinct construct from positive and negative affect is life satisfaction (Lucas, Diener, & Suh, 1996). Life satisfaction is a process through which individuals assess the quality of their lives according to their own unique criteria. According to Pavrot and Diener (1993), individuals compare their life circumstances with a personal set of standards. To the extent that individuals' life conditions match their standards, they will report high life satisfaction.

A fourth component of well-being is domain specific satisfaction. Diener and associates (1999) asked study respondents to indicate their satisfaction with a number of specific domains including their work, family, marriage, health, leisure, and finances.

The components of well-being correlate substantially with each other (Diener et al., 1999) and, therefore, are not completely independent of one another. They do appear

to be distinct, however, and Pavrot and Diener (1993) contend that when assessed separately the constructs provide complementary information.

Well-Being and College Students

Bray, Braxton, and Sullivan (1999) found psychological factors were crucial to the well-being and academic success of college students. In a study conducted by Rimmer, Halikas, and Schuckit (1982) 39% of college students had experienced psychiatric problems at some time during their four years in college. Psychiatric problems suffered by college students affect not only their psychological well-being, but also their academic, social, and emotional development (Rimmer et al., 1982). Poor sleep quality of only one night in psychologically healthy college students resulted in reports of increased somatic complaints, more symptoms of depression and anxiety, increased social discomfort, greater levels of interpersonal reactivity, and greater tendency toward obsessive-compulsive activities (Zammit, 1988).

Sleep and Coping

Few studies have been done in the area of sleep and coping style. Hicks et al. (1991) found that short sleepers used emotion-focused coping more often than did long sleepers. Insomnia patients were found to rely more on emotion-oriented coping strategies and to perceive their lives as more stressful (Morin et al., 2003). In a recent exploratory study, Sadeh et al. (2004) suggested that coping styles moderate the effect of stress on sleep. They found that individuals using more emotion-focused coping shortened their sleep while those with low emotion-focused coping lengthened their sleep during a high-stress period. Those with low emotion-focused coping also perceived their sleep quality to be improved over those high in emotion-focused coping. Thus, shortened

sleep may indicate ineffective coping. In addition to this finding, the researchers also found a positive correlation between high levels of problem-focused coping and length of sleep regardless of the stress level. Another study found that students with higher levels of self-control, self-acceptance, and confidence in other people had significantly better sleep quality (Brown et al., 2001). In the same study, those with lower levels of trust in others took longer to fall asleep than those with higher levels of interpersonal trust.

Sleep and Well-Being

Little research has been done on the variables of sleep and well-being. One study found sleep quality was consistently related to indicators of long-term well-being while sleep length was unrelated to well-being (Gray & Watson, 2002). Another study found that as college students adapted to the social and academic demands of a semester and felt less stress, their perceived quality of sleep increased but their subjective well-being remained stable (Pilcher & Ott, 1998). In addition to having improved sleep quality, participants reported fewer physical and psychological complaints. It has been suggested that, because of its relationship of daily physical and psychological health, sleep quality could be an early predictor of potential health and well-being concerns.

Coping and Well-Being

Subjective well-being is discussed in terms of mental or psychological well-being and physical well-being. Both categories may be impacted by an individual's style of coping, whether adaptive or non-adaptive.

Coping and psychological well-being. Avoidance coping has been positively correlated with psychological distress (Aldwin & Revenson, 1987; Billings & Moos, 1981, Felton et al., 1984; Fleishman & Vogel, 1994; McCrae & Costa, 1986; O'Conner

& O'Conner, 2003; Pearlin & Schooler, 1978). Specifically, avoidance coping has been linked to depressed mood, anxiety, and negative affect (Billings & Moos, 1981). Swindle, Cronkite, and Moos (1989), in a study of individuals receiving treatment for depression, found in a one year follow-up that those relying more on problem-solving and less on emotional venting and information seeking had better treatment outcomes. At the four year follow-up, those who relied more on problem-solving were more self-confident and less depressed. Coping has been found related to symptom severity and treatment in depressed patients (Ravindran et al., 2002). In this study, participants used excessive reliance on emotion-focused coping, had reduced perception of uplifting events, and had higher perceptions of day-to-day stressors. Williams, Hagerty, Yousha, Hoyle, and Oe (2002) also found in assessing risk factors for depression in Navy recruits, that depressed recruits used more emotion-focused coping and less task-oriented coping.

Folkman, Chesney, Pollack, and Coates (1993) in a study of HIV-positive individuals, found that perceived controllable stress was related to more positive coping styles and fewer depressed moods. Detachment among HIV-positive individuals was also related to greater depression. Another study of HIV-positive participants found that active coping strategies were associated with greater social support and fewer mood disturbances (Wolf et al., 1991).

Problem-focused coping was negatively correlated with psychological symptoms in married adults (Folkman et al., 1986). Pakenham (2002), in a study of caretakers of multiple sclerosis patients, found that passive avoidant emotion-focused coping was associated with poorer psychological adjustment of the caregiver. Kim, Greenberg, Seltzer, and Krauss (2003) investigated aging mothers of adults with intellectual

disabilities and mothers of adults with mental illness. In both groups, as use of emotion-focused coping increased, levels of well-being decreased. As mothers of adults with intellectual disabilities increased their use of problem-focused coping, their distress decreased. Additional studies consistently demonstrate that active coping, acceptance, and reappraisal strategies provide more psychological benefits than avoidant coping or disengaging strategies (Carver et al., 1993; Taylor, 1992). Alcohol use is often considered a maladaptive, avoidant, or emotional coping strategy. Breslin, O'Keefe, Burrell, Ratliff-Crain, and Baum (1995), in a study assessing the relationship between women's coping styles and stress-related alcohol consumption, found women who used problem-focused coping consumed less alcohol during stressful periods when compared to women who used emotion-focused coping strategies.

Coping and physical well-being. Positive reappraisal and planful problem-solving have been linked to less deterioration in physical health in a study of first-year medical students (Park & Adler, 2003). Problem-focused coping was negatively correlated with physical symptoms, accidents, and skin problems (Epstein & Katz, 1992). Penley, Tomaka, and Wiebe (2002), in a series of meta-analyses, examined the links between coping and health-related outcomes in non-clinical adult participants. Problem-focused coping was found to be correlated positively with overall health outcomes. Additionally, confrontive coping, self-control, distancing, seeking social support, avoidance, accepting responsibility, and wishful thinking were correlated negatively with overall health outcomes. A study by Swindle and associates (1989) found that patients who at the one-year follow-up had admitted using less emotional discharge coping strategies, reported having fewer physical symptoms at the four-year follow-up. Interestingly, Frare, Axia,

and Battistella (2002), when studying children with headaches, found that the severity of the children's headaches was not associated with coping strategies.

Physical well-being was found related to coping regardless of gender. Women's long-term health consequences in relation to coping styles were examined by Goodkin, Antoni, and Blaney (1986). A significant correlation was found between hopelessness and pessimism in dealing with stressful events and disease promotion to cancer. Everson, et al. (1996) conducted a longitudinal study on 2,482 males from Finland, ages 42-60. They found men scoring high on hopelessness were significantly more at risk for death from all causes than men who scored low on helplessness.

Physical well-being may also be influenced negatively when avoidant coping is used. Nowack (1991) found avoidant coping styles significantly predicted illness. In addition, Fleishman and Vogel (1994) found that avoidant coping increased negative health behaviors such as intravenous drug use in individuals with AIDS. Conversely, Folkman et al. (1992) found that seeking social support and using spirituality may reduce the likelihood that individuals will engage in unsafe behaviors, such as unprotected sexual intercourse or needle sharing.

Hypotheses

The literature suggests there is a relationship between sleep quality and coping style and between sleep quality and well-being. However, an exhaustive review of the literature was unable to produce a single study that examined the relationship between and among sleep quality, coping style, and well-being. Hence, this study is exploratory in nature. Because previous research suggests certain relationships between components of this study, specific hypotheses can be posited.

Justification for Hypothesis 1

Sadeh et al. (2004) found that individuals low in emotion-focused coping perceived their sleep quality to be better than the perceptions of those high in emotion-focused coping. They also found a positive correlation between high levels of problem-focused coping and length of sleep regardless of stress level. Another study found that students with higher levels of self-control, self-acceptance, and confidence in other people had significantly better sleep quality (Brown et al., 2001).

Hypothesis 1

Sleep quality, as measured by the Sleep Quality Index (SQI: Urponen, Paritnen, Vuori, & Hasan, 1991), is related significantly to adaptive and non-adaptive coping styles, as measured by the Coping Styles Questionnaire (CSQ; Roger, Jarvis, & Najarian, 1993).

Justification for Hypothesis 2

Hicks et al. (1991) found short sleepers used emotion-focused coping more often than did long sleepers. Insomnia patients were also found to rely more on emotion-oriented coping strategies (Morin et al., 2003). Brown et al. (2001) found those with lower levels of trust in others took longer to fall asleep than those with higher levels of interpersonal trust.

Hypothesis 2

Sleep latency, as measured by question two on the Pittsburgh Sleep Quality Index (PSQI: Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), is related significantly to adaptive and non-adaptive coping styles, as measured by the CSQ (Roger et al., 1993).

Justification for Hypothesis 3

Sleep efficiency is calculated by dividing the number of hours slept by the number of hours in bed and multiplying by 100 to obtain a sleep efficiency percentage (Buysse et al., 1989). Thus, sleep efficiency is related to sleep latency and awakenings during the night. Insomnia patients were found to rely more on emotion-focused coping strategies. A clear relationship exists between poor sleep quality and negative mood states (Bonnet, 1985; Gau, 2000; Gray & Watson, 2002; Lacks & Morin, 1992; Pilcher & Huffcutt, 1996).

Hypothesis 3

Sleep efficiency, as measured by questions one, three, and four of the PSQI (Buysse et al., 1989), is related significantly to adaptive and non-adaptive coping styles, as measured by the CSQ (Roger et al., 1993).

Justification for Hypothesis 4

Poor sleep has been linked to impaired academic performance, learning and memory, and general cognitive ability in students (Bonnet, 2000, DeKoninck et al., 1989; Lack, 1986; Schredl et al., 1998), lower effort on tasks (Engle-Friedman et al., 2003), and generally lower levels of performance (Dinges, 1988; Pilcher & Huffcutt, 1996; Pilcher & Walters, 1997). The daytime dysfunction component of the PSQI (Buysse et al., 1989) measures daytime dysfunction by adding the code scores (0-3) for questions eight and nine for a total score of 0 (low daytime dysfunction) - 6 (high daytime dysfunction).

Hypothesis 4

Daytime dysfunction, as measured by questions eight and nine of the PSQI (Buysse et al., 1989), is related significantly to adaptive and non-adaptive coping styles, as measured by the CSQ (Roger et al., 1993).

Justification for Hypothesis 5

Sleep quality is known to be consistently related to indicators of long-term well-being (Gray & Watson, 2002). It has been suggested, because of the relationship of daily physical and psychological health to sleep quality, that sleep quality could be an early predictor of potential health and well-being concerns. (Pilcher & Ott, 1998).

Hypothesis 5

Sleep quality, as measured by the SQI (Urponen et al., 1991), is related significantly to well-being, as measured by the General Well-Being Schedule (GWB; Dupuy, 1978).

Justification for Hypothesis 6

In addition to links to physiological health, insomnia is also known to impact overall psychological well-being (Lacks, 1987; Sloan & Shapiro, 1993).

Hypothesis 6

Sleep latency, as measured by question two of the PSQI (Buysse et al., 1989), is related significantly to well-being, as measured by the GWB (Dupuy, 1978).

Justification for Hypothesis 7

Sleep efficiency is one component of sleep quality (Buysse et al., 1989). Sleep quality is known to be related consistently to indicators of long-term well-being (Gray & Watson, 2002); therefore, sleep efficiency is likely related to well-being.

Hypothesis 7

Sleep efficiency, as measured by questions one, three, and four of the PSQI (Buysse et al., 1989), is related significantly to well-being, as measured by the GWB (Dupuy, 1978).

Justification for Hypothesis 8

Sleep disturbances producing daytime dysfunction have been correlated with fatal traffic accidents, industrial and engineering disasters, job performance errors, high levels of stress, fatigue, and health complications (Akerstedt, 1988; Akerstedt et al., 2001; Ariznavarreta et al., 2002; Garbarino et al., 2002; Monk et al., 1996).

Hypothesis 8

Daytime dysfunction, as measured by questions eight and nine of the PSQI (Buysse et al., 1989), is related significantly to well-being, as measured by the GWB (Dupuy, 1978).

Justification for Hypothesis 9

Insomnia patients were found to rely more on emotion-oriented coping strategies (Morin et al., 2003). Higher levels of self-control and self-acceptance correlated significantly with better sleep quality (Brown et al., 2001).

Hypothesis 9

Coping style, as measured by the CSQ (Roger et al., 1993), moderates the relationship between sleep quality, as measured by the SQI (Urponen et al., 1991), and well-being, as measured by the GWB (Dupuy, 1978).

CHAPTER 2

Method

The purpose of this study was to examine the relationships between and among sleep quality, selected coping styles, and well-being. The study was approved by the Institutional Review Board of the participating university (see Appendix A). Statistical analyses were used to determine these relationships. Sleep quality was measured by the Sleep Quality Index (SQI; Urponen, Paritnen, Vuori, & Hasan, 1991) and the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The Coping Styles Questionnaire (CSQ; Roger, Jarvis, & Najarian, 1993) was used to assess coping style. Well-being was measured by the General Well-Being Schedule (GWB; Dupuy, 1978). Finally, a demographics questionnaire was used to gather additional information.

Participants

Participants were recruited from introductory psychology courses at a medium-sized university in the southern United States. There were 327 participants in the initial sample. Data from 319 participants were retained for analysis. Eight participants were excluded from the study for failure to complete the entire survey. Of the 319 participants retained in the study, 164 were male and 155 were female. Ethnic groups found in the overall university population were represented within the participant group with the

comprised of 76.8% Caucasian Americans, 16.3% African Americans, 1.6% Hispanic/Latino, 1.3% Asian Americans, and 4.1% of those who chose "Other" as the ethnic group with which they most closely identified. Participants were informed in writing, as well as verbally, that their participation was entirely voluntary. Participants were also informed of their right to refuse participation. All participants were treated in accordance with the ethical guidelines established by the American Psychological Association (APA, 2002) and their identities were kept confidential. Only grouped data were analyzed and reported. A consent form (Appendix B) explaining the nature of the study was signed by each participant before receiving a survey packet. The survey packet consisted of the four chosen instruments and a demographics questionnaire. All information was held strictly confidential and viewed only by the researcher. The completed surveys were stored separately from the consent forms to ensure confidentiality.

Instrumentation

Sleep Quality Index

The Sleep Quality Index (SQI; Urponen et al., 1991) is a self-report inventory of general sleep difficulties consisting of eight items. This scale can be found in Appendix D. Each item has three possible responses weighted 0, 1, or 2 with 2 representing the most severe symptom. To obtain a total sleep quality score, the 8-item responses are summed. Scores of 0-1 indicate good sleep quality. Scores ranging from 2-8 indicate occasional sleep difficulties, while scores ranging from 9-16 indicate poor sleep quality. Initial support for the validity of the SQI is provided by a significant relationship between

subjective health and sleep quality (Urponen et al., 1991). No other validity or reliability data are currently available.

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989) is a 19-item self-report questionnaire which assesses sleep quality and disturbance during a one-month period. The instrument can be found in Appendix E. The PSQI is made up of seven component scores labeled subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The seven component scores are then summed to obtain one global score. The first four items ask participants about their usual bedtimes, wake times, sleep latency, and sleep duration. The remaining 14 items ask how often participants experienced specific symptoms within the past month (*not during the past month, less than once a week, once or twice a week, three or more times a week*). These symptoms included *cannot get to sleep in less than 30 minutes* or *have to get up to use the bathroom*. Global sleep quality scores range from 0 (*no difficulty*) to 21 (*severe sleep difficulties*).

The PSQI (Buysse et al., 1989) has good internal consistency (Cronbach's α = .83) and good test-retest reliability (r = .85). The seven component scores have moderate internal consistency with Cronbach's α ranging from .76 for subjective sleep quality and habitual sleep efficiency to a low of .35 for sleep disturbances. Test-retest reliability for most component scores is acceptable, ranging from Pearson's r = .84 for sleep latency to r = .65 for medication use. All component scores show significant correlation with the global PSQI score. Buysse and associates (1989) reported an overall sleep quality score of 5 or greater correctly identified 88.5% of all subjects and controls (κ = .75, $p < .001$),

indicating a sensitivity of 89.6% and specificity of 86.5%. The cutoff score also correctly identified 84.4% of subjects with disorders in initiating and maintaining sleep, 97% of depressives, and 88% of disorders of excessive sleepiness in the standardization sample. Carpenter and Andrykowski (1997) completed a psychometric evaluation of the PSQI using four separate populations. They found Cronbach's alphas of .80 for the global score and alphas ranging from .70 to .78 for the eight-item sleep disturbance component. Construct validity was also demonstrated with PSQI scores being moderately to highly correlated with measures of sleep quality and sleep problems and poorly correlated with unrelated constructs. Since the original research was completed, the PSQI has been repeatedly used in research involving university students (Brown et al., 2002; Pilcher et al., 1997; Pilcher & Ott, 1998; Pilcher et al., 2000) as well as medically oriented studies. Widespread use of the PSQI will facilitate comparisons of the findings of the present study with previous findings.

Coping Styles Questionnaire

The Coping Styles Questionnaire (CSQ; Roger et al., 1993) is a 60-item self-report inventory designed to measure coping style through items that question how individuals typically react to stress. This instrument is found in Appendix F. Responses are on a 4-point Likert type scale consisting of *never*, *sometimes*, *often*, or *always*. The CSQ is composed of four subscales including two subscales representing adaptive coping (*rational and detachment*) and two subscales representing maladaptive coping (*emotional and avoidance*). Higher scores on each scale indicate greater usage of that type of coping.

The Rational Coping subscale (RATCOP) consists of 16 items including *see things as a challenge that must be met.* The Detachment Coping subscale (DETCOP) is

composed of 15 items including *decide it's useless to get upset and just get on with things.* The Emotional Coping subscale (EMCOP) has 16 items such as *become lonely or isolated.* The Avoidance Coping subscale (AVCOP) consists of 13 items including *feel that time will sort things out.*

The test-retest reliability coefficients of the CSQ (Roger et al., 1993) at a three-month interval ranged from .70 for AVCOP to .80 for RATCOP. Internal consistencies on the four subscales of the CSQ were as follows: RATCOP (α = .85), DETCOP (α = .89), EMCOP (α = .73), AVCOP (α = .69). Concurrent validation studies with other coping scales concluded that the Emotion Control Questionnaire (ECQ: Roger & Najarian, 1989) was the appropriate scale against which to validate the CSQ. The ECQ subscale of Rehearsal measures the tendency to ruminate about emotionally disturbing events. Rehearsal has been shown related to delayed physiological recovery during stress (Roger, 1988; Roger & Jamieson, 1988). Rehearsal was correlated negatively with RATCOP and DETCOP and correlated positively to EMCOP and AVCOP. The Emotional Inhibition subscale had a significant positive correlation with AVCOP, but not with the other coping subscales. The Benign Control subscale of the ECQ, which measures impulsiveness correlated significantly positively with RATCOP and DETCOP, and negatively with EMCOP. The Benign Control subscale is reverse scored. Hence, subjects scoring high on Benign Control are less impulsive. There were no significant correlations between aggression control and CSQ subscales.

General Well-Being Schedule

The General Well-Being Schedule (GWB; Dupuy, 1978) was chosen to measure participants' mental and physical well-being. The scale measures how individuals feel

about their inner personal state. The GWB consists of 18 self-report items and was designed to measure subjective feelings of psychological well-being and distress reflecting both positive and negative feelings. The six dimensions of the GWB cover anxiety, depression, health, positive well-being, self-control, and vitality. The first 14 questions use a 6-point Likert type scale representing intensity or frequency. The remaining four questions use a 0-10 rating scale defined by adjectives at each end. Dupuy used a total score for the GWB ranging from 0 to 110. He obtained the total score by subtracting 14 from the derived total score of all items. Dupuy proposed cutoff scores to represent three levels of disorder: 0-60 = severe distress; 61-72 = moderate distress; and 73-110 = positive well-being. Test-retest reliability after a three-month interval ranged from .68 to .85. Internal consistency reliability was reported to range from .88 to .95. Criterion and construct validity were reported ranging from .47 to .90 which is considered adequate.

The subscales of the GWB consist of the anxiety well-being subscale (GWBA), the depression well-being subscale (GWBD), the positive well-being subscale (GWBP), the self-control well-being subscale (GWBS), the vitality well-being subscale (GWBV), and finally the general health well-being subscale (GWBG). The GWBA consists of items 2, 5, 8, and 16 and assesses nervousness, strain, stress, pressure, anxiousness, worry, and/or being upset, relaxed, or tense. The GWBD is composed of items 4, 12, and 18 which measure being sad, discouraged, hopeless, blue, down-hearted, and/or depressed. The GWBP measures universal feelings, feelings of happiness and satisfaction, and/or level of interesting life and consists of items 1, 6, and 11. The GWBS

subscale, composed of items 3, 7, and 13, measures control of behavior, emotions, fear of losing mind or control, emotional stability, and certainty of self. The GWBV consists of items 9, 14, and 17 which assess feelings of being rested, tired, worn out, or energetic. Lastly, the GWBG consists of items 10 and 15 and measures illness, worry, and concern about illness.

Demographics Questionnaire

A short demographics questionnaire was utilized to obtain general demographic information. This questionnaire collected data related to age, ACT/SAT score, current GPA, gender, current year in school, ethnicity, current major, marital status, parents' marital status, number of siblings, and current relationship status. The demographic questionnaire is found in Appendix C.

Procedure

Prior to collecting data, the researcher contacted instructors of introductory psychology classes to request permission to collect data from their students. When permission was granted, the researcher attended the classes in order to distribute a survey packet. The researcher explained to the class that data would be collected for a study examining sleep quality and its relationship to coping style and well-being. The researcher further explained that participation was voluntary and refusal to participate would not affect nonparticipants' relationships with the university or their grades in any way. Before receiving a survey packet, participants read and signed a consent form explaining the purpose of the study. In addition, this form explained that participation was completely voluntary and that all information would remain confidential and be disseminated only as group data thereby maintaining confidentiality. The survey packet

was then given to consenting participants to be taken home, completed, and returned at the next class meeting. Participants were reminded not to put any identifying information on the survey packet in order to maintain confidentiality. Approximately one week after the survey packets were distributed, the class instructor contacted the researcher in order to return the completed survey packets to the researcher. Upon receipt of the survey packets, the researcher entered all data into a Statistical Package for Social Sciences (SSPS) database after which the hard copies were destroyed.

Data Analyses

Prior to data analysis, all variables were examined for gender differences. Gender differences were found; therefore, data were analyzed separately. Data were analyzed to determine selected relationships between and among sleep quality, coping style, and general well-being.

Hypothesis one was analyzed using multiple regression. The coping subscales (EMCOP, AVCOP, RATCOP, and DETCOP) of the CSQ were regressed onto sleep quality as measured by the SQI. The independent variables were EMCOP, AVCOP, RATCOP, and DETCOP. The dependent variable was sleep quality.

Hypothesis two was analyzed using multiple regression. The coping subscales of the CSQ were regressed onto sleep latency as measured by the subscale of the PSQI. The independent variables were EMCOP, AVCOP, RATCOP, and DETCOP. The dependent variable was sleep latency.

Hypothesis three was analyzed using multiple regression. The coping subscales of the Coping Style Questionnaire were regressed onto sleep efficiency as measured by the subscale of the PSQI. The independent variables were EMCOP, AVCOP, RATCOP, and DETCOP. The dependent variable was sleep efficiency.

Hypothesis four was analyzed using a multiple analysis of variance (MANOVA) since the relationship between a categorical independent variable and multiple continuous dependent variables was being assessed. The independent variable was daytime dysfunction. The dependent variables were EMCOP, AVCOP, RATCOP, and DETCOP.

Hypothesis five was analyzed using multiple regression. The general well-being subscales (GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG) of the GWB were regressed onto sleep quality as measured by the SQI. The independent variables were GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG. The dependent variable was sleep quality.

Hypothesis six was analyzed using multiple regression. The general well-being subscales (GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG) of the GWB were regressed onto sleep latency as measured by the PSQI. The independent variables were GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG. The dependent variable was sleep latency.

Hypothesis seven was analyzed using multiple regression. The general well-being subscales (GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG) of the GWB were regressed onto sleep efficiency as measured by the PSQI. The independent variables were GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG. The dependent variable was sleep efficiency.

Hypothesis eight was analyzed using a MANOVA. The independent variable was daytime dysfunction. The dependent variables were GWBA, GWBD, GWBP, GWBS, GWBV, and GWBG.

Hypothesis nine was analyzed using hierarchical regression. The moderating effects of coping style on the relationship between sleep quality and well-being were determined using the SQI, the CSQ, and the GWB. Moderator variables were described

by Baron and Kenny (1985) as those variables that change the direction and strength of the relationship between two other variables. The dependent variable was GWBT. In the first step sleep quality was entered. In the second step, the coping subscales were added. In the third step, the interaction between sleep quality and coping were entered. The interaction term was generated by multiplying sleep quality times the coping variable

CHAPTER 3

Results

The purpose of this chapter is to present the results of the examination of the relationships between college students' sleep quality, coping styles, and well-being. Sample characteristics are presented first. Next, gender differences are examined. Means, standard deviations, and correlations between the variables are also provided. Finally, the results of the research are presented by hypothesis.

Participants

Participants consisted of student volunteers enrolled in introductory psychology classes at a medium-sized university in the southern United States. From an initial sample of 327 subjects, data from 319 participants were retained for analysis. Eight participants were excluded from the study for failure to finish the complete survey. Due to the fact that significant gender differences were found, descriptive statistics are presented separately by gender.

Male Participants

A total of 164 males ranging in age from 18-33 participated in the current study. The mean age was 19.5 (SD = 2.7 years). Males accounted for 51.4 % of the overall sample. The male sample consisted of 123 Caucasian Americans (75%), 29 African Americans (17.7%), 4 Hispanic/Latino (2.4%), 2 Asian Americans (1.2%), and 6 (3.7%)

who chose "Other" as the ethnic group with which they most closely identified. Male participants consisted of 92 freshmen (56.1%), 48 sophomores (29.3%), 17 juniors (10.4%), 5 seniors (3%), and 2 (1.2 %) who selected "Other" as their year in college. The mean GPA for the last year of school completed was 3.27 on a 4-point scale (*SD* = .6).

Female Participants

A total of 155 females ranging in age from 18-42 participated in the current study. The mean age was 19.7 (*SD* = 3.9 years). Females accounted for 48.6 % of the overall sample. The female sample consisted of 122 Caucasian Americans (78.7%), 23 African Americans (14.8%), 2 Asian Americans (1.3%), 1 Hispanic/Latino (.6%), and 7 (4.5%) who chose "Other" as the ethnic group with which they most closely identified. Female participants consisted of 103 freshmen (66.5%), 27 sophomores (17.4%), 15 juniors (9.7%), 8 seniors (5.2%), and 1 (.6 %) graduate student. The mean GPA for the last year of school completed was 3.30 on a 4-point scale (*SD* = .6).

Descriptive Statistics and Reliabilities

Significant Gender Differences

Scores of males and females differed significantly on the Sleep Quality Index, three scales of the Coping Styles Questionnaire, four subscales of the General Well-Being Schedule, and on the total GWB score. As shown in Table 1, males and females exhibited significant differences on Sleep Quality $F(1, 316) = 4.72, p < .05$, Rational Coping $F(1, 300) = 7.24, p < .01$, Detached Coping, $F(1, 286) = 14.51, p < .001$; Emotional Coping $F(1, 289) = 16.30, p < .001$; GWB Anxiety $F(1, 315) = 17.21, p < .001$, GWB Self-Control $F(1, 315) = 5.56, p < .05$,

Table 1

Gender Differences

Variables	Mean		*f*	*df*	*p*
	Males	Females			
Sleep Quality Index	4.32	5.14	4.72	316	.031*
Coping Styles Questionnaire					
RATCOP	43.10	41.06	7.24	300	.008**
DETCOP	35.53	33.03	14.51	286	.000***
EMCOP	30.56	33.72	16.30	289	.000***
AVCOP	30.39	31.54	3.48	309	.063
General Well-Being Schedule					
GWBA	17.91	15.51	17.21	315	.000***
GWBD	16.26	16.05	.24	315	.624
GWBP	12.18	12.14	.19	313	.890
GWBS	14.52	13.77	5.56	315	.019*
GWBV	13.62	12.69	5.05	317	.025*
GWBG	11.84	10.97	4.43	317	.036*
GWBT	70.02	65.14	10.23	313	.002**

Note: RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping, GWBA = General Well-Being Schedule Anxiety, GWBD = General Well-Being Schedule Depression, General Well-Being Schedule Positive Well-Being, GWBS = General Well-Being Schedule Self-control, GWBV = General Well-Being Schedule Vitality, GWBG = General Well-Being Schedule General Health, GWBT = General Well-Being Schedule Total

*$p < .05$, two tailed, **$p < .01$, two tailed, ***$p < .001$, two-tailed

GWB Vitality $F(1, 317) = 5.05, p < .05$, GWB General Health $F(1, 317) = 4.43, p < .05$, and GWB Total $F(1, 313) = 10.23, p < .01$. No significant differences were found on the other subscales.

Table 2 presents the means, standard deviations, and reliability coefficients of the SQI, CSQ subscales, and GWB subscales and total for males and females. Although the table contains descriptive statistics and reliabilities for both genders, they are discussed separately.

Male Descriptive Statistics and Reliabilities

The mean and standard deviation for the SQI was $M = 4.32$, $SD = 3.18$. The means and standard deviations for the CSQ were as follows: Rational Coping (RATCOP) ($M = 43.10$, $SD = 7.09$), Detached Coping (DETCOP) ($M = 35.53$, $SD = 5.73$), Emotional Coping (EMCOP) ($M = 30.56$, $SD = 6.66$), and Avoidance Coping (AVCOP) ($M = 30.39$, $SD = 5.48$). Internal consistency on the SQI was .75 and consistent with the standardization sample (Urponen et al., 1991). Internal consistencies found for the CSQ ranged from .75 to .83 and are within acceptable ranges and consistent with the findings of the original study (Roger et al., 1993).

Means and standard deviations for the GWB were as follows: Anxiety ($M = 17.91$, $SD = 5.08$), Depression ($M = 16.26$, $SD = 3.61$), Positive Well Being ($M = 12.18$, $SD = 2.93$), Self Control ($M = 14.52$, $SD = 2.73$), Vitality ($M = 13.62$, $SD = 3.71$), General Health ($M = 11.84$, $SD = 3.37$), and Total ($M = 70.02$, $SD = 13.06$). The internal consistency for the GWB Total was .88 and consistent with previous findings (Fazio, 1977; Himmelfarb & Murrell, 1983). The internal consistencies of the subscales ranging from .22 to .73 are within acceptable limits with the exception of the .22. The lowest

Table 2

Means, Standard Deviations, and Internal Consistencies

Variables	Males			Females		
	M	*SD*	α	*M*	*SD*	α
Sleep Quality Index	4.32	3.18	.75	5.14	3.54	.77
RATCOP	43.10	7.09	.83	41.06	6.01	.77
DETCOP	35.53	5.73	.75	33.03	5.34	.64
EMCOP	30.56	6.66	.82	33.72	6.64	.81
AVCOP	30.39	5.48	.75	31.54	5.31	.71
GWBA	17.91	5.08	.73	15.51	5.20	.75
GWBD	16.26	3.61	.63	16.05	3.98	.69
GWBP	12.18	2.93	.70	12.14	2.80	.67
GWBS	14.52	2.73	.61	13.77	2.94	.62
GWBV	13.62	3.71	.64	12.69	3.64	.65
GWBG	11.84	3.37	.22	10.97	4.03	.46
GWBT	70.02	13.06	.88	65.14	14.01	.89

Note: RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping, GWBA = General Well-Being Schedule Anxiety, GWBD = General Well-Being Schedule Depression, General Well-Being Schedule Positive Well-Being, GWBS = General Well-Being Schedule Self-control, GWBV = General Well-Being Schedule Vitality, GWBG = General Well-Being Schedule General Health, GWBT = General Well-Being Schedule Total, *M* = Mean, *SD* = Standard Deviation, α = alpha

alpha for males was on the General Health subscale. The low alpha level of General Health puts in question the reliability of that subscale.

Female Descriptive Statistics and Reliabilities

The mean and standard deviation for the SQI was $M = 5.14$, $SD = 3.54$. The means and standard deviations for the CSQ were as follows: RATCOP (M =41.06, $SD = 6.01$), DETCOP ($M = 33.03$, $SD = 5.34$), EMCOP ($M = 33.72$, $SD = 6.64$), and AVCOP ($M = 31.54$, $SD = 5.31$). Internal consistency on the SQI was .77 and consistent with the standardization sample (Urponen et al., 1991). Internal consistencies found for the CSQ ranged from .64 to .81 and are within acceptable ranges and consistent with the findings of the original study (Roger et al., 1993).

Means and standard deviations for the GWB were as follows: Anxiety (M = 15.51, $SD = 5.20$), Depression ($M = 16.05$, $SD = 3.98$), Positive Well Being ($M = 12.14$, $SD = 2.80$), Self Control ($M = 13.77$, $SD = 2.94$), Vitality ($M = 12.69$, $SD = 3.64$), General Health ($M = 10.97$, $SD = 4.08$), and Total ($M = 65.14$, $SD = 14.01$). The internal consistency for the GWB Total was .89 and consistent with previous findings (Fazio, 1977; Himmelfarb & Murrell, 1983). The internal consistencies of the subscales ranging from .46 to .75 are within acceptable limits with the exception of .46 on the General Health subscale. This low alpha for females puts into question the reliability of the General Health subscale.

Correlations Among Variables

Males

Intercorrelations of all variables in the current study for males are presented in Table 3. Several significant correlations were found and are discussed here. Age was

correlated significantly only with GPA (r = -.28, p < .001). GPA was correlated significantly with GWBA (r = .17, p < .05), and the PSQI's habitual sleep efficiency (HBSLEF) (r =.19, p < .05).

Sleep quality was correlated significantly with the CSQ's EMCOP (r = .41, p < .001), PSQI's sleep latency (SLPLAT) (r = .47, p < .001), and daytime dysfunction (DDYSF) (r =.32, p < .001). Significant negative correlations were found with RATCOP (r = -.17, p < .05), the GWB's GWBA (r = -.44, p < .001), GWBD (r = -.38, p < 001), GWBP (r = -. 21, p < .01), GWBS (r = -.28, p < .001), GWBV (r = -.46, p < .001), GWBG (r = -.21, p < .01), GWBT (r = -.46, p < 001), and habitual sleep efficiency (HBSLEF) (r = -.16, p < .05).

The CSQ's RATCOP was correlated significantly with DETCOP (r = .71, p < .001), and AVCOP (r = .16, p < .05), GWBA (r = .26, p < .01), GWBD (r = .21, p < .01), GWBP (r = .30, p <.001), GWBS (r = .17, p < .05), GWBV (r = .26, p < .01), and GWBT (r = .30, p < .001).

The CSQ's DETCOP was correlated significantly with AVCOP (r = .27, p < .01), GWBA (r = .29, p < .001), GWBD (r = .26, p < .01), GWBP (r = .32, p < .001), GWBS (r = .19, p < .05), GWBV (r = .24, p < .01), and GWBT (r = .30, p < .001).

The CSQ's EMCOP was correlated significantly with AVCOP (r = .46, p < .001), DDYSF (r = .32, p < .001), and SLPLAT (r = .26, p < .01). Significant negative correlations were found with GWBA (r = -.43, p < .001), GWBD(r = -.46, p < .001), GWBP (r = -.38, p < .001), GWBS (r = -.45, p < .001), GWBV (r = -.41, p < .001), GWBG (r = -.32, p < .001), GWBT (r = -.55, p < .001), and HBSLEF (r = -29,p < .001).

The CSQ's AVCOP was correlated significantly with DDYSF ($r = .25, p < .01$). AVCOP also was correlated significantly with GWBA ($r = -.17, p < .05$), GWBS ($r = -.19, p < .05$), and GWBT ($r = -.20, p < .05$).

The GWB's GWBA was correlated significantly with GWBD ($r = .58, p < .001$), GWBP ($r = .50, p < .001$), GWBS ($r = .56, p < .001$), GWBV ($r = .58, p < .001$), GWBG ($r = .37, p < .001$), and GWBT ($r = .88, p < .001$). Significant negative correlations were found with DDYSF ($r = -.36, p < .001$), and SLPLAT ($r = -.24, p < .01$).

The GWBD correlated significantly with GWBP ($r = .70, p < .001$), GWBS ($r = .69, p < .001$), GWBV ($r = .49, p < .001$), GWBG ($r = .20, p < .05$), GWBT ($r = .71, p < .001$), and HBSLEF ($r = .17, p < .05$). The GWBD also correlated significantly with DDYSF ($r = -.26, p < .01$), and SLPLAT ($r = -.30, p < .001$).

The GWBP was correlated significantly with GWBS ($r = .60, p < .001$), GWBV ($r = .50, p < .001$), and GWBT ($r = .70, p < .001$). Significant negative correlations were found with DDYSF ($r = -.28, p < .001$), and SLPLAT ($r = -.16, p < .05$).

The GWBS was correlated significantly with GWBV ($r = .46, p < .001$), GWBG ($r = .19$, p < .05), and GWBT ($r = .74, p < .001$). Significant negative correlations were found with DDYSF ($r = -.34, p < .001$), and SLPLAT ($r = -.20, p < .01$).

Table 3

Correlation Matrix for All Variables for Males

Variable	1	2	3	4	5	6	7	8
1. Age	1.00	-.28***	.09	.07	.03	.04	.04	-.06
2. GPA		1.00	-.10	.13	.05	-.13	.04	.17*
3. SQISLPQ			1.00	-.17*	-.10	.41***	.14	.44***
4. RATCOP				1.00	.71***	-.13	.16*	.26**
5. DETCOP					1.00	-.07	.27**	.29***
6. EMCOP						1.00	.46***	.43***
7. AVCOP							1.00	-.17*
8. GWBA								1.00

Note: GPA = Grade Point Average, SQISLPQ = Sleep Quality Index Sleep Quality, RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping, GWBA = General Well-Being Schedule Anxiety
*$p < .05$, two tailed, **$p < .01$, two tailed, ***$p < .001$, two-tailed

Table 3 Continued

Correlation Matrix for All Variables for Males

Variable	GWBD 9	GWBP 10	GWBS 11	GWBV 12	GWBG 13	GWBT 14	DDYSF 15	SLPLAT 16	HBSEF 17
1. Age	-.04	-.07	-.01	.11	.05	-.02	-.10	.03	-.13
2. GPA	.03	.03	.02	.07	.07	.11	.08	.04	.19*
3. SQISLPQ	-.38***	-.21**	.28***	-.46***	-.21**	-.46***	.32***	.47***	-.16*
4. RATCOP	.21**	.30***	.17*	.26**	.07	.30***	-.11	-.13	.08
5. DETCOP	.26**	.32***	.19*	.24**	.05	.30***	-.11	-.03	.06
6. EMCOP	-.46***	-.38***	-.45***	-.41***	-.32***	-.55***	.32***	.26**	.29***
7. AVCOP	-.14	-.12	-.19*	-.15	-.13	-.20**	.25**	-.08	-.06
8. GWBA	.58***	.50***	.56***	.58***	.37***	.88***	-.36***	-.24**	.09

Note: GPA = Grade Point Average, SQISLPQ = Sleep Quality Index Sleep Quality, RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping, GWBA = General Well-Being Schedule Anxiety, GWBD = General Well-Being Schedule Depression, GWBP = General Well-Being Schedule Positive Well-Being, GWBS = General Well-Being Schedule Self-Control, GWBV = General Well-Being Schedule Vitality, GWBG = General Well-Being Schedule General Health, GWBT = General Well-Being Schedule Total, DDYSF = Daytime Dysfunction, SLPLAT = Pittsburgh Sleep Quality Index Sleep Latency, HBSLEF = Pittsburgh Sleep Quality Index Habitual Sleep Efficiency

* $p < .05$, two-tailed,** $p < .01$, two-tailed, ***$p < .001$, two-tailed

Table 3 Continued

Correlation Matrix for All Variables for Males

Variable	9	10	11	12	13	14	15	16	17
9. GWBD	1.00	.70***	.69***	.49***	.20*	.71***	-.26**	-.30***	.17*
10. GWBP		1.00	.60***	.50***	.05	.70***	-.28***	-.16*	.06
11. GWBS			1.00	.46***	.19*	.74***	-.34***	-.20**	.13
12. GWBV				1.00	.17*	.76***	-.49***	-.20**	.16*
13. GWBG					1.00	.50***	-.12	-.07	.02
14. GWBT						1.00	-.45***	-.25**	.12
15. DDYSF							1.00	.21**	.02
16. SLPLAT								1.00	.24**
17. HBSLEF									1.00

Note: GWBD = General Well-Being Schedule Depression, GWBP = General Well-Being Schedule Positive Well-Being, GWBS = General Well-Being Schedule Self-Control, GWBV = General Well-Being Schedule Vitality, GWBG = General Well-Being Schedule General Health, GWBT = General Well-Being Schedule Total, DDYSF = Daytime Dysfunction, SLPLAT = Pittsburgh Sleep Quality Index Sleep Latency, HBSLEF = Pittsburgh Sleep Quality Index Habitual Sleep Efficiency,
* $p < .05$, two-tailed, ** $p < .01$, two-tailed, *** $p < .001$, two-tailed

The GWBV was correlated significantly with GWBG ($r = .17, p < .05$), GWBT ($r = .76, p < .001$), and HBSLEF ($r = .16, p = .05$). The GWBV also correlated significantly with DDYSF ($r = -.49, p < .001$), and SLPLAT ($r = -.20, p < .01$).

The GWBG was correlated significantly with GWBT ($r = .50, p < .001$). The GWBT had significant negative correlations with DDYSF ($r = -.45, p < .001$), and SLPLAT ($r = -.25, p < .01$).

DDYSF was correlated significantly with SLPLAT ($r = .21, p < .01$). SLPLAT was correlated significantly with HBSLEF ($r = -.24, p < .01$).

Females

Intercorrelations of all variables in the current study for females are presented in Table 4. Several significant correlations were found and are discussed here. Age correlated significantly only with RATCOP ($r = .22, p < .01$). GPA was correlated significantly with GWBG ($r = .23, p < .01$), and EMCOP ($r = -.24, p < .01$).

Sleep quality was correlated significantly with EMCOP ($r = .39, p < .001$), SLPLAT ($r = .59, p < .001$), DDYSF ($r = .44, p < .001$), and HBSLEF ($r = .21, p < .01$). Significant negative correlations were found with RATCOP ($r = -.24, p < .01$), GWBA ($r = -.41, p < .001$), GWBD ($r = -.38, p < .001$), GWBP ($r = -.41, p < .001$), GWBS ($r = -.35, p < .001$), GWBV ($r = -.55, p < .001$), GWBG ($r = -.34, p < .01$), GWBT ($r = -.55, p <001$), and HBSLEF ($r = -.21, p < .01$).

The CSQ's RATCOP was correlated significantly with DETCOP ($r = .56, p < .001$), GWBP ($r = -.26, p < .01$), GWBV ($r = .30, p < .001$), RATCOP was also correlated significantly with EMCOP ($r = -.24, p < .01$), GWBS ($r = -.21, p < .05$), and GWBT ($r = -.23, p < .01$).

Table 4

Correlation Matrix for All Variables for Females

Variable	1	2	3	4	5	6	7	8
1. Age	1.00	-.12	.14	.22**	.04	-.10	-.06	-.09
2. GPA		1.00	-.04	.02	.01	-.24**	-.06	.00
3. SQISLPQ			1.00	-.24**	-.16	.39***	.15	-.41***
4. RATCOP				1.00	.56***	-.24**	.16	.03
5. DETCOP					1.00	-.24**	.19*	.21*
6. EMCOP						1.00	.44***	-.59***
7. AVCOP							1.00	-.28**
8. GWBA								1.00

Note: GPA = Grade Point Average, SQISLPQ = Sleep Quality Index Sleep Quality, RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping, GWBA = General Well-Being Schedule Anxiety
*$p < .05$, two tailed, **$p < .01$, two tailed, ***$p < .001$, two-tailed

Table 4 Continued

Correlation Matrix for All Variables for Females

Variable	GWBD 9	GWBP 10	GWBS 11	GWBV 12	GWBG 13	GWBT 14	DDYSF 15	SLPLAT 16	HBSLEF 17
1. Age	-.05	-.10	-.02	-.07	-.06	.13	.06	.04	.02
2. GPA	.08	.09	.10	.07	.23**	.13	.05	.05	.02
3. SQISLPQ	-.38***	-.41***	-.35***	-.55***	-.34***	-.55***	.44***	.59***	-.21***
4. RATCOP	.14	.26**	.21*	.31***	.12	.23**	-.11	-.05	.05
5. DETCOP	.27*	.32***	.27**	.37***	.18	.35***	-.05	.02.	.11
6. EMCOP	-.65***	-.54***	-.68***	-.45***	-.45***	-.72***	.40***	.22**	-.08
7. AVCOP	-.39***	-.34***	-.39***	-.27**	-.15	-.36***	.22**	.12	.04
8. GWBA	.55***	.46***	.58***	.50***	.40***	.83***	-.42***	-.20*	.06

Note: GPA = Grade Point Average, SQISLPQ = Sleep Quality Index Sleep Quality, RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping, GWBA = General Well-Being Schedule Anxiety, GWBD = General Well-Being Schedule Depression, GWBP = General Well-Being Schedule Positive Well-Being, GWBS = General Well-Being Schedule Self-Control, GWBV = General Well-Being Schedule Vitality, GWBG = General Well-Being Schedule General Health, GWBT = General Well-Being Schedule Total, DDYSF = Daytime Dysfunction, SLPLAT = Pittsburgh Sleep Quality Index Sleep Latency, HBSLEF = Pittsburgh Sleep Quality Index Habitual Sleep Efficiency

* $p < .05$, two-tailed,** $p < .01$, two-tailed, ***$p < .001$, two-tailed

Table 4 Continued

Correlation Matrix for All Variables for Females

Variable	9	10	11	12	13	14	15	16	17
9. GWBD	1.00	.70***	.75***	.49***	.33***	.73***	-.40***	-.20*	.12
10. GWBP		1.00	.60***	.56***	.23**	.71***	-.38***	-.22**	.11
11. GWBS			1.00	.48***	.33***	.77***	-.43***	-.14	.16
12. GWBV				1.00	.36***	.77***	-.52***	-.29***	.08
13. GWBG					1.00	.65***	-.33***	-.18*	.16
14. GWBT						1.00	-.55***	-.27**	.14
15. DDYSF							1.00	.21**	-.03
16. SLPLAT								1.00	-.18*
17. HBSLEF									1.00

Note: GWBD = General Well-Being Schedule Depression, GWBP = General Well-Being Schedule Positive Well-Being, GWBS = General Well-Being Schedule Self Control, GWBV = General Well-Being Schedule Vitality, GWBG = General Well-Being Schedule General Health, GWBT = General Well-Being Schedule Total, DDYSF = Daytime Dysfunction, SLPLAT = Pittsburgh Sleep Quality Index Sleep Latency, HBSLEF = Pittsburgh Sleep Quality Index Habitual Sleep Efficiency
* $p < .05$, two-tailed, ** $p > .01$, two-tailed, *** $p < .001$, two-tailed

DETCOP had significant correlations with AVCOP ($r = .19, p < .05$), GWBA ($r = .23, p < .05$), GWBD ($r = .20, p < .01$), GWBP ($r = .32, p < .001$), GWBS ($r = .22, p < .01$), GWBV ($r = .37, p < .001$), GWBG ($r = .18, p < .05$,) GWBT ($r = .35, p < .001$), and EMCOP ($r = -.24, p < .01$).

The CSQ's EMCOP was correlated significantly with AVCOP ($r = .44, p < .000$), DDYSF ($r = .40, p < .000$), and SLPLAT ($r = .22, p < .007$). It also correlated significantly with GWBA ($r = -.59, p < .001$), GWBD ($r = -.65, p < .001$), GWBP ($r = -.54, p < .001$), GWBS ($r = -.68, p < .001$), GWBV ($r = -.45, p < .001$), GWBG ($r = -.45, p < .001$), and GWBT ($r = -.72, p < .001$).

AVCOP was correlated significantly with DDYSF ($r = .22, p < .008$), as well as GWBA ($r = -.28, p < .01$), GWBD ($r = -.39, p < .001$), GWBP ($r = -.34, p < .001$), GWBS ($r = -.39, p < .001$), GWBV ($r = -.27, p < .001$), and GWBT ($r = -.36, p < .001$).

The GWB's GWBA was correlated significantly with GWBD ($r = .55, p < .001$), GWBP ($r = .46, p < .001$), GWBS ($r = .58, p < .001$), GWBV ($r = .51, p < .001$), GWBG ($r = .40, p < .001$), and GWBT ($r = .83, p < .001$). Significant negative correlations were found with DDYSF ($r = -.42, p < .001$), and SLPLAT ($r = -.20, p < .05$).

The GWBD correlated significantly with GWBP ($r = .70, p < .001$), GWBS ($r = .75, p < .001$), GWBV ($r = .49, p < .001$), GWBG ($r = .33, p < .001$), GWBT ($r = .73, p < .001$). The GWBD also correlated significantly with DDYSF ($r = -.40, p < .001$), and SLPLAT ($r = -.20, p < .05$).

The GWBP was correlated significantly with GWBS (r = .60, p < .001), GWBV (r = .56, p < .001), GWBG (r = .23, p < .01), and GWBT (r = .71, p <.001). Significant negative correlations were found with DDYSF (r = -.38, p < .001), and SLPLAT (r = -.22, p < .01).

The GWBS was correlated significantly with GWBV (r = .48, p < .001), GWBG (r = -.33, p < .001) and GWBT (r = .77, p < .001). Significant negative correlations were found with DDYSF (r = -.43 p < .001).

The GWBV was correlated significantly with GWBG (r = .36, p < .001) and GWBT (r = .77, p < .001). The GWBV also correlated significantly with DDYSF (r = -.52, p < .001), and SLPLAT (r = -.29, p < .001).

The GWBT was correlated significantly with DDYSF (r = -.55, p < .001) and SLPLAT (r = -.27, p < 01). DDYSF was correlated significantly with SLPLAT (r = .21, p < .01). SLPLAT was correlated significantly with HBSLEF (r = -.18, p < .01).

Results for Hypotheses

In this section the results of the nine hypotheses are presented. The first hypothesis stated sleep quality would be related to both adaptive and non-adaptive coping styles. The second hypothesis examined the relationship between sleep latency and both adaptive and non-adaptive coping styles. The third hypothesis predicted that sleep efficiency would be related to adaptive and non-adaptive coping styles. The fourth hypothesis stated daytime dysfunction would be related to both adaptive and non-adaptive coping styles. The fifth hypothesis examined the relationship between sleep quality and well-being. The sixth hypothesis predicted sleep latency will be related to well-being. The seventh hypothesis stated sleep efficiency would be related to

well-being. The eighth hypothesis examined the relationship between daytime dysfunction and well-being. The ninth hypothesis predicted that coping style moderates the relationship between sleep quality and well-being. Significant gender differences were found; therefore, results for hypotheses are presented separately

Hypothesis 1a for Males

The first hypothesis, that sleep quality would be related to coping in males, was tested using regression analysis. Coping was assessed using the CSQ. Four sub-scale scores (RATCOP, DETCOP, EMCOP, and AVCOP) were obtained and used as the predictor variables. Sleep quality was assessed using the total score on the SQI and was used as the criterion variable. Results for hypothesis 1a are presented in Table 5.

Table 5

Regression with Coping Predicting Sleep Quality

Hypothesis 1a for Males

Variable	β	R	R^2	t	F	p
Model 1		.416	.173		6.732	.000***
RATCOP	-.033			-.283		.778
DETCOP	-.047			-.396		.693
EMCOP	.383			4.180		.000***
AVCOP	.041			.432		.667

Note: β = standardized beta weight; *** $p < .001$
Note 2: RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping

The regression analysis with coping entered as the predictor variables and sleep quality as the criterion variable was significant, $F(4, 133) = 6.732, p < .001, R = .416$, $R^2 = .173$, and accounted for 17.3% of the variance in sleep quality. One of the coping subscales had a significant beta weight with SQI total score. EMCOP had a significant beta weight ($\beta = .383, p < 001, t = 4.180$). The prediction that sleep quality would be related to coping in males was confirmed. Specifically, emotional coping predicted sleep quality.

Hypothesis 1b for Females

The same procedure used to test hypothesis 1a for males was utilized to test hypothesis 1b for females. Results for hypothesis 1b for females are presented in Table 6.

Table 6

Regression with Coping Predicting Sleep Quality

Hypothesis 1b for Females

Variable	β	R	R^2	t	F	p
Model 1		.444	.198		6.853	.000***
RATCOP	-.070			-.663		.508
DETCOP	-.048			-.449		.654
EMCOP	.393			3.647		.000***
AVCOP	.016			.150		.881

Note: β = standardized beta weight; *** $p < .001$
Note 2: RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping

The regression analysis with coping entered as the predictor variable and sleep quality as the criterion variable was significant, $F(4, 116) = 6.89, p < .001, R = .444$,

$R^2 = .198$, and accounted for 19.8% of the variance in sleep quality. One of the subscales had a significant beta weight. EMCOP had a significant beta weight ($\beta = .393, p < .001, t = 3.647$). The prediction that sleep quality would be related to coping in females was confirmed. Specifically, emotional coping predicted sleep quality.

Hypothesis 2a for Males

The second hypothesis, that sleep latency would be related to coping in males, was tested using regression analysis. Coping was assessed using the CSQ. Four sub-scale scores (RATCOP, DETCOP, EMCOP, and AVCOP) were obtained and used as the predictor variable. Sleep latency (PSQI2) was assessed by obtaining from participants the number of minutes it usually took them to fall asleep during the past month and was used as the criterion variable. Results for hypothesis 2a are presented in Table 7.

Table 7

Regression with Coping Predicting Sleep Latency

Hypothesis 2a for Males

Variable	β	R	R^2	t	F	p
Model 1		.301	.091		3.189	.016*
RATCOP	.003			.021		.983
DETCOP	-.010			-.079		.937
EMCOP	.331			3.426		.000***
AVCOP	-.153			-1.535		.127

Note: β = standardized beta weight; * $p < .05$, *** $p < .001$
Note 2: RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping

The regression analysis with coping entered as the predictor variable and sleep latency as the criterion variable was significant, $F(4, 132) = 3.189, p < .05, R = .301$, $R^2 = .091$, and accounted for 9.1% of the variance in sleep latency. Only one of the coping subscales had a significant beta weight. EMCOP had a significant a beta weight ($\beta = .331, p < 01, t = 3.426$). The prediction that sleep latency would be related to coping in males was confirmed. Specifically, emotional coping predicted sleep latency with a positive correlation.

Hypothesis 2b for Females

The same procedure used to test hypothesis 2a for males was utilized to test hypothesis 2b for females. The regression analysis was not significant, $F(4, 117) = 1.99$, $p > .05, R = .257, R^2 = .066$. The prediction that sleep latency would be related to coping in females was not confirmed.

Hypothesis 3a for Males

The third hypothesis, that sleep efficiency would be related significantly to coping in males, was tested using regression analysis. Coping was assessed using the CSQ. Four sub-scale scores (RATCOP, DETCOP, EMCOP, and AVCOP) were obtained and used as the predictor variable. Sleep efficiency was assessed using Component 4 of the PSQI (Questions 1,3, and 4) by dividing the number of hours slept by the number of hours spent in bed and multiplying by 100 to find the sleep efficiency percentage. Sleep efficiency was used as the criterion variable. Results for hypothesis 3a for males are presented in Table 8.

Table 8

Regression with Coping Predicting Sleep Efficiency

Hypothesis 3a for Males

Variable	β	R	R^2	t	F	p
Model 1		.339	.115		4.096	.004**
RATCOP	-.031			-.253		
DETCOP	.060			.483		
EMCOP	-.368			-3.823		.000***
AVCOP	.147			1.482		

Note: β – standardized beta weight; ** $p < .01$, *** $p < .001$
Note 2: RATCOP = Rational Coping, DETCOP = Detached Coping, EMCOP = Emotional Coping, AVCOP = Avoidance Coping

The regression analysis with coping entered as the predictor variable and sleep efficiency as the criterion variable was significant, $F(4, 130) = 4.096$, $p < .01$, $R = .339$, $R^2 = .115$, and accounted for 11.5% of the variance in sleep efficiency. Only one of the subscales had a significant beta weight. EMCOP had a significant beta weight ($\beta = -.368$, $p < .001$, $t = -3.823$). The prediction that sleep efficiency would be related to coping for males was confirmed. Specifically, emotional coping was the only predictor of sleep efficiency.

Hypothesis 3b for Females

The same procedure used to test hypothesis 3a for males was utilized to test the hypothesis 3b for females. The regression analysis was not significant, $F(4, 114) = .633$, $p > .05$, $R = .150$, $R^2 = .023$. Therefore, the prediction that sleep efficiency would be related to coping in females was not confirmed.

Hypothesis 4a for Males

The fourth hypothesis, that daytime dysfunction would be related to coping in males, was tested using a multivariate analysis of variance (MANOVA). Daytime dysfunction was assessed using the PSQI. The answers to questions eight and nine were coded (0-3) and then added together for a daytime dysfunction score of 0-6. Scores were as follows: (a) 0 indicated no daytime dysfunction, (b) 1-2 indicated daytime dysfunction once or twice per month, (c) 3-4 indicated daytime dysfunction once or twice per week, and (d) 5-6 indicated daytime dysfunction three or more times per week. The results of the overall F test of the MANOVA indicated a significant relationship between daytime dysfunction and the coping subscales, $F(3, 131) = 6.257, p < .001$. Examination of between subjects effects showed there were significant effects for emotional coping, $F(3, 131) = 6.735, p < .001$, and avoidance coping, $F(3, 131) = 3.913, p < .05$.

Tukey's post hoc tests were performed on all significant findings. All alpha levels for the following were less than .05. Regarding emotional coping, individuals who reported never experiencing daytime dysfunction differed significantly from those who reported daytime dysfunction once or twice a month and those who reported it once or twice per week. As for avoidance coping, individuals who reported never experiencing daytime dysfunction differed significantly from those who reported it once or twice per week and those who experience it three or more times per week. No other findings were significant.

Hypothesis 4b for Females

The same procedure used to test hypothesis 4a for males was utilized to test hypothesis 4b for females. The results of the overall F test of the MANOVA indicated a significant relationship between daytime dysfunction and the coping subscales, $F(3, 114) = 7.602, p < .001$. Examination of between subjects effects showed there were significant effects for emotional coping, $F(3, 114) = 9.896, p < .001$, and avoidance coping, $F(3, 114) = 2.839, p < .05$.

Tukey's post hoc tests were performed on all significant findings. All alpha levels for the following were less than .05. Regarding emotional coping, individuals who reported never experiencing daytime dysfunction differed significantly from those who reported daytime dysfunction once or twice a month, from those who reported daytime dysfunction once or twice per week, and from those who reported it three or more times per week. Individuals who reported daytime dysfunction once or twice per month also differed from those reporting it once or twice per week and those reporting it three or more times per week. As for avoidance coping, although there were significant effects overall, no significant differences were found between groupings of individuals reporting daytime dysfunction. No other findings were significant.

Hypothesis 5a for Males

The fifth hypothesis, that sleep quality would be related to well-being in males, was tested using regression analysis. Well-being was assessed using the GWB. Six sub-scale scores (GWBA, GWBD, GWBP, GWBS, GWBV, GWBG) were obtained and used

as predictor variables. Sleep quality was assessed using the total score on the SQI and was used as the criterion variable. Results for hypothesis 5a for males are presented in Table 9.

Table 9

Regression with Well-Being Predicting Sleep Quality

Hypothesis 5a for Males

Variable	β	R	R^2	t	F	p
Model 1		.540	.291		10.688	.000***
GWBA	-.202			-2.063		.041*
GWBD	-.250			-2.305		.022*
GWBP	.198			2.000		.047*
GWBS	.045			.452		.652
GWBV	-.336			-3.866		.000***
GWBG	-.044			-.601		.549

Note: β = standardized beta weight; * $p < .05$, *** $p < .001$
Note 2: GWBA = General Well-Being Anxiety, GWBD = General Well-Being Depression, GWBP = General Well-Being Positive Well-Being, GWBS = General Well-Being Self-Control, GWBV = General Well-Being Vitality, GWBG = General Well-Being General Health

The regression analysis with well-being subscales entered as predictor variables and sleep quality as the criterion variable was significant, $F(6, 162) = 10.69, p < .01$, $R = .540$, $R^2 = .291$, and accounted for 29.1% of the variance in sleep quality. Four of the well-being subscales had significant beta weights with SQI total score. The following subscales had significant beta weights: GWBA ($\beta = -.202, p < .05, t = -2.063$); GWBD ($\beta = -.250, p < .05, t = -2.305$); GWBP ($\beta = .198, p < .05, t = 2.000$);

GWBV (β = -.336, p < .001, t = -3.866). The prediction that sleep quality would be related to well-being in males was confirmed. Specifically, GWB anxiety, GWB depression, GWB positive well-being, and GWB vitality predicted sleep quality.

Hypothesis 5b for Females

The same procedure used to test hypothesis 5a for males was used to test hypothesis 5b for females. Results for hypothesis 5b for females are presented in Table 10.

Table 10

Regression with Well-Being Predicting Sleep Quality

Hypothesis 5b for Females

Variable	β	R	R^2	t	F	p
Model 1		.589	.346		12.542	.000**
GWBA	-.113			-1.256		.211
GWBD	-.057			-.485		.628
GWBP	-.114			-1.128		.261
GWBS	.042			.385		.701
GWBV	-.362			-4.117		.000**
GWBG	-.149			-1.965		.051

Note: β = standardized beta weight; *** p < .001
Note 2: GWBA = General Well-Being Anxiety, GWBD = General Well-Being Depression, GWBP = General Well-Being Positive Well-Being, GWBS = General Well-Being Self-Control, GWBV = General Well-Being Vitality, GWBG = General Well-Being General Health

The regression analysis with well-being subscales entered as predictor variables and sleep quality as the criterion variable was significant, F (6, 148) = 12.54, p < .001, R = .589, R^2 = .346, and accounted for 34.6 % of the variance in sleep quality. Only GWBV had a significant beta weight (β = -.362, p < .001, t = -4.117). The prediction

that sleep quality would be related to well-being in females was confirmed. Specifically, GWB vitality predicted sleep quality.

Hypothesis 6a for Males

The sixth hypothesis, that sleep latency would be related to well-being in males, was tested using regression analysis. Well-being was assessed using the GWB. Six sub-scale scores (GWBA, GWBD, GWBP, GWBS, GWBV, GWBG) were obtained and used as predictor variables. Sleep latency (PSQI2) was assessed by obtaining from participants the number of minutes it usually took them to fall asleep during the past month and was used as the criterion variable. Results for hypothesis 6a for males are presented in Table 11.

Table 11

Regression with Well-Being Predicting Sleep Latency

Hypothesis 6a for Males

Variable	β	R	R^2	t	F	p
Model 1		.316	.100		2.865	.011*
GWBA	-.229			-2.068		.040*
GWBD	-.193			-1.574		.118
GWBP	.094			.841		.402
GWBS	.000			-.001		.999
GWBV	-.017			-.174		.862
GWBG	.670			.670		.504

Note: β = standardized beta weight; * $p < .05$
Note 2: GWBA = General Well-Being Anxiety, GWBD = General Well-Being Depression, GWBP = General Well-Being Positive Well-Being, GWBS = General Well-Being Self-Control, GWBV = General Well-Being Vitality, GWBG = General Well-Being General Health

The regression analysis with well-being entered as the predictor variable and sleep latency as the criterion variable was significant, F (6, 161) = 2.87, $p < .05$, $R = .316$, $R^2 = .100$, and accounted for 10% of the variance in sleep quality. Only GWBA had a significant beta weight ($\beta = -.229$, $p < .05$, $t = -.229$). The prediction that sleep latency would be related to well-being in males was confirmed. Specifically, GWB anxiety predicted sleep quality.

Hypothesis 6b for Females

The same procedure used to test hypothesis 6a for males was used to test hypothesis 6b for females. Results for hypothesis 6b for females are presented in Table 12.

Table 12

Regression with Well-Being Predicting Sleep Latency

Hypothesis 6b for Females

Variable	β	R	R^2	t	F	p
Model 1		.361	.13		3.587	.002**
GWBA	-.053			-.514		.608
GWBD	-.087			-.642		.522
GWBP	-.213			-1.818		.071
GWBS	.215			1.727		.086
GWBV	-.196			-1.927		.056
GWBG	-.050			-.571		.569

Note: β = standardized beta weight; ** $p < .01$
Note 2: GWBA = General Well-Being Anxiety, GWBD = General Well-Being Depression, GWBP = General Well-Being Positive Well-Being, GWBS = General Well-Being Self-Control, GWBV = General Well-Being Vitality, GWBG = General Well-Being General Health

The regression analysis with well-being subscales entered as the predictor variables and sleep latency as the criterion variable was significant, $F(6, 150) = 3.59$, $p < .01$, $R = .361$, $R^2 = .130$, and accounted for 13% of the variance in sleep quality. Although the model was significant, none of the well-being subscales had a significant beta weight. The prediction that sleep latency would be related to well-being in females was confirmed. It was not determined which aspects of well-being related to sleep latency.

Hypothesis 7a for Males

The seventh hypothesis, that sleep efficiency would be related significantly to well-being in males, was tested using a regression. Well-being was assessed using the GWB. Six sub-scale scores (GWBA, GWBD, GWBP, GWBS, GWBV, GWBG) were obtained and used as the predictor variable. Sleep efficiency was assessed using Component 4 of the PSQI (Questions 1,3, and 4) by dividing the number of hours slept by the number of hours spent in bed and multiplying by 100 to find the sleep efficiency percentage. Sleep efficiency was used as the criterion variable.

The regression analysis with well-being subscales entered as the predictor variables and sleep efficiency as the criterion variable for males was not significant, $F(6, 159) = 1.266$, $p > .05$, $R = .218$, $R^2 = .047$. The prediction that sleep efficiency would be related to well-being for males was not confirmed.

Hypothesis 7b for Females

The same procedure used to test hypothesis 7a for males was utilized to test hypothesis 7b for females. The regression analysis was not significant, $F(6,146) = 1.07$,

$p > .05$, $R = .209$, $R^2 = .044$. The prediction that sleep efficiency would be related to well-being in females was not confirmed.

Hypothesis 8a for Males

The eighth hypothesis, that daytime dysfunction would be related to well-being in males, was tested using a multivariate analysis of variance (MANOVA). Daytime dysfunction was assessed using the PSQI. The answers to questions eight and nine were coded (0-3) and then added together for a daytime dysfunction score of 0-6. Scores were as follows: (a) 0 indicated no daytime dysfunction, (b) 1-2 indicated daytime dysfunction once or twice per month, (c) 3-4 indicated daytime dysfunction once or twice per week, and (d) 5-6 indicated daytime dysfunction three or more times per week. The results of the overall F test of the MANOVA indicated a significant relationship between sleep quality and the well-being subscales, $F(3, 160) = 10.11, p < .001$. Examination of between subjects effects showed there were significant effects for GWB anxiety $F(3, 160) = 9.36, p < .001$, GWB depression $F(3, 160) = 5.25, p < .01$, GWB positive well-being $F(3, 160) = 8.0, p < .001$, GWB self-control $F(3, 160) = 8.44$, $p < .001$, and GWB vitality, $F(3, 160) = 17.94, p < .001$. General Well-Being general health did not demonstrate significant effects.

Tukey's post hoc tests were performed on all significant findings. All alpha levels for the following were less than .05. Regarding GWB anxiety, individuals reporting no dysfunction differed from those reporting daytime dysfunction once or twice per month and those reporting it once or twice per week. As to GWB depression, individuals who reported never experiencing daytime dysfunction differed significantly from those who reported it once or twice per month and those who reported it once or twice per week.

Regarding GWB positive well-being, individuals who reported never experiencing daytime dysfunction differed significantly from those reporting it once or twice per month and those reporting it once or twice per week. In examining GWB self-control, individuals reporting no experience of daytime dysfunction differed significantly from those reporting it once or twice per month and those who reporting it once or twice per week. As to GWB vitality, individuals who reported never experiencing daytime dysfunction differed from those reporting it once or twice per month, from those reporting it once or twice per week, and from those reporting it three or more times per week. There were no other significant findings.

Hypothesis 8b for Females

The eighth hypothesis, that daytime dysfunction would be related to well-being in females, was tested using a multivariate analysis of variance (MANOVA). The results of the overall F test of the MANOVA indicated a significant relationship between sleep quality and the well-being subscales, $F(3, 147) = 12.30, p < .001$. Examination of between subjects effects showed there were significant effects for GWB anxiety $F(3, 147) = 11.99, p < .001$, GWB depression $F(3, 147) = 9.52, p < .001$, GWB positive well-being $F(3, 147) = 8.4, p < .001$, GWB self-control $F(3, 147) = 11.41, p < .001$, GWB vitality $F(3, 147) = 20.46, p < .001$, and GWB general health $F(3, 147) = 6.42, p < .001$.

Tukey's post hoc tests were performed on all significant findings. All alpha levels for the following were less than .05. Regarding GWB anxiety, individuals reporting no dysfunction differed from those reporting daytime dysfunction once or twice per month, from those reporting it once or twice per week, and from those who reported it three or

more times per week. As to GWB depression, individuals who reported never experiencing daytime dysfunction differed significantly from those reporting it once or twice per week and those who reported experiencing it three or more times per week. Those reporting daytime dysfunction once or twice per month differed significantly from those who reported it once or twice per week and from those reporting it three or more times per week. Regarding GWB positive well-being, individuals who reported never experiencing daytime dysfunction differed significantly from those reporting it once or twice per week and those reporting it three or more times per week. In examining GWB self-control, individuals with no report of daytime dysfunction differed significantly from those reporting it once or twice per month, from those who reported it once or twice per week, and from those who reported it three or more times per week. Individuals who reported daytime dysfunction once or twice per month differed significantly from those reporting it once or twice per week and from those reporting it three or more times per week. As to GWB vitality, individuals who reported never experiencing daytime dysfunction differed significantly from those who reported it once or twice per month, from those who reported it once or twice per week, and from those reporting it three or more times per week. Those reporting daytime dysfunction once or twice per month differed significantly from individuals who reported it once or twice per week. Regarding GWB general health, individuals who reported never experiencing daytime dysfunction differed significantly from those who reported it once or twice per week, from those reporting it once or twice per month, and from those reporting it three or more times per week. There were no other significant findings.

Hypothesis 9a for Males

The final hypothesis stated that coping style moderates the relationship between sleep quality and well-being. A hierarchical regression was used to assess this moderating relationship. The dependent variable was the GWB total score. Sleep quality was entered first, followed by coping variables. Finally interactions between sleep quality and coping variables were entered.

The results of the first block (sleep quality) show that 20.7 % of the variance, $F(1, 132) = 34.46, p < .001, R = .455, R^2 = .207$, of well-being is accounted for by sleep quality. This suggests that sleep quality predicts well-being.

The second block of variables, coping styles, indicate that 25.4%, $F(5, 128) = 21.89, p < .001, R = .679, R^2 = .461$, more variance is explained by adding coping style. Specifically sleep quality, detached coping and emotional coping are the factors responsible for the predictive relationship. In other words, sleep quality, detached coping and emotional coping were predictors of well-being.

The final block of variables show that an additional 3.4% of the variance, $F(9, 124) = 13.52, p < .001, R = .704, R^2 = .495$, is accounted for by the interactions between sleep quality and coping. The specific factors responsible for the predictive relationship are emotional coping, the interaction between sleep quality and emotional coping, and the interaction between avoidance coping and sleep quality. This suggests that emotional coping, the interaction between emotional coping and sleep quality, and the interaction between avoidance coping and sleep quality predict well-being.

Overall, 50% of the total variance is accounted for by sleep quality, coping style and the interactions between the two. In other words, the relationship between well-being

and sleep quality for males is moderated by coping style and the prediction confirmed.

Table 13 shows the results of the hierarchical regression for males.

Table 13

Hierarchical Regression with Coping Moderating the Relationship Between Well-Being and Sleep Quality

Hypothesis 9a for Males

Variable	β	R	R^2	t	F	p
Block 1 (Sleep quality)		.455	.207		34.457	.000***
	-.455			-5.870		.000**
Block 2 (add coping)		. 679	.461		21.891	.000***
SLPQ	-.247			-3.458		.001**
RATC	.064			.686		.494
DETC	.254			2.636		.009**
EMC	-.411			-5.191		.000***
AVC	-.058			.760		.449
Block 3 (add Interactions)		.704	.495		13.52	.000***
SLPQ	.088			.159		.874
RATC	.108			-.656		.513
DETC	.196			.196		.253
EMC	-.627			-5.035		.000***
AVC	.236			1.644		.103
SLPQ*RATC	-.102			-.174		.862
SLPQ*DETC	.313			.539		.591
SLPQ*EMC	.685			2.055		.042*
SLPQ*AVC	-1.189			-2.052		.042*

Note: β = standardized beta weight; * $p < .05$, ** $p < .01$, *** $p < .001$
Note 2: SLPQ = Sleep Quality, RATC = Rational Coping, DETC = Detached Coping, EMC = Emotional Coping, AVC = Avoidance Coping

Hypothesis 9b for Females

The same procedure used to test hypothesis 9a for males was utilized to test hypothesis 9a for females. The results of the first block (sleep quality) show that 32.8 %,

$F(1, 111) = 54.18, p < .001, R = .573, R^2 = .328$, of the variance of well-being is accounted for by sleep quality. This suggests that sleep quality predicts well-being.

The second block of variables, coping styles, indicate 32.7%, $F(5, 107) = 40.57$, $p < .001, R = .809, R^2 = .655$, more variance is explained by adding coping style. Specifically, sleep quality, detached coping and emotional coping are the factors responsible for the predictive relationship. In other words, sleep quality, detached coping, and emotional coping are predictors of well-being.

The final block of variables show that an additional .06%, $F(9, 103) = 22.65$, $p < .001, R = .813, R^2 = .661$, of the variance is accounted for by the interactions between sleep quality and coping. This model suggests that only emotional coping is predictive of well-being. None of the interactions were significant. Although there were no significant beta weights for the interaction terms, this model is still significant in that it answers a theoretical question regarding moderating effect.

Overall, 66% of the total variance is accounted for by sleep quality and coping style. None of the interactions had significant beta weights. The relationship between sleep quality and well-being was not moderated by coping. The prediction is not confirmed. Table 14 shows the results of the hierarchical regression for females.

Table 14

Hierarchical Regression with Coping Moderating the Relationship Between Well-Being and Sleep Quality

Hypothesis 9b for Females

Variable	β	R	R^2	t	F	p
Block 1 (Sleep quality)		.573	.328		54.178	.000***
	-.573			-7.361		.000***
Block 2 (add coping)		.809	.655		40.566	.000***
SLPQ	-.300			-4.703		.000***
RATC	-.078			-1.095		.276
DETC	.206			2.877		.005**
EMC	-.533			-6.895		.000***
AVC	-.095			-1.353		.179
Block 3 (add Interactions)		.813	.661		22.345	.000***
SLPQ	-.672			1.067		.288
RATC	-.081			-.674		.502
DETC	.143			1.057		.293
EMC	-.703			-4.780		.000***
AVC	.021			.137		.892
SLPQ*RATC	-.023			-.049		.961
SLPQ*DETC	.243			.523		.602
SLPQ*EMC	.725			1.361		.177
SLPQ*AVC	-.517			-.938		.350

Note 1: β = standardized beta weight; ** $p < .01$, *** p .001
Note 2: SLPQ = Sleep Quality, RATC = Rational Coping, DETC = Detached Coping, EMC = Emotional Coping, AVC = Avoidance Coping

CHAPTER 4

Discussion

The focus of the current study was to determine the relationship, if any, between and among sleep quality, coping, and well-being. The hypotheses were narrowed to specify relationships between coping and sleep quality, coping and sleep latency, coping and sleep efficiency, coping and daytime dysfunction, well-being and sleep quality, well-being and sleep latency, well-being and sleep efficiency, well-being and daytime dysfunction, and finally the level at which coping moderates the relationship between sleep quality and well-being.

The discussion of the results of the current study will begin with a summary of the demographic and descriptive data. Next is the individual introduction and discussion of the nine formal hypotheses. A general discussion follows, highlighting the significant findings and implications. The limitations of the study are discussed next. Finally, suggestions for future research are explored.

Demographic and Descriptive Data

Significant gender differences were found on the Sleep Quality Index, the Coping Styles Questionnaire, and the General Well-Being Schedule. Males reported better sleep quality than females. Males were also reported using rational and detached coping more often than females. Females reported using more emotional and avoidance coping

than males. Females reported more anxiety, as defined by the General Well-Being Schedule (GWB), than males. Males on the other hand reported more GWB self-control and GWB energy than females. Males also reported less concern over GWB health issues and better overall well-being than females.

There were many significant correlations for males. As GPA increased, anxiety decreased while sleep efficiency increased. As sleep quality increased for males, the use of rational coping increased as did GWB positive well-being, self-control, vitality, general health, overall well-being, and sleep efficiency. On the other hand, emotional coping, anxiety, depression, daytime dysfunction, and sleep latency decreased. As the use of rational coping increased in males, detached coping, avoidance coping, positive well-being, self-control, vitality, and overall well-being increased. When males reported using more rational coping, anxiety and depression decreased. Males who reported increased use of detached coping, also reported increased avoidance coping, positive well-being, self-control, vitality, and overall well-being increased while anxiety and depression decreased. Males using more emotional coping reported an increase in avoidance coping, anxiety, depression, daytime dysfunction, and sleep latency. On the other hand, these males reported a decrease in positive well-being, self-control, vitality, general health, overall well-being, and sleep efficiency. As males increased the use of avoidance coping, anxiety and daytime dysfunction increased while self-control and overall well-being decreased. Males with an increase in overall well-being reported an increase in positive well-being, vitality, self-control, and general health, while anxiety, depression, daytime dysfunction, and sleep latency decreased.

There were a number of significant correlations for females as well. As age increased in females, there was an increase in the use of rational coping. As GPA increased, emotional coping decreased while general health increased. As reported sleep quality improved for females there was an increase in reported rational coping, positive well-being, self-control, vitality, general health, overall well-being, and sleep efficiency. On the other hand, there was a reported decrease in emotional coping, anxiety, depression, daytime dysfunction, and sleep latency. When females reported increased use of rational coping, they also reported more detached coping and less emotional coping. There was also an increase in positive well-being, self-control, vitality, and overall well-being. Females reporting the use of more detached coping reported less emotional coping and an increase in positive well-being, self-control, vitality, and overall well-being. Females reporting more emotional coping also reported more avoidance coping and an increase in anxiety, depression, daytime dysfunction, and sleep latency. As females used more avoidance coping, they reported an increase in anxiety, depression, and daytime dysfunction, while positive well-being, self-control, vitality, and overall well-being decreased. When overall well-being increased in females, there were also increases in positive well-being, self-control, vitality, and general health, while anxiety, depression, daytime dysfunction, and sleep latency decreased.

Hypotheses

Hypothesis 1a for Males

The first hypothesis tested the relationship between sleep quality and coping for males. Results indicated there was a significant relationship between these two variables.

Upon closer examination, Emotional Coping was the only significant predictor of sleep quality accounting for 17.3% of the variance in sleep quality.

Results from hypothesis 1a indicated males using emotional coping reported poorer sleep quality. These males may tend to worry more about problems than other males. They may be more self-critical than males using other coping styles. This worry and self-criticism may have an impact on their overall sleep quality by causing them to think about these things at bedtime, thus delaying sleep onset. They also may be prone to wake during the night worrying about issues, thereby resulting in reduced sleep efficiency. The results of hypothesis 1a for males generally supported the findings of Hicks et al. (1991) that short sleepers use more emotional coping than those who sleep longer. In addition to prior findings associating emotional coping with sleep length (Hicks et al., 1991), this study provided evidence that those who use emotional coping also have poorer sleep quality. Also supported is the research of Sadeh et al. (2004) that found individuals low in emotional coping reported their sleep quality to be better than those high in emotional coping.

Hypothesis 1b for Females

The first hypothesis was tested to determine the relationship between sleep quality and coping for females. The results indicated there was a significant relationship between sleep quality and coping. An examination of the results demonstrated only Emotional Coping was a significant predictor. Emotional Coping accounted for 19.8% of the variance in sleep quality for females.

The results for hypothesis 1b indicated that females using emotional coping reported poorer sleep. In general the current study found that females tend to use more

emotional coping than males. Females using emotional coping may tend to worry more about problems than other females. They may be more self-critical than females using other coping styles. This worry and self-criticism may have an impact on their overall sleep quality by causing them to think about these things at bedtime, thus delaying sleep onset. They also may be prone to wake during the night worrying about issues, thereby resulting in reduced sleep efficiency. As stated previously, the results from hypothesis 1 supported the research findings of Hicks et al. (1991) indicating those using emotional coping got less sleep than others who slept longer. The results of hypothesis one add to the literature on sleep quality by providing a connection between sleep quality and emotional coping.

Hypothesis 2a for Males

Sleep latency and coping were hypothesized to be related significantly for males. This hypothesis was supported by the research. Specifically, the variable of Emotional Coping was related significantly to sleep latency and accounted for 9.1% of the variance in sleep latency for males.

The results suggested males using more emotional coping have longer periods of sleep latency. Since males in general use less emotional coping than females, it could be that those using emotional coping tend to ruminate about problems at bedtime thereby increasing sleep latency time. This is congruent with the findings of Morin et al. (2003) that individuals who suffer from insomnia rely more on emotion-focused coping strategies. It generally supports the findings of Hicks et al. (1991) that short sleepers reported emotional coping more than long sleepers.

Hypothesis 2b for Females

Sleep latency and coping were hypothesized to be related significantly for females. In examining the results, a significant relationship was not found for females. Coping did not account for a significant amount of variance in sleep latency for females.

Hypothesis 3a for Males

The third hypothesis investigated the relationship between sleep efficiency and coping for males. There was a significant relationship found between these two variables for males. Upon close examination, there was only one significant predictor of sleep efficiency. Emotional Coping accounted for 11.5% of the variance in sleep efficiency for males.

The results indicated males reporting less emotional coping report better sleep efficiency. These males may feel better about their ability to solve the problem. This may result in better sleep efficiency since they tend to worry less. These results support the findings of Morin et al. (2003) that insomnia patients rely more on emotion-focused strategies.

Hypothesis 3b for Females

Hypothesis 3b examined the relationship between sleep efficiency and coping for females. A significant relationship was not found between sleep efficiency and coping for females. Coping did not account for a significant amount of variance in sleep efficiency for females.

Hypothesis 4a for Males

Hypothesis four investigated the relationship between daytime dysfunction and coping for males. A significant relationship was found between daytime dysfunction and

coping for males. Upon examination of the results, two coping styles were related significantly to daytime dysfunction, those of Emotional Coping and Avoidance Coping.

Post hoc analyses indicated that males who do not report daytime dysfunction use emotional coping strategies significantly less than those who report daytime dysfunction once or twice per month or once or twice per week. Males reporting no daytime function likely have better sleep quality, worry less, and are less self-critical. No other emotional coping findings were significant.

The results further indicated that males not reporting daytime dysfunction use avoidance coping significantly less than males reporting daytime dysfunction one or more times per week. Males not reporting daytime dysfunction likely have better sleep quality and tend to not deny the existence of problems or procrastinate in managing them. No other avoidance coping findings were significant.

The results of the current study generally supported the findings that poor sleep is linked to impaired academic performance, learning and memory, general cognitive performance (Bonnet, 2000; DeKoninck et al., 1989; Lack, 1986; Schredl et al. 1998), and generally lower levels of performance (Dinges, 1988; Pilcher & Huffcutt, 1996; Pilcher & Walters, 1997).

Hypothesis 4b for Females

Hypothesis four examined the relationship between daytime dysfunction and coping for females. A significant relationship was found between these two variables for females. Upon further examination, the two maladaptive coping styles, Emotional Coping and Avoidance Coping, were related significantly to daytime dysfunction.

Post hoc analyses suggested that females who do not report daytime dysfunction use emotional coping less than females who report daytime dysfunction at any level. Further, females reporting daytime dysfunction once or twice per month use emotional coping less than females reporting daytime dysfunction one or more times per week. Females reporting no daytime function likely have better sleep quality, worry less, and are less self-critical.

Overall avoidance coping was related to daytime dysfunction. Upon further investigation, no significant differences were found in number of daytime dysfunction experiences for females using avoidance coping.

Hypothesis 5a for Males

The fifth hypothesis examined the relationship between sleep quality and well-being for males. A significant relationship was found between sleep quality and well-being. Upon further investigation, the significant predictors of sleep quality were General Well-Being Anxiety, General Well-Being Depression, General Well-Being Positive Well-being, and General Well-Being Vitality. These predictors accounted for 29.1% of the variance in sleep quality.

In general, males who reported poor sleep reported more anxiety, more depressed mood, more feelings of positive well-being, and less energy. Males reporting poor sleep quality may tend to worry more often and blame themselves for their problems. They also may isolate themselves from others, eat less, and feel fatigued. An unusual finding was that males reporting poor sleep quality report more feelings of positive well-being. While the other findings are intuitive, this unusual finding is counterintuitive. One explanation could be that although these males may worry more and have more physiological

symptoms, they may not blame themselves for their problems resulting in more positive feelings about themselves. These results generally supported the findings of Gray and Watson (2002) that sleep quality is related consistently to indicators of long-term well-being. The results also provided more evidence to support the findings of Pilcher and Ott (1998) who stated that because of the relationship of daily physical and psychological health to sleep quality, sleep quality could be an early predictor of potential health and well-being concerns.

Hypothesis 5b for Females

Hypothesis five examined the relationship between sleep quality and well-being for females. A significant relationship was found between sleep quality and well-being. Upon further investigation, only General Well-Being Vitality was a significant predictor of sleep quality for females, accounting for 34.6% of the variance in sleep quality.

The results of the current study suggest that females who are poor sleepers report significantly less energy than females who are good sleepers. Females with poor sleep may be staying up late to study or spend time with friends. They may have to get up early for class which likely results in feeling tired or fatigued. None of the other findings were significant.

Hypothesis 6a for Males

Hypothesis six was tested to determine whether a relationship exists between sleep latency and well-being for males. The results indicated that a significant relationship exists between reported sleep latency and well-being. Well-being accounted for 10% of the variance in sleep latency. A closer examination of the results revealed that only General Well-Being Anxiety was a significant predictor of sleep latency in males.

In general, males who reported more anxiety had longer periods of sleep latency. In other words, males who tend to worry more take longer to go to sleep. These results supported previous research that insomnia is known to be linked to psychological well-being and physiological well-being (Lacks, 1987; Sloan & Shapiro, 1993).

Hypothesis 6b for Females

The sixth hypothesis was investigated to determine the relationship between sleep latency and well-being in females. The results indicate a significant relationship between reported sleep latency and well-being in females. Well-being accounted for 13% of the variance in sleep latency according to the results of the current study. Upon further examination, although overall well-being was related significantly to sleep latency for females, no specific components of well-being were significant. In other words, the longer females take to go to sleep, the less overall well-being they experience.

Hypothesis 7a for Males

Hypothesis seven examined the relationship between sleep efficiency and well-being for males. The results indicated that a significant relationship between sleep efficiency and well-being did not exist for males in the current study.

Hypothesis 7b for Females

The seventh hypothesis investigated the relationship between sleep efficiency and well-being for females. The results of the current study indicated no significant relationship between sleep efficiency and well-being for females.

Hypothesis 8a for Males

Hypothesis eight examined the relationship between daytime dysfunction and well-being for males. A significant relationship was found between these two variables.

Upon further examination, five components of well-being were related significantly to daytime dysfunction, those being General Well-Being Anxiety, General Well-Being Depression, General Well-Being Positive Well-Being, General Well-Being Self-Control, and General Well-Being Vitality.

The results suggested males who report no daytime dysfunction have significantly less reported anxiety than males who report daytime dysfunction once or twice per month and those who report it once or twice per week. Males reporting daytime dysfunction once or twice per month have less reported anxiety than those reporting daytime dysfunction once or twice per week. Males who fall asleep while in class or driving may worry more about upcoming tests, academic standing, or about having a car accident.

With regard to depression, the results indicated males who report no daytime dysfunction report significantly less depression than males who report daytime dysfunction once or twice per month or once or twice per week. Males having difficulties staying awake during the day may feel guilty, self-critical, and fatigued.

In examining feelings of positive well-being, the results of the current study suggested that males reporting no daytime dysfunction report more feelings of positive well-being than males reporting daytime dysfunction once or twice per month or once or twice per week. Males who have trouble staying awake during the day may feel less satisfied with themselves and their lives, especially if daytime dysfunction interferes with keeping their grades up, other responsibilities, and social activities.

Males who report no daytime dysfunction report more control over their emotions and behavior than males who report daytime dysfunction once or twice per month and males who report daytime dysfunction once or twice per week. Males having difficulties

staying awake during the day or feeling less alert may tend to be more irritable or frustrated. This may lead to outward expressions of their emotions (e.g. lashing out at someone) when ordinarily they would have handled stressful situations in a calm, more appropriate manner.

Finally, males reporting no daytime dysfunction report having more energy than males reporting daytime dysfunction at any level. Males who feel tired and fatigued may also have difficulty staying awake during the day. There were no other significant findings.

The results of the current study generally provided support for previous findings that sleep disturbances producing daytime dysfunction are related significantly to fatal traffic accidents, industrial and engineering disasters, job performance errors, high levels of stress, fatigue, and health complications (Akerstedt, 1988; Akerstedt, et al., 2001; Ariznavarreta et al., 2002; Garbarino et al., 2002; Monk et al., 1996).

Hypothesis 8b for Females

Hypothesis eight was investigated to determine the relationship between daytime dysfunction and well-being for females. A significant relationship was found between reported daytime dysfunction and well-being in females. Upon closer examination, significant between-subjects effects were found for all six separate components of well-being. Specifically, effects were found for General Well-Being Anxiety, General Well-Being Depression, General Well-Being Positive Well-Being, General Well-Being Self-Control, General Well-Being Vitality, and General Well-Being General Health.

The results suggested females who reported no daytime dysfunction had less reported anxiety than females reporting daytime dysfunction at any level. In other words,

the more females have difficulty staying awake during the day, the more they are likely to experience anxiety. Females who fall asleep during class may worry more about their grades.

Regarding depression, the results that indicated females reporting no daytime dysfunction or those who reported it once or twice per month report less depressed mood than females who reported daytime dysfunction once or twice per week or three or more times per week. Females having difficulties staying awake in class may feel guilty, self-critical, and fatigued.

Current study results suggest that females who reported no daytime dysfunction also reported more satisfaction with their lives than females who reported daytime dysfunction one or more times per week. Females who have trouble staying awake during the day may feel less satisfied with themselves and their lives, especially if daytime dysfunction interferes with keeping their grades up, other responsibilities, and social activities.

The results further suggested that females reporting no daytime dysfunction had a significantly greater sense of self-control than females reporting daytime dysfunction. Additionally, females reporting daytime dysfunction once or twice per month had a greater sense of self-control than those reporting daytime dysfunction one or more times per week. Females having difficulties staying awake during the day or feeling less alert may tend to be more irritable or frustrated. This may lead to outward expressions of their emotions (e.g. lashing out at someone) when ordinarily they would have handled stressful situations in a calm, more appropriate manner.

Regarding vitality or energy, results indicated that females who reported no daytime dysfunction reported feeling more energetic than females who reported no daytime dysfunction. Additionally, females reporting daytime dysfunction only once or twice per month reported more energy than females reporting daytime dysfunction once or twice per week. Females who feel tired and fatigued may also have difficulty staying awake during the day.

Lastly, the current study's results suggested that females reporting no daytime dysfunction reported better general health and less concern over health issues than females reporting daytime dysfunction at any level. Females who have no problem staying awake during the day may be healthier or less concerned about their health.

Hypothesis 9a for Males

The relationships between sleep quality, coping, and well-being were all significant for males. The question remained whether sleep quality and coping together increased the impact on well-being. Hypothesis nine addressed the moderating effect of coping on the relationship between sleep quality and well-being for males. The hypothesis stated that coping would moderate the relationship between sleep quality and well-being.

To determine the moderating effects of coping, the variables were blocked into three sets. The criterion variable in all blocks was General Well-Being Total. The relationship was significant in all sets. In the first set, the Sleep Quality variable was entered into the equation and found related significantly to well-being. This suggested that good sleepers have better overall well-being. Only 20.7% of the variance in the relationship was accounted for by Sleep Quality alone.

The second set of variables was entered next. These variables consisted of Sleep Quality and the four coping variables. When the four coping variables were entered, the accountability of the variance of the relationship was increased by 25.4%. In this set the contributing factors were Sleep Quality, Detached Coping, and Emotional Coping. Specifically, males using Detached Coping had better overall well-being, while those using Emotional Coping had decreased well-being.

The final set of variables entered was the interactions. The results of this set indicated that the interactions between coping and Sleep Quality account for another 3.4% of the variance in the relationship. The specific variables that predicted this relationship significantly were Emotional Coping and two interactions. The two interactions were between Emotional Coping and Sleep Quality and between Avoidance Coping and Sleep Quality. This indicated coping had a moderating relationship between sleep quality and well-being. In other words, in order to predict well-being Sleep Quality, Emotional Coping, and Avoidance Coping are examined, but the interactions must also be examined. In males the level of sleep quality, emotional coping, or avoidance coping alone does not define the relationship with well-being.

Hypothesis 9b for Females

The relationships between sleep quality, coping, and well-being were all significant for females. The question that remained was whether sleep quality and coping together increased the impact on well-being. Hypothesis nine addressed the moderating effect of coping on the relationship between sleep quality and well-being for females. The hypothesis stated that coping would moderate the relationship between sleep quality and well-being.

To determine the moderating effects of coping, the variables were blocked into three sets. The criterion variable in all blocks was General Well-Being Total. The relationship was significant in all sets.

In the first set, the Sleep Quality variable was entered into the equation and found related significantly to overall well-being. This suggested that good sleepers have better well-being. Only 32.8% of the variance in the relationship was accounted for by Sleep Quality alone.

The second set of variables was entered next. These variables consisted of Sleep Quality and the four coping variables. When the four coping variables were entered, the accountability of the variance of the relationship was increased by another 32.7%. In this set the contributing factors were Sleep Quality, Detached Coping, and Emotional Coping.

The final set of variables entered was the interactions. The results of this set indicated that only Emotional Coping was a significant factor in accounting for another .6% of the variance in the relationship. The interaction variables were not significant. Therefore, coping does not moderate the relationship between sleep quality and well-being in females. In other words, when predicting the relationship between sleep quality and well-being, the variables of Sleep Quality, Detached Coping, and Emotional Coping can be examined separately. Females with better sleep quality also may have a higher level of well-being. Females who differentiate between themselves and their problems may have a greater sense of well-being. Finally, females who blame themselves for their problems and are self-critical likely have less overall well-being.

Significant Findings and Implications

Based on the results of the current study, reported sleep quality is related to coping in college students. These findings further validate the relationship previously found by Sadeh et al. (2004). In the current study individuals with overall poor sleep quality tended to use an emotional coping style more. In addition, those with reported poor sleep quality had lower reported levels of well-being. While the connection between coping and sleep quality enhanced the relationship with well-being in males, it did not have an effect for females. University mental health professionals seeing clients with complaints of anxiety or depression may want to assess for poor sleep quality. Overall sleep quality and well-being can be assessed quickly at minimal cost to the university counseling center.

In addition to providing clinical treatment for anxiety or depression, therapists can provide sleep hygiene education to their clients which may result in better sleep quality. Clinical interventions such as behavior therapy (Morin & Wooten, 1996), relaxation, (Morin & Wooten), and cognitive therapy (Bootzin & Perlis, 1992) have been shown effective in improving sleep quality (Buboltz et al., 2002). These interventions combined with sleep hygiene education may aid therapists in improving clients' sleep quality and lowering levels of anxiety and depression. Non-clinical interventions (Buboltz et al., 2002) such as sleep hygiene education, exercise, and bright light therapy can be discussed with clients with less serious well-being difficulties such as less life satisfaction, emotional control problems, low energy, and more concern about health issues. University counselors can also teach more adaptive coping strategies to students

complaining of poor sleep quality. These students may find that using more adaptive coping strategies improves their quality of sleep.

College and university administrators may benefit from the findings of this study. Administrators can ensure that college students have access to information on sleep quality and the effects it may have on psychological well-being, as well as sleep hygiene recommendations, by including this information during orientation or university seminars taken during their freshman year. Administrators may also want to include instruction on adaptive coping strategies in these seminars in an effort to prevent future sleep difficulties in students. In addition, colloquia on poor sleep quality and its effects can be presented by departments with majors in the helping professions such as nursing, psychology, or social work. Future educators would also benefit from this information so they may educate high school students about sleep quality since adolescence is the time that sleep circadian rhythms shift to later sleep onset and waking (Wolfson & Carskadon, 1998). Administrators should also note this natural shift to later sleep onset and waking times for adolescents. Machado et al. (1998) and Valdez (1996) noted that class scheduling most often determines wake times. College administrators may want to allow for more afternoon classes to accommodate this shift in circadian rhythm so that students will be more alert in class.

Physicians treating college students are another group that would benefit from the findings of this study. They may want to assess for poor sleep quality when college student patients present with complaints of low energy levels or other health concerns. In addition to affecting physical health (Alsplund, 2000; Hyyppa & Kronholm, 1989; Irwin et al., 1992, Irwin et al., 1996; Newman et al., 1997; Tanaka et al., 2002), poor sleep also

affects mood and overall psychological well being (Ford & Cooper-Patrick, 2001; Lacks, 1987; Sloan & Shapiro, 1993; Weisman et al., 1997; Wolfson & Carskadon, 1998). Physicians may want to further assess college students' mood and sense of well-being when there is evidence of poor sleep quality. They may refer students to a psychotherapist for treatment of their depressed mood, anxiety, or decreased well-being.

The findings of the current study add to the literature on the relationships between and among sleep quality, coping, and well-being. There are few prior studies on these relationships and the current study provides further evidence of their significance.

Limitations

Several limitations may have affected the results of the current study. The sample of college students limits generalizing the results to other populations. Students in the study were predominately undergraduates attending a medium-sized southern United States university. In this geographical area, ethnic diversity is somewhat restricted. The sample reflected this restriction in that it principally consisted of European Americans. Approximately 90% of the participants ranged in age from 18-21. Given the nature of the sample, results from this study should not be generalized to other educational levels, ethnic backgrounds, geographical areas, or age groups.

Another limitation may be the time frame in which the data were collected. The collection of data was obtained during the first week of the fall quarter. Students were just beginning to adjust to the college routine. Since a majority of participants were first-quarter-freshmen, their sleep quality may have been more disturbed during this week than before due to the excitement of being on their own and learning to live in a residence hall. Overall, students' sleep quality may have been worse during the first week of the school

year than at other times during the year. Therefore, the current findings may not generalize to other times of the quarter, semester, or the school year in general.

The method used in the current study may be a limitation. Self-report surveys assume the participants are giving accurate answers about themselves. The current study is limited by the trust in the accuracy of participants' responses. Several response sets were thrown out due to incompletion or obviously inaccurate responses (e.g. responding identically on all items). However, purely random responses are impossible to detect. When using survey research, there is also a possibility that participants are not being sincere in their responses. These are complicating factors in any self-report study. A thorough effort was made to reduce inaccuracy by excluding from the current study surveys that were obviously responded to randomly and incompletely.

The last set of limitations is related to the instrumentation of the current study. Studies investigating the reliability and validity of the Sleep Quality Index are limited. However, upon close examination of the individual items in the SQI, they are directly related to sleep quality. Hence, the lack of psychometric studies on the SQI may not be a problem. The other instruments used in the current study, the Pittsburgh Sleep Quality Index, the General Well-Being Schedule, and the Coping Styles Questionnaire have all been widely used and found reliable and valid. One concern regarding the General Well-Being Schedule is the low alpha levels on some of the subscales, particularly the General Health subscale. Given the low alpha level on this subscale for both males and females, these results should be used with caution. There is a second concern regarding the Coping Styles Questionnaire. Close examination of the individual items on the Emotional Coping subscale revealed most items were related to negative affectivity or psychological distress

as described by Endler and Parker (1990), instead of emotional-focused coping as described by Folkman and Lazarus (1980). Folkman and Lazarus described emotional-focused coping as thoughts and behaviors directed toward relieving or decreasing the emotional impact of a stressful situation or stressor. Therefore, care should be taken in comparing the current results with studies that have used coping instruments which defined emotional coping in a different manner.

Suggestions for Future Research

The current study is correlational in design. Therefore, causation cannot be determined. Future research might include process outcome designs in order to further explore the significant relationships found in this study. For example, a study might be designed to teach adaptive coping methods, which through the use of a control group may determine whether a change in coping strategies occurs and whether the change improves sleep quality. Other research designs might be employed to determine causation which would assist therapists in choosing interventions for sleep quality, coping, or well-being difficulties.

The sample used in this study was not a very diverse group. Future replications should attempt to use a more multiculturally diverse sample. This might be done by choosing a sample population from a university where more ethnicities are represented significantly. A more diverse sample might also be obtained by using students from several different universities in different areas of the country. The current sample used was also predominately in the age range of 18-21. Future studies might be completed on samples from other age groups (e.g. high school students, young adults, geriatric patients). Broadening the scope of the sample population in future studies would expand

the generalizability of the results and further validate the current study's findings if similar results were found. Future studies might be conducted on the working population, particularly shift-workers. With numerous accidents, job performance errors, and health complications attributed to circadian rhythm disruptions and poor daytime sleep, it follows that sleep quality and well-being may be compromised.

Considering the concerns about instrumentation, future researchers might develop measures of well-being that have high internal consistency on all subscales. Self-report measures of sleep quality could also be combined with physiological measures and/or sleep lab studies. This would provide a better picture of sleep quality than a one dimensional subjective self-report. The current study used a coping measure that identified four styles of coping, with two labeled adaptive and two labeled maladaptive. There is currently some discussion about coping measures and what they actually assess with regard to emotional coping (Stanton, Parsa, & Austenfeld, 2002). Future research may want to further examine this issue in order to clarify the construct.

The current study was the first known to examine the moderating effects of coping on the relationship between reported sleep quality and well-being. While moderating effects were found for males, none were found for females. Future replications should test this initial finding for validity as well as determine whether the same results are found with different samples. Future studies also might be conducted to determine why differences exist in the moderating effects of coping between males and females.

In conclusion, the current study found significant relationships between reported sleep quality and coping, and sleep quality and well-being, but no direction of causality.

This initial examination of the moderating effects of coping on the relationship between sleep quality and well-being found mixed results. Hence, it is clear that although this study certainly contributed to the body of knowledge regarding these relationships, much more work in this area is required to garner a comprehensive understanding.

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APPENDIX A

INTSTITUTIONAL REVIEW BOARD APPROVAL

LOUISIANA TECH
UNIVERSITY

OFFICE OF UNIVERSITY RESEARCH

MEMORANDUM

TO: Dr. Cathy Alison Word

FROM: Elizabeth Womack, University Research

SUBJECT: HUMAN USE COMMITTEE REVIEW

DATE: 7/25/05

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

"Sleep Quality of College Students and Its Relationship to Coping Styles and Well-Being"
HUC-186

The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. This approval was finalized on July 25, 2005 and this project will need to receive a continuation review by the IRB if the project, including data analysis, continues beyond July 25, 2006. Any discrepancies in procedure or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the

conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

If you have any questions, please contact Dr. Mary Livingston at 257-4315.

APPENDIX B

HUMAN SUBJECTS CONSENT FORM

HUMAN SUBJECTS CONSENT FORM

The following is a brief summary of the project in which you are asked to participate. Please read this information before signing the statement below.

TITLE OF STUDY: Sleep quality of college students and its relationship to coping styles and well-being.

PURPOSE OF STUDY: To explore the relationships between sleep quality, coping styles, and well-being.

PROCEDURE: In this study, you will be asked to complete a demographics questionnaire as well as 4 surveys designed to assess your attitudes, feelings, beliefs, behaviors, and personality characteristics.

INSTRUMENTS: The Sleep Quality Index (SQI), Pittsburgh Sleep Quality Index (PSQI), Coping Styles Questionnaire (CSQ), General Well-Being Schedule (GWBS), and a brief demographics questionnaire.

RISKS/ALTERNATIVE TREATMENTS: None.

BENEFITS/COMPENSATION: There will be no benefits or compensation for participants.

I, _____, attest with my signature that I have read and understood the following description of the study, "Sleep quality of college students and its relationship to coping styles and well-being", and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate in this study will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive any of my rights related to participating in this study.

_____ _____

Signature of Participant or Guardian Date

CONTACT INFORMATION: The principal experimenters listed below may be reached to answer questions about the research, subjects' rights, or related matters.

Cathy Alison Word, M. A., Principal Investigator (318) 288-2116, psych2006@hotmail.com
Walter C. Buboltz, Jr., Ph.D., Dissertation Chair (318) 257-4315

Members of the Human Use Committee of Louisiana Tech University may also be contacted if a problem cannot be discussed with experimenters:

Dr. Les Guice (257-4647)
Dr. Mary M. Livingston (257-2292)
Stephanie Herrmann (257-5075)

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

Demographic Questionnaire

Please provide the following information by filing in the blank or circling the appropriate answer.

A. Age in years_____

B. Gender M F

C. Current year/status in school? Freshman Sophomore Junior Senior Graduate Student Other

D. With which ethnic group do you **most** identify?

1. African American 2. Asian American 3. Caucasian American

4. Hispanic/Latino 5. Native American 6. Other

E. Current Major (if any) or

Undecided_____

F. Grade Point Average (G.P.A.) for the last year of school you completed

_____

G. ACT/SAT score _____

H. Marital status Single Married Divorced Remarried Widowed

I. Parents' marital status Single Married Divorced Remarried Widowed

J. Number of siblings ____

K. My hometown was directly impacted by Hurricane Katrina:

1. Not at all 2. Somewhat 3. Moderately 4. Quite a bit 5. Totally devastated

APPENDIX D

SLEEP QUALITY INDEX

Sleep Quality Index

Please answer the following questions to the best of your ability by circling the response that best fits you. If unsure, please give your best guess.

1. Time to fall asleep.

   <10 min 11-30 min >30 min

2. Suffered from insomnia during the past 3 months

   No < 3 days/week 3-7 days/week

3. Difficulties falling asleep during the past 3 months

   No < 3 days/week 3-7 days/week

4. Disturbed night sleep during the past 3 months

   No <3 days/week 3-7 days/week

5. Nocturnal awakenings during the past 3 months

   No <3 days/week 3-7 days/week

6. Tiredness in the morning

   Very or Mostly Alert Don't Know Very or Mostly Tired

7. Wake up too early in the morning during the past 3 months

   No <3 days/week 3-7 days/week

8. Use of sleeping medication during the past 3 months

   No Occasionally At least once per week

APPENDIX E

PITTSBURGH SLEEP QUALITY INDEX

Pittsburgh Sleep Quality Index

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

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

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

3. During the past month, when have you usually gotten up in the morning? _____

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

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

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

(a) Cannot get to sleep within 30 minutes

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

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

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(c) Have to get up to use the bathroom

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(d) Cannot breathe comfortably

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(e) Cough or snore loudly

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(f) Feel too cold

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(g) Feel too hot

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(h) Had bad dreams

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(i) Have pain

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

(j) Other reason(s), please describe _____

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

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

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

Very good _____
Fairly good _____
Fairly bad _____
Very bad _____

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

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

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

Not during the Past month ___	Less than once a week ___	Once or twice a week ___	Three or more times a week ___

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

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

APPENDIX F

COPING STYLES QUESTIONNAIRE

Coping Styles Questionnaire

***Instructions:** Although people may react in different ways to different situations, we all tend to have a characteristic way of dealing with things which upset us. How would you describe the way you typically react to stress? Circle Always (A), Often (O), Sometimes (S), or Never (N) for each item below:

	Always	Often	Sometimes	Never
1. Feel overpowered and at the mercy of the situation.	A	O	S	N
2. Work out a plan for dealing with what has happened.	A	O	S	N
3. See the situation for what it actually is and nothing more.	A	O	S	N
4. See the problem as something separate from myself so I can deal with it.	A	O	S	N
5. Become miserable or depressed.	A	O	S	N
6. Feel that no one understands.	A	O	S	N
7. Stop doing hobbies or interest.	A	O	S	N
8. Do not see the problem or situation as a threat.	A	O	S	N
9. Try to find the positive side to the situation.	A	O	S	N
10. Become lonely or isolated.	A	O	S	N
11. Daydream about times in the past when things were better.	A	O	S	N
12. Take action to change things.	A	O	S	N
13. Have presence of mind when dealing with the problem or circumstances.	A	O	S	N
14. Avoid family or friends in general.	A	O	S	N
15. Feel helpless--there's nothing you can do about it.	A	O	S	N
16. Try to find out more information to help make a decision about things.	A	O	S	N
17. Keep things to myself and not let others know how bad things are for me.	A	O	S	N
18. Think about how someone I respect would handle the situation and try to do the same.	A	O	S	N
19. Feel independent of circumstances.	A	O	S	N
20. Sit tight and hope it all goes away.	A	O	S	N
21. Take my frustration out on the people closest to me.	A	O	S	N
22. 'Distance' myself so I don't have to make any decision about the situation.	A	O	S	N
23. Resolve the issue by not becoming identified with it.	A	O	S	N
24. Assess myself or the problem without getting emotional.	A	O	S	N
25. Cry, or feel like crying.	A	O	S	N
26. Try to see things from the other person's point of view.	A	O	S	N
27. Respond neutrally to the problem.	A	O	S	N
28. Pretend there's nothing the matter, even if people ask what's bothering me.	A	O	S	N
29. Get things into proportion---nothing is really that important.	A	O	S	N
30. Keep reminding myself about the good things about myself.	A	O	S	N
31. Feel that time will sort things out.	A	O	S	N
32. Feel completely clear-headed about the whole thing.	A	O	S	N
33. Try to keep a sense of humor---laugh at myself or the situation.	A	O	S	N
34. Keep thinking it over in the hope that it will go away.	A	O	S	N
35. Believe that I can cope with most things with the minimum of fuss.	A	O	S	N

	Always	Often	Sometimes	Never
36. Try not to let my heart rule my head.	A	O	S	N
37. Eat more (or less) than usual.	A	O	S	N
38. Daydream about things getting better in the future.	A	O	S	N
39. Try to find a logical way of explaining the problem.	A	O	S	N
40. Decide it's useless to get upset and just get on with things.	A	O	S	N
41. Feel worthless and unimportant.	A	O	S	N
42. Trust in fate---that things have a way of working out for the best.	A	O	S	N
43. Use my past experience to try to deal with the situation.	A	O	S	N
44. Try to forget the whole thing.	A	O	S	N
45. Just take nothing personally.	A	O	S	N
46. Become irritable or angry.	A	O	S	N
47. Just give the situation my full attention.	A	O	S	N
48. Just take one step at a time.	A	O	S	N
49. Criticize or blame myself.	A	O	S	N
50. Simply and quickly disregard all irrelevant information.	A	O	S	N
51. Pray that things will just change.	A	O	S	N
52. Think or talk about the problem as if it did not belong to me.	A	O	S	N
53. Talk about it as little as possible.	A	O	S	N
54. Prepare myself for the worst possible outcome.	A	O	S	N
55. Feel completely calm in the face of any adversity.	A	O	S	N
56. Look for sympathy and understanding from people.	A	O	S	N
57. See the thing as a challenge that must be met.	A	O	S	N
58. Be realistic in my approach to the situation.	A	O	S	N
59. Try to think about or do something else.	A	O	S	N
60. Do something that will make me feel better.	A	O	S	N

APPENDIX G

GENERAL WELL-BEING SCHEDULE

General Well-Being Schedule

Instructions: This section contains questions about how you feel and how things have been going with you. For each question, circle the appropriate number that best applies to you.

1. How have you been feeling in general? (DURING THE PAST MONTH)	1	In excellent spits
	2	In very good spirits
	3	In good spirits mostly
	4	I have been up and down in spirits a lot
	5	In low spirits mostly
	6	In very low spirits
2. Have you been bothered by nervousness or your "nerves"? (DURING THE PAST MONTH)	1	Extremely so---to the point where I could not work or take care of things
	2	Very much so
	3	Quite a bit
	4	Some---enough to bother me
	5	A little
	6	Not at all
3. Have you been in firm control of your behavior, thoughts, emotions, OR feelings? (DURING THE PAST MONTH)	1	Yes, definitely so
	2	Yes, for the most part
	3	Generally so
	4	Not too well
	5	No, and I am somewhat disturbed
	6	No, and I am extremely disturbed
4. Have you felt so sad, discouraged, hopeless, or had so many problems that you wondered if anything was worthwhile? (DURING THE PAST MONTH)	1	Extremely so---to the point that I have just about given up
	2	Very much so
	3	Quite a bit
	4	Some---enough to bother me
	5	A little
	6	Not at all
5. Have you been under or felt you were under any stress, strain, or pressure? (DURING THE PAST MONTH)	1	Yes---almost more than I could bear or stand
	2	Yes---quite a bit of pressure
	3	Yes---some, more than usual
	4	Yes---some, but about usual
	5	Yes---a little
	6	Not at all
6. How happy, satisfied, or pleased have you been with your personal life? (DURING THE PAST MONTH)	1	Extremely happy---could not have been more satisfied or pleased
	2	Very Happy
	3	Fairly Happy
	4	Satisfied---pleased
	5	Somewhat dissatisfied
	6	Very dissatisfied
7. Have you had any reason to wonder if you wonder if you were losing your mind, or losing control over the way you act, talk, think, feel, or of your memory? (DURING THE PAST MONTH	1	Not at all
	2	Only a little
	3	Some---but not enough to be concerned or worried about
	4	Some and I have been a little concerned
	5	Some and I am quite concerned

For each of the four items below, note that the words at each end of the 0 to 10 scale describe opposite feelings. Circle any number along the scale that seems closest to how you have generally felt DURING THE PAST MONTH.

15. How concerned or worried about your HEALTH have you been? (DURING THE PAST MONTH)	0 Not concerned at all	1	2	3	4	5	6	7	8	9	10 Very concerned
16. How RELAXED or TENSE have you been? (DURING THE PAST MONTH)	0 Very Relaxed	1	2	3	4	5	6	7	8	9	10 Very Tense
17. How much ENERGY, PEP, & VITALITY have you felt? (DURING THE PAST MONTH)	0 No energy AT ALL listless	1	2	3	4	5	6	7	8	9	10 Very ENERGETIC dynamic
18. How DEPRESSED or CHEERFUL have you been? (DURING THE PAST MONTH)	0 Very Depressed	1	2	3	4	5	6	7	8	9	10 Very Cheerful