

2006

## Forgiveness and insomnia

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FORGIVENESS AND INSOMNIA

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In Partial Fulfillment of the Requirements for

The Degree

Master of the Arts in Clinical Psychology

By

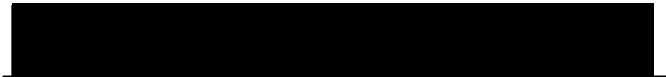
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## ABSTRACT

### FORGIVENESS AND INSOMNIA

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This study examined the relationship between forgiveness and insomnia. Participants ( $N = 97$ ) were recruited from introductory psychology classes at a medium-sized Midwestern Catholic university. Participants completed self-report questionnaires assessing forgiveness, insomnia, and negative affect. Specifically, the following questions were addressed: (1) How does forgiveness relate to insomnia? (2) Does negative affect and cognition mediate the relationship between forgiveness and insomnia? Results showed several relationships in the expected direction, with various aspects of forgiveness (i.e., Absence of Negative, Presence of Positive, Forgiveness Likelihood) having different correlates. There was also some evidence to support the hypothesis that negative affect and cognition may act as a mediator in the relationship between forgiveness and insomnia. Study limitations and clinical implications will be discussed.

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## CHAPTER 1

### INTRODUCTION

Insomnia is the most common sleep disorder (Vgontzas et al., 1998), and often has a negative impact in many areas of an individual's life (Drake, Roehs, & Roth, 2003; Thase, 2005). Research has shown that there are physiological (Hauri, 2000; Dauvilliers et al., 2005) and emotional factors that contribute to insomnia (Berger & Voderholzer, 2001; Harvey & Greenall, 2003). A cognitive process that contributes to both mental health problems and insomnia is rumination (Donaldson & Lam, 2004). Thus, coping strategies that help break the cycle of rumination, such as forgiveness, may help alleviate insomnia. Research has shown that forgiveness relates to decreased physiological distress (Huang & Enright, 2000), and improved mental health (Lin, Mack, Enright, Krahn, & Baskin, 2004). To our knowledge, no previous studies have examined the relationship between forgiveness and insomnia. Thus, this study will address the following questions: (1) How does forgiveness relate to insomnia? (2) Does negative affect/cognition mediate the relationship between forgiveness and insomnia?

A review of the literature will be organized in the following manner. First, an overview of insomnia will be presented including a discussion of the symptoms, prevalence, consequences, and possible causes. Next, a general conceptualization of forgiveness will be discussed with a focus on common misconceptions of forgiveness.

Particular attention will be paid to research examining the relationship between forgiveness and physical/mental health. Rumination will be proposed as a possible mediator between forgiveness and sleep quality. Finally, the present study will be discussed.

## Insomnia

### *Diagnostic Criteria*

According to the DSM-IV-TR, primary insomnia involves difficulty initiating or maintaining sleep, or experiencing nonrestorative sleep for at least one month (American Psychiatric Association, 2000). The sleep disturbance or resulting daytime fatigue must cause considerable distress or impairment in social, occupational, or other important areas of functioning (APA, 2000). Primary insomnia cannot occur solely during the course of another sleep related disorder, another mental disorder, or be due to the direct effects of a substance or a general medical condition (APA, 2000; Drake et al., 2003; Thase, 2005).

### *Types of Insomnia*

Four types of insomnia are described in the literature. One type involves delayed sleep onset or difficulty initiating sleep. A second type is intermittent wakefulness, which involves waking several times throughout the night and is often accompanied by having difficulty falling back to sleep. A third type is truncated sleep, which involves early awakening. A fourth type is called nonrestorative sleep, which occurs when an individual sleeps but feels the sleep is restless, light, or of poor quality. Individuals experiencing nonrestorative sleep do not exhibit delta waves, which are indicative of stage three and stage four sleep (APA, 2000; Drake et al., 2003; Thase, 2005).

### *Prevalence and Course*

Insomnia is the most common sleep disorder (Drake et al., 2003; Vgontzas et al., 1998). It is estimated that 30 to 45 percent of adults experience periods of insomnia in any given year (APA, 2000). Insomnia occurs in 1 to 10 percent of adolescents and up to 25 percent in the elderly (APA, 2000). Insomnia is more often found in women and with increasing age (APA, 2000; Bastien, Vallieres, & Morin, 2004). It usually begins either in young adulthood with the major complaint being difficulty falling asleep or in middle age with the significant complaint being difficulty in maintaining sleep (APA, 2000).

The course of insomnia can be classified as either acute or chronic. Acute insomnia lasts for a period of several months, and is often precipitated by a psychosocial or general medical stressor. Acute insomnia often disappears when the stressor ends or is resolved (APA, 2000; Thase, 2005). In contrast, chronic insomnia is characterized by sleep difficulty lasting for more than one year. Estimates suggest that 9 to 15 percent of adults experience chronic insomnia, and about 27 percent complain of occasional insomnia (Bastien et al., 2004). Research has found that 88.2 percent of patients with either acute or chronic insomnia continue to have sleep disturbances five years after the initial onset of the disorder, and 56 percent continue to experience sleep disturbances after 10 years (Chevalier et al., 1999; Mendelson, 1995).

### *Consequences of Insomnia*

Insomnia has a negative impact in many areas of an individual's life. For example, insomnia adversely affects work performance due in large part to decreased motivation, reduced concentration and disturbances in short-term memory (Leger, Guilleminault, Bader, Levy, & Paillard, 2002; Sateia & Nowell, 2004). These problems

can lead to lost productivity, work-related accidents, and absenteeism (Drake et al., 2003). People with insomnia also commonly report physical complaints such as headaches or gastrointestinal disturbances (Sateia & Nowell, 2004). Importantly, loss of sleep can diminish immune system functioning, which results in increased susceptibility to physical illness (Carney, Freedland, Miller, & Jaffe, 2002). Research has also found that individuals with insomnia are more likely to develop depression (Thase, 2005).

### *Possible Causes of Insomnia*

Research has identified a number of possible causes of insomnia. These include physiological causes (Hartmann, 1988), environmental factors (Vgontzas et al., 1998), substance use (Hauri, 2000), and mental health problems (Dauvilliers et al., 2005). Each of these will be briefly described below.

#### *Physiological Causes*

Several physiological factors contribute to the development of insomnia. For example, some individuals with insomnia experience hyperarousal, which involves increased nervous system sensitivity, high muscle tension, increased metabolic rates, and increased body temperature during both sleep and wakefulness (Hartmann, 1988; Hauri, 2000). Another common characteristic of individuals with hyperarousal is elevated slow brain wave activity, particularly in the right hemisphere (Hauri, 2000). This increased activity appears during wakefulness, sleep onset, and sleep (Hauri, 2000). Hyperarousal also involves an increase in sympathetic nervous system activity during non-REM sleep, particularly during slow-wave-sleep (Vgontzas et al., 1998). There is substantial evidence to support the genetic influence of hyperarousal, with heritability estimates averaging 50 percent (Dauvilliers et al., 2005).

Another possible physiological contributor to insomnia involves the disruption of circadian rhythms through hormonal imbalances (Hauri, 2000). For example, melatonin is a hormone that is secreted by the pineal gland and helps regulate the sleep-wake cycle. Melatonin is only released at night, and can be suppressed by exposure to light (Lowden, Akerstedt, & Wibom, 2004). Research suggests that there are decreased levels of melatonin in individuals with insomnia, which may disrupt the sleep-wake cycle (Kuhlwein, Hauger, & Irwin, 2003).

Circadian rhythms can also be disrupted when there is an imbalance of neurotransmitters (Hauri, 2000). For instance, one neuronal mechanism involved with sleep is the cholinergic system. Research suggests that individuals with insomnia often have increased levels of corticotrophin (Hauri, 2000). Research has also found insomnia to be associated with the hypersecretion of cortisol (Drake et al., 2003; Vgontzas et al., 1998). Cortisol secretion affects the hypothalamic-pituitary-adrenal (HPA) axis, which is involved in sleep regulation and hyperarousal (Rodenbeck et al., 2003).

### *Environmental Factors*

There are several environmental factors that can affect sleep (Hauri, 2000). For example, elevated temperature decreases slow-wave sleep and rapid eye movement (REM) sleep. Moreover, high temperatures increase wakefulness (Okamoto-Mizuno, Tsuzuki, Mizuno, & Iwaki, 2005). Extreme temperatures may be less of a problem during the initial stages of sleep than in later stages when REM sleep dominates (Okamoto-Mizuno et al., 2005). However, a drop in body temperature usually occurs when individuals become drowsy (Monk & Moline, 1989). Indeed, individuals with

insomnia tend to have higher body temperatures at night with less variability (Monk & Moline, 1989).

A change in the amount of light or noise an individual is accustomed to when going to sleep may interfere with his/her ability to fall asleep or stay asleep (Hauri, 2000). Similarly, individuals who sleep at irregular hours or lack relaxation time before going to bed often experience difficulties sleeping (Hauri, 2000). Research shows that establishing a routine before going to bed and maintaining regular sleep hours can help alleviate sleep difficulties (Hauri, 2000).

Classical conditioning can also contribute to insomnia. Previously neutral stimuli such as the bed, bedroom, and bedtime can become associated with the anxiety and frustration that accompany insomnia (Hauri, 2000). Consequently, in an attempt to reverse the conditioning, individuals with insomnia should only be in their beds when they are sleeping or having sex (Hauri, 2000). Thus, many experts recommend that people with insomnia should leave their bed when having trouble sleeping, and engage in other activities until becoming sleepy.

### *Substance Use*

Sleep may also be adversely affected by substance use. Stimulants, such as caffeine or nicotine, tend to increase sleep latency and awakenings after sleep onset (Hartmann, 1988). Research suggests that stimulants block adenosine reuptake, which leads to elevation of mood and increased energy (Hartmann, 1988). Depressants, such as alcohol, decrease physiological arousal and increase relaxation. In fact many individuals will use alcohol as a means to help them fall asleep (Hauri, 2000). Although alcohol may

increase sleepiness and decrease sleep latency, it produces significant increases in awakening from sleep and disturbances in sleep (Hartmann, 1988).

### *Mental Health Problems*

Research has found anxiety to be one of the most common precipitating factors of insomnia. Several studies have found the most common complaint of insomniacs to be unpleasant intrusive thoughts and excessive uncontrollable worry during the pre-sleep period (Harvey & Greenall, 2003). Anxiety relates to hyperarousal, which as noted earlier, is linked to insomnia (Bastien et al., 2004). In addition, research has also found that individuals are more likely to experience a panic attack at night which disrupts their sleep (Labbate, Pollack, Otto, & Langenauer, 1994).

Depression is another possible cause of insomnia. More than 90 percent of individuals experiencing depression have difficulty falling asleep (Riemann, Berger, & Voderholzer, 2001). According to Riemann and colleagues (2001), depressed patients exhibit impaired sleep continuity, reduction of slow-wave sleep, and disinhibited REM sleep. In addition, depressed patients have a supersensitive cholinergic system, which causes a dysregulation of REM sleep (Riemann et al., 2001). Moreover, insomnia patients report a greater frequency of negative life events, decreased coping skills, and lower self-esteem, which are highly correlated with depression (Bastien et al., 2004).

There is also evidence that sleep is often severely disrupted following exposure to a traumatic event (Harvey, Jones, & Schmidt, 2003). This is particularly true for individuals suffering from Post Traumatic Stress Disorder (PTSD). According to Green (1993), sleep disturbances are the most frequently endorsed symptom among traumatized populations, affecting almost 70 percent of individuals with PTSD. For example, North



and colleagues (1999) found that 70 percent of the Oklahoma City bombing survivors surveyed suffered from sleep disturbances and almost 50 percent had nightmares.

Similarly, after the 1995 earthquake in Japan, sleep disturbances were the most commonly reported symptom (Kato, Asukai, Miyake, Minakawa, & Nishiyama, 1996). Possible contributors to insomnia are nightmares and hyper-arousal associated with the traumatic event (Harvey et al., 2003; Zayfert, DeViva, & Mellman, 2004).

A cognitive process that may explain why anxiety, depression, and PTSD are linked to insomnia is rumination (Muris, Roelofs, Meesters, & Boomsma, 2004). Rumination plays an important role in anxiety disorders (Donaldson & Lam, 2004). For example, individuals with anxiety often complain of intrusive thoughts and excessive worry. Donaldson and Lam (2004) examined the relationship between rumination and mood. The study included 36 patients with major depression and 36 control subjects. The participants were randomly assigned to either a rumination or distraction induction condition. Levels of trait rumination were measured at baseline, and mood was measured before and after the inductions. Results showed that depressed patients with higher levels of rumination reported poorer mood. Rumination may also play a role in the maintenance of symptoms of PTSD. A study by Friedberg and colleagues (2005) found that individuals who report higher levels of rumination are more likely to experience increased stress and trauma symptoms. Rumination does not allow for emotional resolution of the negative event, and causes increased arousal that maintains the threat of a negative event (Friedberg et al., 2005).

Rumination also appears to play a role in insomnia (Harvey, 2002). According to Sateia and Nowell (2004), chronic insomnia “emanates from a cycle of progressively

disturbing and distorted cognitive precepts that reinforce and escalate the sleep disturbance” (p. 1962). The dearousal that normally takes place before sleep is interrupted by repetitive and intrusive negative cognitions (Sateia & Nowell, 2004). Similarly, Harvey and Greenall (2003) found a correlation between intrusive thoughts (e.g. catastrophizing cognitions), and sleep disturbances.

Given the role that rumination plays in insomnia and mental health problems such as anxiety, depression, and PTSD, it seems reasonable to hypothesize that any coping strategy that reduces rumination may improve both sleep problems and mental health. One strategy that may alleviate rumination, particularly after someone has experienced a transgression, is forgiveness.

## Forgiveness

### *Types of Forgiveness*

Forgiveness may be examined from multiple perspectives. To begin, one can seek forgiveness from others after committing a wrongdoing. One can also engage in intra-personal forgiveness, which involves forgiveness of one’s self (Maltby, Day, & Barber, 2004). Finally, one can pursue interpersonal forgiveness, which involves forgiving an offender (Maltby et al., 2004). Enright (1996) refers to these three types of forgiveness as the forgiveness triad. While each of these types of forgiveness is important, this study will focus exclusively on interpersonal forgiveness.

### *Definition of Interpersonal Forgiveness*

Several definitions of interpersonal forgiveness have been offered. Most definitions suggest that forgiveness is a complex process that involves letting go of negative emotions toward an offender. However, there is not agreement as to whether

forgiveness necessarily involves cultivating positive emotions toward an offender (Rye et al., 2001). According to Zechmeister and Romero (2002), individual experiences of forgiveness may be different from the theoretical conceptualizations, which contribute to the difficulty in developing a universal definition. The present study defines interpersonal forgiveness as “the willingness to discard one’s right to resentment, negative judgment and indifferent behavior toward one who has unfairly wronged us while promoting unwarranted qualities of sympathy, generosity and love towards the offender” (Enright & North, 1998, p. 46).

#### *What Forgiveness is Not*

While there is some disagreement about the definition of forgiveness, there is greater consensus regarding what forgiveness is not (McCullough, Pargament, & Thoresen, 2000). For example, many social scientists agree that forgiveness does not require reconciliation (Brown, 2003). Reconciliation, which involves reestablishing a relationship with an offender, requires two parties to work together to resolve differences (Enright, 1992). To be successful, reconciliation requires the restoration of trust in a relationship where trust has been violated (Worthington, 2001). In contrast, forgiveness does not require any action by the offender (Enright, 2001). In some cases, forgiveness is one step towards reconciliation (Enright, 2001). However, it is sometimes unwise or dangerous to reestablish a relationship with an offender. For example, a victim of domestic violence may choose to forgive while refusing to get back together with a person who may cause future harm.

Furthermore, forgiveness is not the same as condoning, pardoning, or forgetting (Enright & Fitzgibbons, 2002). Forgiveness differs from condoning because condoning

implies that there was no real injury in the first place (Freedman & Enright, 1996). In contrast, forgiveness involves recognizing that a mental or physical injury occurred. According to Enright and North (1998), it is not the wrong that is annulled in forgiveness; it is the distorting effect that the wrong has upon one's relations with the wrongdoer. Forgiveness also differs from legal pardon in that forgiveness does not excuse a transgression (Enright & North, 1998). In fact, Freedman and Enright (1996) noted that it is possible to forgive and still pursue justice through the legal system. Moreover, forgiveness is not the same as forgetting a wrong was committed (Enright, 2001). If one could forget the wrongdoing occurred there would be no need to forgive. Forgiveness may involve focusing less on distressful memories about the offense and focusing more on other aspects of the wrongdoing (e.g. personal growth that occurred following the wrongdoing) (Enright, 2001).

### Forgiveness and Insomnia

To our knowledge this is the first study to examine the relationship between forgiveness and insomnia. Consequently, elaborate theories as to why these constructs might be related do not yet exist in the literature. However, research has examined how forgiveness relates to physical and emotional distress. As noted earlier, physical and emotional distress are common precipitating factors of insomnia.

### *Forgiveness and Physical Distress*

Several studies have examined the effects of forgiveness and unforgiveness on physiological well-being. For example, Lawler and colleagues (2003) monitored the psychophysiological responses of college students ( $N = 108$ ) who were interviewed about times they experienced interpersonal betrayal (Lawler et al., 2003). Measures of the

participants' blood pressure, heart rate, electromyography (EMG), and skin conductance were recorded during baseline, interviews, and recovery periods (Lawler et al., 2003). Results showed that forgiveness was associated with lower blood pressure, lower heart rate, and decreased EMG reactivity (Lawler et al., 2003). Lawler and her colleagues (2003) concluded that interpersonal forgiveness was associated with decreased cardiovascular reactivity and therefore may be beneficial to an individual's health.

Similarly, Huang and Enright (2000) examined the blood pressure of adults in Taiwan ( $N = 1,427$ ) during and immediately following their verbal description of an incident of deep interpersonal hurt (Huang & Enright, 2000). Dependent measures included self-reported physiological arousal, change in facial expressions, eye contact, and blood pressure (Huang & Enright, 2000). Results showed that the participants' blood pressure significantly increased when they recalled an interpersonal hurt (Huang & Enright, 2000). There was also a significant decrease of eye contact and an increase of masking or phony smiles during the recall of interpersonal hurt (Huang & Enright, 2000). Huang and Enright (2000) concluded that offering forgiveness when the individual is ready may reverse these unwanted physical effects.

A third study conducted by Witvliet, Ludwig, and Vander Laan (2001) examined emotional and physiological reactions that occurred when participants (35 females, 36 males) reflected on a personally experienced transgression in both forgiving and unforgiving ways. The researchers used a repeated measures approach to examine facial and autonomic reactivity (heart rate, blood pressure, skin conductance, and electromyography) at both baseline and after the memories were recalled. Results showed that unforgiving reflection produced more negative emotions and significantly

higher arousal as recorded by the EMG, skin conductance and heart rate test. However, forgiving reflections produced lower physiological stress responses (Witvliet et al., 2001).

Despite the supportive conclusions of these studies, there were a few limitations that should be mentioned. In the study by Lawler and colleagues (2003) there was no direct measure of emotional feelings of resentment toward the offender. Also, the results only show a “snapshot” of what the participants were feeling at that time. The study did not look at the development of forgiveness over time. In the study by Huang and Enright (2000) the researchers did not assess the degree of the negative affect reported by the participants. In addition, not all levels of Enright’s forgiveness model were assessed.

Taken together these studies demonstrate a connection between forgiveness and decreased physiological arousal. As noted previously, physiological arousal is a contributor to insomnia. Thus, it is possible that forgiveness aids sleeping in part by decreasing physiological arousal. Another way forgiveness could reduce insomnia is by reducing emotional distress such as anxiety and depression.

#### *Forgiveness and Negative Affect/Cognition*

Several correlational studies have investigated the relationship between forgiveness and both anxiety and depression. For example, Hope and Fitzgibbons (1987) assessed depression and anxiety before and after participants forgave an offender. Results found that forgiveness of an offender related to decreased depression and anxiety (Hope & Fitzgibbons, 1987). Similarly, Mauger and colleagues (1992), using a sample of outpatient clients at a Christian counseling center found that low levels of forgiveness were related to higher levels of depression and anxiety (Mauger et al., 1992).

Several intervention studies using experimental designs have also examined the relationship between forgiveness, and depression and anxiety. For example, Freedman and Enright (1996) studied the effects of a forgiveness intervention on female incest survivors ( $N = 12$ ). Participants were randomly divided into two groups (i.e., forgiveness intervention group and a wait-listed control group) and were assessed on a variety of measures including anxiety and depression. The women in the forgiveness intervention group were treated with individual forgiveness therapy once a week, and treatment was terminated once forgiveness was granted. Compared to wait-listed participants, the treated women showed increased hope and greater decreases in anxiety and depression (Freedman & Enright, 1996). A one-year follow-up showed the continued benefit of the forgiveness treatment (Freedman & Enright, 1996). Once the control group received the intervention, the decreases in depression and anxiety were replicated (Freedman & Enright, 1996).

In 1997, Coyle and Enright evaluated a forgiveness intervention for men hurt by their partner's decision to have an abortion. Participants ( $N = 10$ ) were randomly assigned to either a forgiveness intervention group or a wait listed control group (Coyle & Enright, 1997). The intervention lasted for twelve weeks and included one to one forgiveness therapy. Forgiveness and mental health measures were given to both groups before and after the intervention period. Results showed a significant increase in forgiveness and decrease in anxiety for the intervention group (Coyle & Enright, 1997). Once participants in the control group received the forgiveness therapy intervention, they also showed significant increases in forgiveness and decreases in anxiety (Coyle &

Enright, 1997). Follow-up examinations showed that both groups maintained treatment gains.

A study by Lin, Mack, Enright, Krahn, and Baskin (2004) examined forgiveness among substance dependent patients ( $N = 14$ ) at a residential treatment facility. The patients were divided into two groups; a forgiveness therapy group that met twice per week, and a drug and alcohol therapy group that also met twice per week. Several measures were administered before and after the six-week treatment including measures of anxiety and depression. The forgiveness therapy group demonstrated more improvement in both depression and anxiety than the drug and alcohol therapy group. These results were maintained at a four-month follow-up assessment.

There were a few limitations of these studies that should be mentioned. First, each of the studies used a small sample. Replication of the results of each of these studies is needed. Some of these studies were prone to experimenter effects due to the fact that the experimenter was also the person who facilitated the interventions. Also, without a components analysis, it is difficult to tell whether improvement was due to forgiveness or nonspecific effects of therapy.

In spite of these limitations, studies using both correlational and experimental designs have shown that forgiveness of others relates to improved physical and mental health. It seems reasonable to hypothesize, then, that forgiveness may also relate to improved sleep. Another proposed mechanism for how forgiveness might improve sleep is by reducing rumination.



*Unforgiveness, Rumination, and Insomnia*

Unforgiveness may contribute to insomnia through rumination. Rumination in regards to unforgiveness involves mental replaying of the transgression, the motives of the transgressor, or the consequences of the transgression (Worthington, 2001). Rumination is a repetitive and intrusive cognitive pattern, which interferes with a person's ability to forgive due to active suppression of positive thoughts (Donaldson & Lam, 2004; McCullough, Bellah, Kilpatrick, & Johnson, 2001; Muris et al., 2004; Siegle, Moore, & Thase, 2004). Rumination following a transgression likely contributes to negative affect. According to Nolen-Hoeksema (1993), ruminative responses result in longer lasting and more severe episodes of low mood. As rumination continues, negative thinking becomes more intense, appraisals of problem situations become more distorted and ability to select adaptive solutions decreases (Donaldson & Lam, 2004). The resulting decreases likely have an adverse effect on sleep quality.

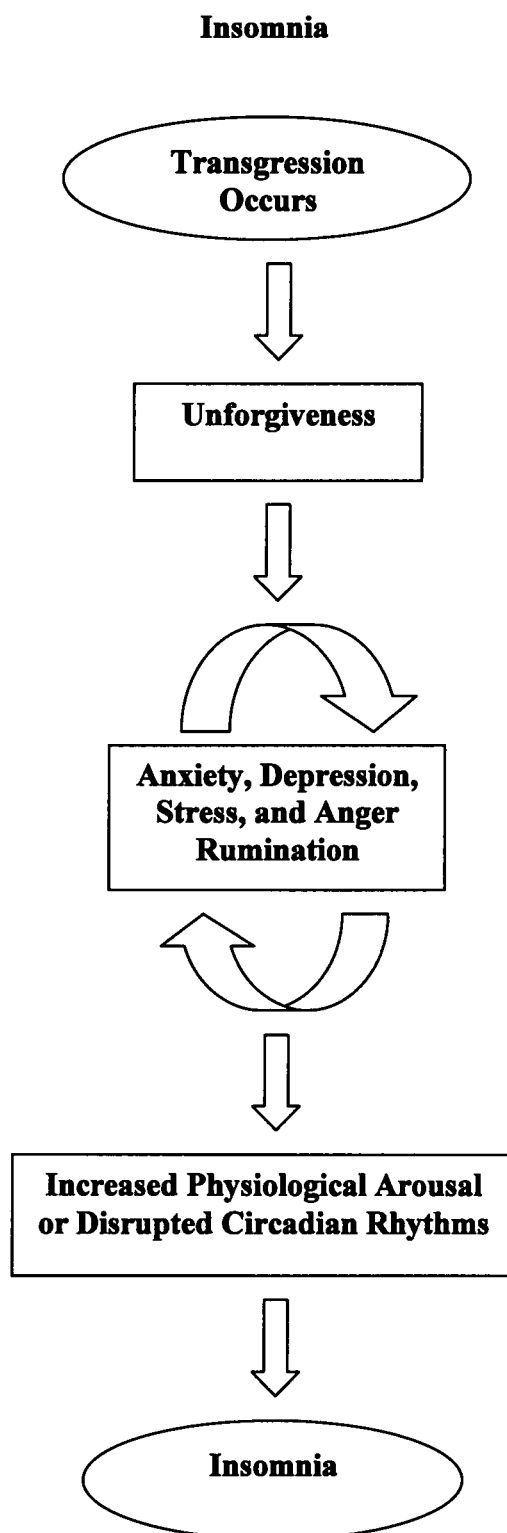
The theoretical model for the present study is illustrated in figure 1. Once a transgression occurs, the victim can choose to either forgive or not forgive the offender. If unforgiveness occurs, the victim is likely to experience anger rumination about the transgression, and an increase in anxiety, stress, and/or depression. The cycle of anger rumination, and feelings of anxiety, stress, and depression will likely disrupt sleep by increasing physiological arousal, and/or disrupting circadian rhythms.

*Present Study*

The present study examined the relationship between forgiveness of others and sleep. Two main questions are addressed. First, how does forgiveness relate to sleep? It is hypothesized that both state and trait forgiveness will be negatively

correlated with various aspects of insomnia. Second, does negative affect and cognition (i.e, anxiety, depression, stress, and anger rumination) mediate the relationship between forgiveness and sleep? It is hypothesized that negative affect and cognition will act as a mediator in the relationship between forgiveness and sleep.

**Figure 1. Theoretical Model of Unforgiveness, Negative Affect and Cognition, and**



## CHAPTER 2

### METHOD

#### *Participants*

The participants for the study were 97 undergraduate psychology students from a medium-sized Midwestern Catholic university (see Table 1). Most of the participants were female (63.9 %) and Caucasian (93.8 %). The other self-identified races represented in the sample included Latino/a (2.0 %), Asian/Pacific Islander (2.0 %), American Indian (1.0 %), and African American (1.0 %). Participants ages ranged from 18 to 22 ( $M = 18.9$ ,  $SD = 1.0$ ). Most of the participants were in their first year (67 %) or second year (20.6 %) of college. The majority of participants lived in a campus dormitory (75.3 %) or a campus owned house/apartment (16.5 %). Other participants lived off-campus (5.2 %), with their parents (2.1 %), or had some other living arrangement (1.0 %).

Participants completed a number of background questions regarding their sleep environment (see Table 1). Commonly endorsed sleep disorders included Nightmares (13.4 %), Insomnia (12.4 %), Restless Leg Syndrome (7.2 %), and Sleep Walking (6.2 %). Substance use of the participants was also examined. The number of times females reported binge drinking (i.e., four or more drinks in one sitting) in the previous two

Table 1

*Demographic/Background Characteristics of Participants*

Variable	<i>n</i>	(%)	<i>Mean</i>	<i>SD</i>
Age (range = 18 to 22)			18.94	1.00
Gender				
Male	35	(36.1)		
Female	62	(63.9)		
Year in School				
Freshman	65	(67.0)		
Sophomore	20	(20.6)		
Junior	9	(9.3)		
Senior	2	(2.1)		
Other	1	(1.0)		
Race				
Caucasian	91	(93.8)		
American Indian	1	(1.0)		
Asian/Pacific Islander	2	(2.0)		
African American	1	(1.0)		
Latino/a	2	(2.0)		
Living Situation				
Campus Dormitory	73	(75.3)		
UD Owned House/Apartment	16	(16.5)		
Off-Campus House/ Apartment	5	(5.2)		
Live with Parents	2	(2.1)		
Other	1	(1.0)		
Number of Roommates (range = 0 to 5)			1.69	1.27
Sleep Interference			1.89	1.18
Range: 0 (Not at All) to 4 (Very Much)				
Noise Level			1.48	1.03
Range: 0 (Not at All) to 4 (Very Much)				

Table 1 (cont'd)

*Demographic/Background Characteristics of Participants*

Variable	<i>n</i>	(%)	<i>Mean</i>	<i>SD</i>
Substance Use				
Range: 0 (Never) to 4 (Almost Every Day)				
Alcohol			1.85	1.12
Caffeine			2.19	1.33
Nicotine			.46	1.02
Binge Drinking in Past 2 Weeks				
Male (range = 0 to 10)	35		2.86	2.52
Female (range = 0 to 9)	62		2.47	2.44
Drink Totals				
Thursday (range = 0 to 12)			1.30	2.81
Friday (range = 0 to 16)			3.72	4.75
Saturday (range = 0 to 20)			4.88	4.93
Total (range = 0 to 41)			9.90	10.22
Common Sleep Disorders				
Insomnia	12	(12.4)		
Narcolepsy	1	(1.0)		
Sleep Apnea	1	(1.0)		
Sleep Walking	6	(6.2)		
Nightmares	13	(13.4)		
Sleep Terrors	4	(4.1)		
Restless Leg Syndrome	7	(7.2)		
Other	4	(4.1)		

weeks ranged from 0 to 9 ( $M = 2.47$ ,  $SD = 2.44$ ). The males reported binge drinking (i.e., 5 or more drinks in one sitting) in the past two weeks between 0 and 10 times ( $M = 2.86$ ,  $SD = 2.52$ ). The total number of drinks reportedly consumed for both females and males over a three day period ranged from 0 to 41 ( $M = 9.90$ ,  $SD = 10.22$ ).

Participants were asked to think about a person who had wronged them in the past. Participants reported that their relationship to the offender was as follows: a friend (41.2 %), a romantic partner (35.1 %), a family member (13.4 %), an acquaintance (7.2 %), or a stranger (3.1 %) (see Table 2). The nature of the offenses reported were as follows: being lied to (71.1 %), failed obligation (69.1 %), being called names/or recipient of unkind words (50.5 %), gossip (32.0 %), being cheated on (20.6 %), being stolen from (15.5 %), physical harm (9.3 %), and other (33.0 %) (see Table 3). The percentages add to more than 100 % because the participants often endorsed more than one offense. For additional information concerning the nature of the offense refer to Table 2.

### *Measures*

Participants completed several self-report questionnaires including measures of demographic/background information, forgiveness (Forgiveness Scale and Forgiveness Likelihood Scale), insomnia (The Pittsburgh Sleep Quality Index), and negative affect and cognition (Depression Anxiety Stress Scale and Anger Rumination Scale). These measures are described below.

#### *Demographic/Background Information*

A questionnaire on demographic information was completed by each participant. Questions included items relating to age, gender, race, educational level, and sleep

Table 2

*Nature of the Offense Background Variables*

Variable	<i>n</i>	(%)	<i>Mean</i>	<i>SD</i>
Nature of Offense				
Relationship to Person				
Romantic Partner	34	(35.1)		
Friend	40	(41.2)		
Family Member/Relative	13	(13.4)		
Acquaintance	7	(7.2)		
Stranger	3	(3.1)		
Amount of Time Since Offense			1.31	2.03
Hurt Now				
Range = 0 (not at all) to 4 (very much)			2.25	.96
Offense Severity				
Range = 0 (not at all) to 4 (very much)			2.81	.81
Angry Now				
Range = 0 (not at all) to 4 (very much)			1.93	.88



Table 3

*Nature of the Offense*

Offense	<i>n</i>	(%)
Lied	69	(71.1)
Failed Obligation	67	(69.1)
Called Names/Unkind	49	(50.5)
Other	32	(33.0)
Gossip	31	(32.0)
Cheated	20	(20.6)
Stole	15	(15.5)
Physical Harm	9	(9.3)

*Note.* Percentages add to more than 100% because participants were able to endorse more than one offense.

environment (Appendix A). In addition, the participants self-reported use and/or abuse of alcohol and other substances such as caffeine or nicotine was assessed (Appendix A).

The participants completed several questions concerning the nature of a wrongdoing they have experienced, their relationship to the offender, how long ago it occurred, how angry or hurt they are now, and the severity of the offense (Appendix B).

### *Forgiveness*

*Forgiveness Scale.* The Forgiveness Scale was used to measure forgiveness toward a particular offender (Rye et al., 2000; Appendix C). Participants were instructed to think about how they have responded to a person who wronged them. They then rated their level of agreement on 15 Likert-type items, with response possibilities ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Factor analysis revealed the presence of two subscales (Rye et al., 2000). The Absence of Negative factor includes 10 items and measures the degree to which a person experiences negative thoughts, feelings, and behaviors toward the offender. A sample question is, "I feel resentful toward the person who wronged me." The Presence of Positive factor contains five items relating to the presence of positive thoughts, feelings, and behaviors toward the offender. A sample question on this subscale is, "I have compassion for the person who wronged me."

Cronbach's alpha was adequate for Absence of Negative (.86), Presence of Positive (.85), and the total scale (.87) (Rye et al., 2001). The test-retest reliability for both these subscales over an average of 15.2 days was .76, and .80 for the entire scale. The subscales were significantly correlated with Enright's Forgiveness Inventory (Absence of Negative,  $r = .52, p < .001$ ; Presence of Positive,  $r = .75, p < .001$ ) and a global forgiveness item from the Enright Forgiveness Inventory (Absence of Negative,

$r = .60, p < .001$ ; Presence of Positive,  $r = .53, p < .001$ ). In addition, this scale was correlated in the expected direction with several other constructs. The Absence of Negative subscale was significantly correlated with state anger ( $r = -.41$ ), trait anger ( $r = -.34$ ), hope ( $r = .35$ ), and spiritual well-being ( $r = .40$ ). The Presence of Positive subscale was significantly correlated with state anger ( $r = -.13$ ), trait anger ( $r = -.21$ ), hope ( $r = .11$ ), and spiritual well-being ( $r = .30$ ) (Rye et al., 2000). Scores on the Absence of Negative subscale can range from 10 to 50, while scores on the Presence of Positive subscale can range from 5 to 25. Higher scores on each subscale reflect higher levels of forgiveness. Cronbach's alphas for this study were .88 for Absence of Negative and .83 for Presence of Positive.

*Forgiveness Likelihood Scale.* The Forgiveness Likelihood Scale examines the general tendency or willingness of a person to forgive an offender (Rye et al., 2000; Appendix D). The scale consists of ten items that describe hypothetical acts of wrongdoing, and asks the respondent how likely they would be to forgive the wrongdoer. The items use a Likert-type format, with response possibilities ranging from 1 (*not at all likely*) to 5 (*extremely likely*). Sample items include "A friend borrows your most valued possession, and then loses it. The friend refuses to replace it. What is the likelihood you would choose to forgive your friend?" and "Your significant other has a 'one night stand' and becomes sexually involved with someone else. What is the likelihood that you would choose to forgive your significant other?"

A factor analysis demonstrated that a one-factor solution was the most appropriate. Cronbach's alpha was .85 and the test-retest reliability over an average of 15.2 days was .81. This scale was significantly correlated with the Enright Forgiveness

Table 4

*Means and Standard Deviations for Study Variables*

	Possible Range	Mean	SD
<u>Sleep Measure</u>			
Subjective Sleep Quality	(0 to 3)	1.20	.55
Sleep Latency	(0 to 3)	1.15	.87
Sleep Duration	(0 to 3)	.85	.78
Habitual Sleep Efficiency	(0 to 3)	.37	.74
Sleep Disturbance	(0 to 3)	1.15	.42
Use of Sleep Medication	(0 to 3)	.32	.67
Daytime Dysfunction	(0 to 3)	1.14	.65
<u>Forgiveness Measures</u>			
Absence of Negative Emotions	(1 to 50)	38.00	8.04
Presence of Positive Emotions	(1 to 25)	16.51	4.74
Forgiveness Likelihood	(1 to 50)	26.68	6.65
<u>Negative Affect/Cognition Measures</u>			
Depression	(0 to 42)	7.24	7.16
Anxiety	(0 to 42)	6.06	4.87
Stress	(0 to 42)	12.18	7.71
Anger Rumination	(1 to 76)	38.10	11.11

Inventory ( $r = .25, p < .001$ ) and a global forgiveness item from the Enright Forgiveness Inventory ( $r = .23, p < .001$ ). The Forgiveness Likelihood Scale was also significantly correlated with other constructs including trait anger ( $r = -.31$ ), religious well-being ( $r = .23$ ), and social desirability ( $r = .17$ ). Scores on this scale range from 10 to 50 with higher scores reflecting an increased willingness to forgive. Cronbach's alpha in this study was .84.

### *Insomnia*

*Pittsburgh Sleep Quality Index.* The Pittsburgh Sleep Quality Index (PSQI) is a self-report questionnaire that measures sleep quality and disturbances over a one-month time interval (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Appendix E). The roommate/partner portion of the questionnaire was not used. A factor analysis produced seven components included in the overall global score of sleep quality. These seven components include subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. Sample questions include "During the past month, how long [in minutes] does it usually take you to fall asleep each night?" and "During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?"

The Cronbach's alpha for the total scale was .83 (Buysse et al., 1989). The test-retest reliability for the total scale was .85. The comparison of scores obtained from a polysomnography to the PSQI was used to assess the validity of the PSQI. Results showed that there were no significant differences in estimates of sleep latency (Buysse et al., 1989). Items were scored according to the instructions provided by Buysse and colleagues (1989). The component scores were analyzed separately in this study because

the researchers wanted to examine whether forgiveness related differentially to various aspects of insomnia. No Cronbach's alphas were computed because several components consisted of single items and others were scored using values assigned in the scale instructions. Scores on each component can range from 0 to 3 with higher scores indicating worse sleep quality.

### *Negative Affect and Cognition*

*Depression Anxiety Stress Scale.* Depression, anxiety, and stress were measured with the Depression Anxiety Stress Scale (DASS) (Lovibond & Lovibond, 1995; Appendix F). This scale consists of 42 self-rated Likert-type items, with response possibilities ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). There are three subscales in this measure. The depression subscale contains items pertaining to hopelessness, lack of involvement or interest, devaluation of life, and self-criticism. Sample items include "I couldn't seem to experience any positive feelings at all," and "I just couldn't seem to get going." The anxiety subscale examines autonomic arousal, situational anxiety, and skeletal muscle effects. Sample items include "I was aware of dryness in my mouth," and "I had a feeling of shakiness." Finally, the stress subscale contained items that examined sensitivity to levels of chronic non-specific arousal, difficulty relaxing, and being upset or agitated. Sample items include "I found myself getting upset by quite trivial things," and "I found it difficult to relax."

Cronbach's alphas were acceptable for each of the subscales (depression = .91, anxiety = .84, stress = .90). The anxiety subscale of the DASS was highly correlated with the Beck Anxiety Inventory ( $r = .81, p < .05$ ), and the depression subscale was strongly correlated with the Beck Depression Inventory ( $r = .74, p < .05$ ) (Lovibond &

Lovibond, 1995). Scores on the depression and stress subscales can range from 0 to 42. Scores on the anxiety subscale can range from 0 to 39. One item was deleted from this subscale in order to improve the Cronbach's alpha. Higher scores reflect higher levels of depression, anxiety, and stress. In this study, Cronbach's alphas were as follows: Depression = .93, Anxiety = .79, and Stress = .91.

*Anger Rumination Scale.* The Anger Rumination Scale (ARS) measures an individual's tendency to focus attention on angry moods, recall past anger experiences, and think about the causes and consequences of anger episodes (Sukhodolsky, Golub, & Cromwell, 2000, Appendix G). The measure consists of 19 Likert-type items with response possibilities ranging from 1 (*almost never*) to 4 (*almost always*). A factor analysis produced a four-component solution. These factors include angry afterthoughts (e.g. "I re-enact the anger episodes in my mind after it has happened"), thoughts of revenge (e.g. "I have daydreams and fantasies of violent nature"), angry memories (e.g. "I ruminate about my past anger experiences"), and understanding of causes (e.g. "I analyze events that make me angry"). In this study, all items were summed to compute a single total score.

An acceptable Cronbach's alpha was found for the overall scale at .93 (Sukhodolsky et al., 2000). Test-retest reliability for the total scale was .77, indicating stability of anger rumination over a period of one month (Sukhodolsky et al., 2000). The total scores of the ARS were found to be significantly correlated with several of the subscales of Spielberger's State-Trait Anger Inventory including trait-anger ( $r = .57$ ), anger-in ( $r = .52$ ), anger-out ( $r = .43$ ), and anger control ( $r = -.35$ ). The ARS was also significantly correlated with measures of negative affect ( $r = .54$ ). The range of scores

possible on the ARS ranges from 19 to 76. Higher scores indicate increased likelihood of anger rumination. In this study, Cronbach's alpha was .92.

### *Procedure*

Undergraduate students were recruited from Introduction to Psychology classes at a Midwestern Catholic university. Both male and females who were at least 18 years of age were included in the sample. The researcher administered the questionnaires to groups of approximately 20-40 students. The researcher explained the instructions and confidentiality prior to distributing the questionnaires, and was available throughout the session to answer any questions. An informed consent form (Appendix H) was provided to explain that participation in the study was voluntary and participation may be withdrawn at anytime. Confidentiality was maintained by assigning each participant a code number, and by asking the participants to refrain from putting their name on the questionnaires. A list containing the participant's names and code numbers was stored separately from the questionnaires. The participants signed their names on the informed consent form indicating their willingness to participate. After completion of the session, the participants were given a debriefing form (Appendix I) and received one experimental credit for their coursework.



## CHAPTER 3

### RESULTS

The results section will be presented as follows. First, preliminary analyses will be presented. Specifically, correlations for continuous demographic variables and ANOVAs for categorical demographic/background variables were computed to determine the relationship between demographic variables and sleep measures. Once identified, demographic/background variables related to sleep measures were controlled for to ensure these variables did not influence reported associations between forgiveness and sleep measures. Additionally, in order to assess for multicollinearity and to determine whether study variables were related as expected, intercorrelations were computed between all forgiveness variables (Absence of Negative, Presence of Positive, and Forgiveness Likelihood), between all negative affect and cognition variables (Depression, Anxiety, Stress, and Anger Rumination), and between all sleep measures (Subjective Sleep Quality, Sleep Latency, Sleep Duration, Habitual Sleep Efficiency, Sleep Disturbances, Use of Sleep Medication, and Daytime Dysfunction).

Next, results from major study questions will be presented. First, partial correlations between forgiveness and sleep will also be discussed, controlling for appropriate demographic/background variables. Next, the relationship between negative affect and cognition (Depression, Anxiety, Stress, and Anger Rumination) and forgiveness will be examined.

The relationship between potential mediators and sleep (controlling for forgiveness) will then be examined. For the variables that met preconditions for mediation, hierarchical multiple regression analyses will be presented.

### *Preliminary Analyses*

Means and standard deviations were computed for all study variables (see Table 4). Correlations were computed between continuous demographic/background variables (i.e., age, number of roommates, sleep interference by others, sleep interference due to noise, use of substances, number of binge drinking episodes in past two weeks, total number of drinks consumed last weekend, offense severity, and how long ago the offense occurred) and sleep variables (i.e., subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, sleep medication, and daytime dysfunction) (see Table 5). Subjective Sleep Quality was positively correlated with sleep interference by others ( $r = .32, p < .001$ ) and sleep interference due to noise level ( $r = .36, p < .001$ ). Sleep Latency was positively correlated with sleep interference by others ( $r = .28, p < .01$ ). Sleep Duration was positively correlated with the amount of time since the offense ( $r = .20, p < .05$ ). In addition, Sleep Disturbance was positively correlated with the severity of the offense ( $r = .30, p < .01$ ). The use of Sleep Medication was positively correlated with the reported use of alcohol ( $r = .22, p < .05$ ) and binge drinking ( $r = .22, p < .05$ ). Lastly, Daytime Dysfunction was positively correlated with sleep interference due to others ( $r = .23, p < .05$ ).

Table 5

*Zero-Order Correlations Between Continuous Demographic/Background Variables and PSQI Component Scores*

Variable	SSQ	SL	SDU	HSE	SDI	SM	DD
Age	-.13	.05	-.08	.03	.02	-.03	.05
Roommate	-.08	.04	-.15	.05	.03	.13	.09
Sleep Interference	.32***†	.27**†	-.03	.12	.12	.13	.23*
Noise Level	.36***†	.06	-.09	.10	.09	.05	.04
Substance Use							
Alcohol	.12	.19	.00	.11	.10	.22*	-.03
Caffeine	.12	.20	-.05	-.05	.12	.17	.05
Nicotine	.15	.15	.07	.14	.15	-.04	.20
Binge Drinking	.07	.17	.06	.06	.00	.22*	.01

*Note.* SSQ = Subjective Sleep Quality; SL = Sleep Latency; SDU = Sleep Duration; HSE = Habitual Sleep Efficiency; SDI = Sleep Disturbance; SM = Use of Sleep Medication; DD = Daytime Dysfunction

† Significant with Bonferroni correction (.05/7 = .007)

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 5 (cont'd)

*Zero-Order Correlations Between Continuous Demographic/Background Variables and PSQI Component Scores*

Variable	SSQ	SL	SDU	HSE	SDI	SM	DD
Total Number of Drinks	.05	.11	-.04	.16	-.03	.13	.10
Nature of Offense							
Offense Severity	.13	.03	.02	.10	.30**†	-.02	.19
Amount of Time Since Offense	-.01	.09	.20*	.13	-.11	.03	-.01

*Note.* SSQ = Subjective Sleep Quality; SL = Sleep Latency; SDU = Sleep Duration; HSE = Habitual Sleep Efficiency; SDI = Sleep Disturbance; SM = Use of Sleep Medication; DD = Daytime Dysfunction

† Significant with Bonferroni correction (.05/7 = .007)

\*  $p < .05$  \*\*  $p < .01$

Analyses of Variance (ANOVAs) were computed on each categorical variable (i.e., gender, year in school, living situation, and relationship to the offender) to determine if they related to the sleep variables (see Table 6). Race was excluded from the analyses due to the high percentage of Caucasian participants. Results revealed a significant relationship between the participants relationship to the offender and Subjective Sleep Quality ( $F(1,96) = 5.12, p < .05$ ). Specifically, participants that reported a romantic partner as the offender ( $M = 1.32, SD = .54$ ) scored higher than those that reported a friend as the offender ( $M = 1.05, SD = .50$ ) on the Subjective Sleep Quality measure (higher scores = poorer sleep). In addition, a significant relationship between the participants relationship to the offender and Sleep Latency ( $F(1, 96) = 5.34, p < .05$ ) was found. Specifically, participants that reported a romantic partner as the offender ( $M = 1.32, SD = .95$ ) scored higher than those that reported a friend as the offender ( $M = .88, SD = .72$ ) on the Sleep Latency measure. Finally, a significant relationship was found between the participants relationship to the offender and Sleep Disturbance ( $F(1, 96) = 17.50, p < .001$ ). Participants that reported a romantic partner as the offender ( $M = 1.29, SD = .46$ ) scored higher than those that reported a friend as the offender ( $M = .95, SD = .22$ ) on the Sleep Disturbances measure. Results also revealed a positive relationship between participant living situation and Sleep Disturbances ( $F(1, 96) = 4.48, p < .05$ ). Specifically, participants that reported living in a UD owned house/apt., off-campus, with parents, or other ( $M = 1.30, SD = .47$ ) scored higher than participants that reported living in a UD dormitory ( $M = 1.10, SD = .39$ ) on Sleep Disturbance measures. No other ANOVAs were significant.

Table 6

*ANOVA Results for Categorical Demographic/Background Variables and PSQI Component Scores*

Variable	<i>F-Values</i>						
	SSQ	SL	SDU	HSE	SDI	SM	DD
Gender	.19	.69	.15	1.32	1.51	1.01	.10
Year in School <sup>a</sup>	.79	.57	.08	.83	.30	.32	.63
Living Situation <sup>b</sup>	.08	.99	.28	.36	4.48*	.79	.44
Relationship to Offender <sup>c</sup>	5.12*	5.34*	.00	1.84	17.50***†	3.85	1.33

*Note.* SSQ = Subjective Sleep Quality; SL = Sleep Latency; SDU = Sleep Duration; HSE = Habitual Sleep Efficiency; SDI = Sleep Disturbance; SM = Use of Sleep Medication; DD = Daytime Dysfunction

<sup>a</sup> Year in school variable was collapsed as freshman and other (i.e., sophomore, junior, senior, other).

<sup>b</sup> Living situation variable was collapsed as UD dormitory and other (i.e., UD Owned House/Apt., Off Campus, Live with Parents, Other).

<sup>c</sup> Due to unequal cell sizes for relationship to the offender, only romantic partner and friend were compared.

† Significant with Bonferroni correction (.05/7 = .007)

\*  $P < .05$  \*\*\*  $p < .001$

*Intercorrelations Within Classes of Measures*

Correlations between sleep measures (Subjective Sleep Quality, Sleep Latency, Sleep Duration, Habitual Sleep Efficiency, Sleep Disturbances, Use of Sleep Medication, and Daytime Dysfunction) were computed. As noted earlier, higher scores on each of the measures reflect more insomnia. As shown in Table 7, there were several significant correlations in the expected direction. Specifically, Subjective Sleep Quality was positively correlated with Sleep Latency ( $r = .35, p < .001$ ), Sleep Duration ( $r = .31, p < .01$ ), Habitual Sleep Efficiency ( $r = .30, p < .01$ ), and Daytime Dysfunction ( $r = .21, p < .05$ ). Sleep Latency was positively correlated with Habitual Sleep Efficiency ( $r = .20, p < .05$ ), Sleep Disturbances ( $r = .22, p < .05$ ), and Use of Sleep Medication ( $r = .36, p < .05$ ). Finally, Sleep Duration was positively correlated with Habitual Sleep Efficiency ( $r = .39, p < .001$ ).

Correlations between negative affect and cognition measures (Depression, Anxiety, Stress, and Anger Rumination) were also computed (see Table 8). All of these variables were correlated in the expected direction. Depression was positively correlated with Anxiety ( $r = .54, p < .001$ ), Stress ( $r = .72, p < .001$ ), and Anger Rumination ( $r = .52, p < .001$ ). In addition, Anxiety was positively correlated with Stress ( $r = .69, p < .001$ ) and Anger Rumination ( $r = .48, p < .001$ ). Lastly, Stress was positively correlated with Anger Rumination ( $r = .54, p < .001$ ).

Finally, correlations were computed between forgiveness measures (Absence of Negative, Presence of Positive, and Forgiveness Likelihood). As shown in Table 9, all of the forgiveness measures were correlated in the expected direction. Absence of Negative was positively correlated with Presence of Positive ( $r = .49, p < .001$ ) and Forgiveness

Table 7

*Zero-Order Correlations Between Sleep Measures*

Variable	1	2	3	4	5	6	7
1. Subjective Sleep Quality	--						
2. Sleep Latency	.35***	--					
3. Sleep Duration	.31**	.11	--				
4. Habitual Sleep Efficiency	.30**	.20*	.39***	--			
5. Sleep Disturbances	.09	.22*	-.18	.05	--		
6. Sleep Medication	.17	.36*	-.08	-.01	.16	--	
7. Daytime Dysfunction	.21*	-.04	.13	.17	.11	.04	--

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$



Table 8

*Zero-Order Correlations Between Negative Affect and Cognition Measures*

Variable	1	2	3	4
1. Depression	--			
2. Anxiety	.54***	--		
3. Stress	.72***	.69***	--	
4. Anger Rumination	.52***	.48***	.54***	--

\*\*\*  $p < .001$

Table 9

*Zero-Order Correlations Between Forgiveness Measures*

Variable	1	2	3
1. Absence of Negative	--		
2. Presence of Positive	.49 <sup>***</sup>	--	
3. Forgiveness Likelihood	.22 <sup>*</sup>	.37 <sup>***</sup>	--

\*  $p < .05$  \*\*\*  $p < .001$

Likelihood ( $r = .22, p < .05$ ). In addition, Presence of Positive was positively correlated with Forgiveness Likelihood ( $r = .37, p < .001$ ).

### *Analyses of Major Study Question*

#### *Relationship Between Forgiveness and Sleep*

According to Baron and Kenny (1986), the first step in testing mediation is to examine the relationship between the independent variable (i.e., forgiveness) and the dependent variable (i.e., sleep). Results are presented below.

Partial correlations were computed between forgiveness measures (Absence of Negative, Presence of Positive, and Forgiveness Likelihood) and sleep measures (Subjective Sleep Quality, Sleep Latency, Sleep Duration, Habitual Sleep Efficiency, Sleep Disturbances, Use of Sleep Medication, and Daytime Dysfunction) while controlling for demographic/background variables (see Table 10). Absence of Negative was negatively correlated with Sleep Latency ( $r = -.22, p < .05$ ). Presence of Positive was negatively correlated with Subjective Sleep Quality ( $r = -.24, p < .05$ ) and Daytime Dysfunction ( $r = -.21, p < .05$ ). Lastly, Forgiveness Likelihood was negatively correlated with Habitual Sleep Efficiency ( $r = -.24, p < .05$ ). No other significant relationships were found between forgiveness and sleep variables.

#### *Relationship Between Forgiveness and Negative Affect/Cognition*

Following the model presented by Baron and Kenny (1986), the second step in testing for mediation is to examine the relationship between the independent variable (i.e., forgiveness) and the mediator (i.e., negative affect and cognition).

Table 10

*Partial Correlations Between Forgiveness Measures and Sleep Measures Controlling for Demographic/Background Variables*

Variable	Absence of Negative	Presence of Positive	Forgiveness Likelihood
Subjective Sleep Quality	-.07	-.24*	-.16
Sleep Latency	-.22*	-.05	.03
Sleep Duration	.06	-.04	.00
Habitual Sleep Efficiency	-.09	-.16	-.24*
Sleep Disturbance	-.07	-.07	-.13
Sleep Medication	-.13	-.16	-.15
Daytime Dysfunction	-.19	-.21*	-.11

*Note.* Variables controlled for as follows: SSQ = sleep interference and noise level; SL = sleep interference. Offense specific background variables were not controlled for in these analyses.

\*  $p < .05$

Thus, correlations were computed between forgiveness measures (Absence of Negative, Presence of Positive, and Forgiveness Likelihood) and negative affect and cognition measures (Depression, Anxiety, Stress, and Anger Rumination). As shown in Table 11, Absence of Negative was negatively correlated with Depression ( $r = -.41, p < .001$ ), Anxiety ( $r = -.41, p < .001$ ), Stress ( $r = -.41, p < .001$ ), and Anger Rumination ( $r = -.53, p < .001$ ). Presence of Positive was negatively correlated with Depression ( $r = -.22, p < .05$ ) and Anger Rumination ( $r = -.35, p < .001$ ). Lastly, Forgiveness Likelihood was negatively correlated with Anger Rumination ( $r = -.26, p < .05$ ).

#### *Relationship Between Negative Affect/Cognition and Sleep*

According to Baron and Kenny (1986), the third step is to evaluate the relationship between the potential mediator (i.e., negative affect and cognition) and the dependent variable (i.e., sleep) while controlling for the independent variable (i.e., forgiveness). Thus, multiple regression equations were computed with sleep as the criterion variable and forgiveness and negative affect/cognition as simultaneous predictors (see Table 12). Subjective Sleep Quality was predicted by depression ( $\beta = .30, p < .01$ ), anxiety ( $\beta = .31, p < .01$ ), and stress ( $\beta = .38, p < .001$ ). Sleep Latency was predicted by anxiety ( $\beta = .36, p < .001$ ). Sleep Disturbance was a significant predictor of anxiety ( $\beta = .29, p < .01$ ) and stress ( $\beta = .32, p < .01$ ). Lastly, Daytime Dysfunction was predicted by depression ( $\beta = .36, p < .001$ ), anxiety ( $\beta = .29, p < .01$ ), and stress ( $\beta = .36, p < .001$ ).

#### *Negative Affect and Cognition as a Mediator*

According to Baron and Kenny (1986), if each of the previous three conditions are met, the final step is to determine whether the IV (i.e., forgiveness) predicts the DV

Table 11

*Zero-Order Correlations Between Forgiveness and Negative Affect/Cognition Measures*

Variable	Absence of Negative	Presence of Positive	Forgiveness Likelihood
Depression	-.41 <sup>***</sup>	-.22 <sup>*</sup>	.01
Anxiety	-.41 <sup>***</sup>	-.16	-.04
Stress	-.41 <sup>***</sup>	-.14	-.10
Anger Rumination	-.53 <sup>***</sup>	-.35 <sup>***</sup>	-.26 <sup>*</sup>

\*  $p < .05$  \*\*\*  $p < .001$

Table 12

*Multiple Regression Examining the Relationship Between Negative Affect/Cognition and Sleep While Controlling for Forgiveness*

Variable	<i>B</i> (Betas)						
	SSQ	SL	SDU	HSE	SDI	SM	DD
Depression	.30**	.06	.09	.09	.15	-.04	.36***
Anxiety	.31**	.36***	.10	.17	.29**	.10	.29**
Stress	.38***	.18	.00	.07	.32**	.09	.36***
Anger Rumination	.10	.05	-.20	.07	.11	-.07	.17

*Note.* As suggested by Baron and Kenny (1986), forgiveness (Absence of Negative, Presence of Positive, and Forgiveness Likelihood) was included as a predictor in all regression analyses.

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

(i.e., sleep) after controlling for the mediator (i.e., negative affect and cognition). Thus, hierarchical multiple regression equations were computed for variables that met the other preconditions for mediation. For one equation, Subjective Sleep Quality was entered as the criterion variable with predictors entered in the following manner: Step 1 – Depression; Step 2 – Presence of Positive. Of interest is whether the  $R^2$  change is significant on the second step because a lack of significance would indicate complete mediation. As shown in Table 13, Presence of Positive predicted Subjective Sleep Quality beyond Depression (incremental  $R^2 = .04, p < .05$ ). For another equation, Sleep Latency was entered as the criterion variable with predictors entered in the following manner: Step 1- Anxiety; Step 2-Absence of Negative. As shown in Table 14, Absence of Negative did not predict Sleep Latency when controlling for Anxiety (incremental  $R^2 = .01, p > .05$ ). Finally, Daytime Dysfunction was entered as the criterion variable with predictors entered in the following manner: Step 1-Depression; Step 2-Presence of Positive. As shown in Table 15, the Presence of Positive did not predict Daytime Dysfunction when controlling for Depression (incremental  $R^2 = .02, p > .05$ ).

As noted by Baron and Kenny (1986), complete mediation is only established if the other preconditions are met and the effect of the independent variable (i.e., forgiveness) on the dependent variable (i.e., sleep) while controlling for the mediator (i.e., negative affect) is not significant. Thus, Anxiety completely mediated the relationship between Absence of Negative and Sleep Latency and Depression completely mediated the relationship between Presence of Positive and Daytime Dysfunction. Depression partially mediated the relationship between Presence of Positive and Subjective Sleep Quality.



Table 13

*Hierarchical Multiple Regression Analyses (with Betas) Examining the Prediction of Subjective Sleep Quality by Negative Affect/Cognition (Step 1) and Forgiveness (Step 2)*

Variable	Beta	t	R <sup>2</sup> Δ
Negative Affect Depression	.28**	2.79**	
Forgiveness Presence of Positive	-.20*	-2.04*	.04 <sup>a</sup>

<sup>a</sup> This incremental  $R^2$  represents the unique contribution of the forgiveness variable to the prediction of sleep.

\*  $p < .05$  \*\*  $p < .01$

Table 14

*Hierarchical Multiple Regression Analyses (with Betas) Examining the Prediction of Sleep Latency by Negative Affect/Cognition (Step 1) and Forgiveness (Step 2)*

Variable	Beta	t	R <sup>2</sup> Δ
Negative Affect Anxiety	.40***	4.23***	
Forgiveness Absence of Negative	-.09	-.90	.01 <sup>a</sup>

<sup>a</sup> This incremental  $R^2$  represents the unique contribution of the forgiveness variable to the prediction of sleep.

\*\*\*  $p < .001$

Table 15

*Hierarchical Multiple Regression Analyses (with Betas) Examining the Prediction of Daytime Dysfunction by Negative Affect/Cognition (Step 1) and Forgiveness (Step 2)*

Variable	Beta	t	R <sup>2</sup> Δ
Negative Affect Depression	.37***	3.92***	
Forgiveness Presence of Positive	- .13	- 1.38	.02 <sup>a</sup>

<sup>a</sup> This incremental R<sup>2</sup> represents the unique contribution of the forgiveness variable to the prediction of sleep.

\*\*\*  $p < .001$

## CHAPTER 4

### DISCUSSION

#### *Major Study Questions*

##### *Relationship Between Forgiveness and Sleep*

Consistent with hypotheses, several components of sleep were related in the expected direction to forgiveness. To begin, Absence of Negative was negatively related to Sleep Latency. Thus, the more that participants had overcome their negative feelings toward an offender, the less time it reportedly took them to fall asleep. Other studies examining individuals with insomnia found increased levels of hostility (Hart et al., 1987; Swaffer & Hollin, 2001; Waters, Adams, Binks, & Varnado, 1993) and an inability to express anger outwardly (Kales, 1983). According to Kales (1983), the internalization of anger leads to physiological arousal and is a major factor in the development and maintenance of insomnia. Interestingly, participant relationship to the offender was significantly related to Sleep Latency. Specifically, participants had a harder time getting to sleep if the offender was a romantic partner rather than a friend. This highlights the importance of considering the context in which wrongdoing occurs when working with individuals with insomnia.

The Presence of Positive was negatively related to Subjective Sleep Quality (i.e., higher scores = poorer sleep) and Daytime Dysfunction. Thus, the more positive feelings the participants had toward their offender, the better their subjective experience of sleep

quality and overall ability to be alert and function during the day. These results are consistent with past research examining positive affect and sleep. For example, Norlander, Johansson, and Bood (2005) examined positive and negative affect and sleep quality among 91 participants. Results indicated that individuals with high positive affect and low negative affect reported the best sleep quality even when experiencing high stress. Similarly, Taub (1978) examined the presence of positive and negative mood states in irregular sleepers. Results showed that the presence of positive mood was significantly less in irregular sleepers. Once again, participants wronged by a romantic partner showed poorer sleep quality than those wronged by a friend.

In addition, participant likelihood of endorsing forgiveness in response to hypothetical scenarios was negatively related to the ratio of total hours asleep to number of hours spent in bed (Habitual Sleep Efficiency). Although no other study has examined how dispositional forgiveness relates to sleep, other research has linked dispositional/personality variables with sleep. For example, Saint Hilaire, Straub, and Pelissolo (2005) found that individuals with primary insomnia were generally more pessimistic, fearful, and shy. Similarly, Gray and Watson (2001) found that poorer sleep was related to higher levels of neuroticism. In addition, individuals with poorer sleep quality tend to have lower levels of self-acceptance and self-control (Saint Hilaire et al., 2005; Taub & Hawkins, 1979).

To our knowledge, this is the first study to look at how forgiveness toward a specific offender or general tendency to forgive relates to sleep. However, as noted earlier, previous research has found a relationship between forgiveness and signs of physical distress such as increased physiological arousal (Lawler et al., 2003; Witvliet et

al., 2001), higher blood pressure (Huang & Enright, 2000; Witvliet et al., 2001), higher heart rate (Lawler et al., 2003), and increased EMG arousal (Lawler et al., 2003; Witvliet et al., 2001).

Interestingly, this study revealed that various aspects of forgiveness are related differently to sleep. Different correlates were found for Absence of Negative (i.e., Sleep Latency), Presence of Positive (i.e., Subjective Sleep Quality, Daytime Dysfunction), and Forgiveness Likelihood (i.e., Habitual Sleep Efficiency). These results are consistent with previous researcher's suggestions that different aspects of forgiveness relate somewhat differently to mental health (e.g., Rye and colleagues, 2000). These findings highlight the importance of considering the multidimensional nature of forgiveness when examining how it relates to sleep and other constructs (McCullough, 2001).

Although several hypothesized relationships were found between forgiveness and sleep, the sizes of the correlations were modest (i.e., correlations ranged from  $-.21$  to  $-.25$ ). In contrast, the relationship between forgiveness and negative affect/cognition measures were generally stronger (i.e., correlations ranged from  $-.22$  to  $-.53$ ). Although the direction of causality cannot be determined from the analyses, it is possible that forgiveness has a more proximate effect on mental health and a more distal effect on sleep.

#### *Relationship Between Forgiveness and Negative Affect/Cognition*

The present study found that situational forgiveness (i.e., Absence of Negative and Presence of Positive) was negatively related to reported levels of depression. The link between forgiveness and depression has been reported in numerous studies. For example, Freedman and Enright (1996) studied the effects of a forgiveness intervention

on female incest survivors ( $N = 12$ ). Results revealed that compared to wait-listed participants', the treated women showed increased hope and greater decreases in depression (Freedman & Enright, 1996). A one-year follow-up showed continued benefits of the forgiveness treatment (Freedman & Enright, 1996). Similarly, Lin and colleagues (2004) examined forgiveness among substance dependent patients at a residential treatment facility. Results showed that the forgiveness therapy group led to greater improvement in depression than the drug and alcohol therapy group. These results were maintained at a four-month follow-up assessment.

Reported levels of anxiety and stress were negatively related to Absence of Negative, but not other aspects of forgiveness. Past research also shows a link between forgiveness and anxiety/stress. For example, Freedman and Enright's (1996) study described above found that compared to wait-listed participants', the women in the forgiveness intervention showed decreases in levels of anxiety and stress (Freedman & Enright, 1996). Similarly, Coyle and Enright (1997) evaluated a forgiveness intervention for men hurt by their partner's decision to have an abortion. Results showed a significant decrease in anxiety for the intervention group (Coyle & Enright, 1997).

Anger rumination was negatively related to both situational and dispositional forgiveness. Barber, Maltby, and Macaskill (2005) also found that forgiveness of others related to anger rumination. Moreover, previous research has found that individuals with poorer sleep quality exhibit more rumination (Bertelson & Monroe, 1979; Kales, Caldwell, Soldatos, Bixler, & Kales, 1983). A more recent study by Thomsen and colleagues (2003) also found that rumination was generally associated with poorer sleep quality, sleep latency, and more sleep disturbances. Despite previous research, the

present study did not find a relationship between anger rumination and any of the sleep components (after controlling for forgiveness). Thus, anger rumination did not meet all of the preconditions for mediation. However, as noted in Table 8, anger rumination was significantly related to the other negative affect and cognition measures (i.e., depression, anxiety, and stress). One possibility is that anger rumination mediates the relationship between forgiveness and negative affect/cognition and that negative affect/cognition then subsequently affects sleep. While not tested in the present study, future research should consider this possibility.

*Does Negative Affect/Cognition Mediate the Relationship Between Forgiveness and Sleep*

Some evidence was found to support the hypothesis that negative affect and cognition mediates the relationship between forgiveness and sleep. To begin, anxiety mediated the relationship between Absence of Negative and Sleep Latency. It is possible that anxiety about the future can develop when one chooses not to let go of negative feelings about an offender. In cases where the victim had a relationship with the offender prior to the offense, some of the anxiety might involve uncertainty over how the relationship will be affected. Anxiety might also pertain to how the offense might affect one's life. As noted earlier, anxiety has been found to relate to sleep (Bastien et al., 2004). After one goes to bed, but before falling asleep, thoughts that have been less salient due to distractions during the day might become more salient when resting. This explanation is speculative and should be explored in future research.

Depression also mediated the relationship between Presence of Positive and Sleep Latency. In addition, depression partially mediated the relationship between Presence of Positive and Daytime Dysfunction. Perhaps feelings of sadness or loss develop after an

offense occurs and the victim contemplates how this will affect the relationship. As noted previously, depression has been found to relate to sleep (Riemann et al., 2001). After one goes to bed but prior to sleep, these feelings of sadness, loss, and hopelessness may be especially likely to surface and thus affect one's subjective experience of daytime functioning and quality of sleep. Again this explanation is speculative and should be explored in further research.

Overall, these results provided partial support for the proposed model (see Figure 1) which suggests that if a transgression occurs and the victim chooses not to forgive the offender, the victim is likely to experience negative affect and cognition such as anxiety, depression, stress, or anger rumination. The cycle of negative affect and cognition will likely disrupt sleep by increasing physiological arousal, and/or disrupting circadian rhythms, although this part of the model was not tested in this study. Several hypothesized mediational pathways were not significant.

#### *Limitations and Suggestions for Future Research*

Although this study laid the foundation for a possible new area of research, several limitations should be discussed. First, the sample comprised only college undergraduates. It is difficult to assess the sleep habits of this particular population due to the irregular sleep schedule of college students. In an attempt to address this issue, this study assessed other variables that might be affecting sleep (i.e., substance use and sleep environment). Only a small percentage of students reported experiencing sleep disorders and it is not clear how the results might generalize to a clinical sleep disordered population. Also, the sample was fairly homogenous with respect to ethnicity with more than 90 percent of the sample being Caucasian. Future research should examine both



clinical and non-clinical populations and include greater diversity with respect to age, socioeconomic status, and ethnicity. It should be noted that the sample size was relatively small ( $N = 97$ ), thus limiting the statistical power of the results. Further, only self-report measures of sleep were utilized in the study. While self-report measures are useful, observer report measures could provide additional corroborating information. Finally, sleep was measured at a single point in time, which may not accurately capture the sleep habits of the participant. In the future, researchers may consider using longitudinal designs. Measuring forgiveness at multiple points in time, as recommended by McCullough (2000), would take into consideration the change in intensity of feelings toward an offender over time and may provide a more accurate picture of the forgiveness process.

#### *Implications for Clinicians*

In spite of the limitations noted above, this study has provided initial evidence that forgiveness is modestly related with several aspects of sleep. The study also found that negative affect may mediate the relationship between several aspects of forgiveness and sleep. This has important implications for clinicians working with clients who are experiencing insomnia. It is well documented that sleep problems are associated with a variety of mental health problems such as depression (Riemann, Berger & Voderholzer, 2001) and anxiety (Bastien et al., 2004). This study suggests that when working with clients who have experienced wrongdoing and insomnia, clinicians may wish to explore the nature of the wrongdoing and their perspective toward the offender. When working with the issue of forgiveness with a client, it would be important to examine positive and negative feelings toward an offender as well as general tendency to forgive. Not all

clients may wish to pursue forgiveness of an offender so it is important that clinicians are aware of and respect their client's values. However, insomnia clients who have been wronged and who value forgiveness may appreciate it when therapists incorporated forgiveness along with standard cognitive-behavioral treatment techniques.

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8. In the past month, to what extent has external noise (e.g. traffic, music, barking dog) interfered with your ability to sleep?

Not At All		Somewhat		Very Much
0	1	2	3	4

Rate the frequency with which you have used the following substances during the past 30 days.

9. Alcohol:

Never		Sometimes		Almost Every Day
0	1	2	3	4

10. Caffeine

Never		Sometimes		Almost Every Day
0	1	2	3	4

11. Nicotine:

Never		Sometimes		Almost Every Day
0	1	2	3	4

12. For the questions below, one drink = 12 ounces of beer; 4 ounce glass of wine; one shot of liquor; or one mixed drink containing one 1 ounce of liquor.

**For Men:**

How many times have you **had five or more** drinks in one sitting in the past two weeks?

---

**For Women:**

How many times have you **had four or more** drinks in one sitting in the past two weeks?

---

**For All Participants:**

13. Consider your drinking behavior this past weekend. Indicate the number of drinks you consumed each of the following days. If you drank between midnight and 6:00 am, include these drinks in the previous night's drinks. For example, drinks consumed after midnight on Friday would be included in Fridays rather than Saturdays total.

Thursday total # of drinks \_\_\_\_\_

Friday total # of drinks \_\_\_\_\_

Saturday total # of drinks \_\_\_\_\_

14. Below is a list of common sleep disorders. Please indicate any sleep disorders that you have been diagnosed with or regularly experience (check all that apply).

\_\_\_\_\_ Insomnia (Chronic inability to fall asleep or remain asleep for an adequate  
1 length of time)

\_\_\_\_\_ Narcolepsy (Sleep disorder characterized by sudden and uncontrollable  
2 daytime episodes of sleep)

\_\_\_\_\_ Sleep Apnea (Temporary suspension of breathing occurring repeatedly  
3 during sleep)

\_\_\_\_\_ Sleep Walking (Act or an instance of walking or performing another  
4 activity associated with wakefulness while asleep or in a sleeplike state)

\_\_\_\_\_ Nightmares  
5

\_\_\_\_\_ Sleep Terrors (Abrupt awakening from sleep accompanied by intense  
6 fear)

\_\_\_\_\_ Restless Leg Syndrome (Discomfort or twitching in the legs that occurs  
7 after going to bed and often leads to insomnia)

\_\_\_\_\_ Other (please specify): \_\_\_\_\_  
8

## APPENDIX B

### Forgiveness Background Information

Please complete the following questionnaire. All of your responses will remain confidential. Please do not place your name on this questionnaire.

1. Think about someone who has wronged or mistreated you in the past. (If you have been wronged or mistreated by more than one person, select a person whose actions were very hurtful).

What is/was your relationship to the person who wronged you (pick one)?

- (a) romantic partner
- (b) friend
- (c) family member or relative
- (d) acquaintance
- (e) stranger

Indicate the nature of the other person's hurtful actions by answering yes or no for **ALL** of the categories below that apply.

YES	NO	
(a)	(b)	
_____	_____	This person lied to me.
_____	_____	This person spread gossip about me.
_____	_____	This person cheated on me.
_____	_____	This person failed to follow through on his/her obligation(s) to me.
_____	_____	This person called me names or used unkind words.
_____	_____	This person physically harmed me.
_____	_____	This person stole from me.
_____	_____	Other (not listed above).

2. How long ago did the mistreatment by this person occur?

Number of years \_\_\_\_\_ Number of months \_\_\_\_\_



3. How hurt do you feel **NOW** as a result of this person's wrongful actions?

Extremely hurt	Moderately Hurt	A Little Hurt	Not Hurt At All
(4)	(3)	(2)	(1)

4. In your opinion, how severe was the wrongdoing that was committed against you?

Very Severe	Moderately Severe	A Little Severe	Not Severe At All
(4)	(3)	(2)	(1)

5. How angry do you feel **NOW** as a result of the person's wrongful actions?

Extremely Angry	Moderately Angry	A Little Angry	Not Angry At All
(4)	(3)	(2)	(1)

# APPENDIX C The Forgiveness Scale

Think of how you have responded to the person who has wronged or mistreated you. Indicate the degree to which you agree or disagree with the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I can't stop thinking about how I was wronged by this person.	5	4	3	2	1
2. I wish for good things to happen to the person who wronged me.	5	4	3	2	1
3. I spend time thinking about ways to get back at the person who wronged me.	5	4	3	2	1
4. I feel resentful toward the person who wronged me.	5	4	3	2	1
5. I avoid certain people and/or places because they remind me of the person who wronged me.	5	4	3	2	1
6. I pray for the person who wronged me.	5	4	3	2	1
7. If I encountered the person who wronged me I would feel at peace.	5	4	3	2	1
8. This person's wrongful actions have kept me from enjoying life.	5	4	3	2	1
9. I have been able to let go of my anger toward the person who wronged me.	5	4	3	2	1
10. I become depressed when I think of how I was mistreated by this person.	5	4	3	2	1

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11. I think that many of the emotional wounds related to this person's wrongful actions have healed.	5	4	3	2	1
12. I feel hatred whenever I think about the person who wronged me.	5	4	3	2	1
13. I have compassion for the person who wronged me.	5	4	3	2	1
14. I think my life is ruined because of the person's wrongful actions.	5	4	3	2	1
15. I hope the person who wronged me is treated fairly by others in the future.	5	4	3	2	1

**Reverse Code:** 1,3,4,5,8,10,12,14

**Absence of Negative subscale items:** 1,3,4,5,8,9,10,11,12,14

**Presence of Positive subscale items:** 2,6,7,13,15

# APPENDIX D Forgiveness Likelihood Scale

Imagine the scenarios below happened to you. Based on the information provide, consider the likelihood that you would choose to forgive the person. Then, circle the response that is most true for you.

1. You share something embarrassing about yourself to a friend who promises to keep the information confidential. However, the friend breaks his/her promise and proceeds to tell several people. What is the likelihood that you would choose to forgive your friend?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

2. One of your friends starts a nasty rumor about you that is not true. As a result, people begin treating you worse than they have in the past. What is the likelihood that you would choose to forgive your friend?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

3. Your significant other has just broken up with you, leaving you hurt and confused. You learn that the reason for the break up is that your significant other started dating a good friend of yours. What is the likelihood that you would choose to forgive your significant other?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

4. A family member humiliates you in front of others by sharing a story about you that you did not want anyone to know. What is the likelihood that you would choose to forgive that family member?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

5. Your significant other has a 'one night stand' and becomes sexually involved with someone else. What is the likelihood that you would choose to forgive your significant other?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

6. Your friend has been talking about you behind your back. When you confront this person, he/she denies it, even though you know that he/she is lying. What is the likelihood that you would choose to forgive your friend?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

7. A friend borrows your most valued possession, and then loses it. The friend refuses to replace it. What is the likelihood that you would choose to forgive your friend?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

8. You tell an acquaintance about a job you hope to be hired for. Without telling you, the acquaintance applies and gets the job for him/herself. What is the likelihood that you would choose to forgive your acquaintance?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

9. A stranger breaks into your house and steals a substantial sum of money from you. What is the likelihood that you would choose to forgive that stranger?

Extremely Likely	Fairly Likely	Somewhat Likely	Slightly Likely	Not at all Likely
<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

- 10.** You accept someone's offer to attend a formal dance. However, this person breaks their commitment to take you and goes with someone who they find more attractive. What is the likelihood that you would choose to forgive this person?

Extremely  
Likely

**5**

Fairly  
Likely

**4**

Somewhat  
Likely

**3**

Slightly  
Likely

**2**

Not at all  
Likely

**1**

APPENDIX E  
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?

Usual bed time \_\_\_\_\_

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

Number of minutes \_\_\_\_\_

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

Usual getting up time \_\_\_\_\_

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

Hours of sleep per night \_\_\_\_\_

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

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

	Not during the past month	Less than 1 x a week	1-2x a week	3 or more times a week
(a) Cannot get to sleep within 30 minutes.	0	1	2	3
(b) Wake up in the middle of the night or early morning.	0	1	2	3
(c) I Have to get up to use the bathroom.	0	1	2	3
(d) Cannot breathe comfortably.	0	1	2	3

	Not during the past month	Less than 1x a week	1-2x a week	3 or more times a week
(e) Cough or snore loudly.	0	1	2	3
(f) Feel too cold.	0	1	2	3
(g) Feel too hot.	0	1	2	3
(h) Had bad dreams.	0	1	2	3
(i) Have pain.	0	1	2	3
(j) Other reasons: _____	0	1	2	3

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

Very Good	Fairly Good	Fairly Bad	Very Bad
0	1	2	3

**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
0	1	2	3

**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
0	1	2	3

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

Not a Problem At All	Only a Very Slight Problem	Somewhat of A Problem	A Very Big Problem
0	1	2	3



## APPENDIX F

### Depression Anxiety Stress Scale

Please read each statement and circle a number 0, 1, 2, or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any one statement.

The rating scale is as follows:

**0** Did not apply to me at all

**1** Applied to me to some degree, or some of the time

**2** Applied to me to a considerable degree, or a good part of the time

**3** Applied to me very much, or most of the time

---

<b>1.</b> I found myself getting upset by quite trivial things.	0	1	2	3
<b>2.</b> I was aware of dryness in my mouth.	0	1	2	3
<b>3.</b> I couldn't seem to experience any positive feelings at all.	0	1	2	3
<b>4.</b> I experience breathing difficulty (e.g. excessively rapid or breathlessness).	0	1	2	3
<b>5.</b> I just couldn't seem to get going.	0	1	2	3
<b>6.</b> I tended to over-react to situations.	0	1	2	3
<b>7.</b> I had a feeling of shakiness (e.g. legs giving away).	0	1	2	3
<b>8.</b> I found it difficult to relax.	0	1	2	3
<b>9.</b> I found myself in situations that made me so anxious I was most relieved when they ended.	0	1	2	3
<b>10.</b> I felt that I had nothing to look forward to.	0	1	2	3
<b>11.</b> I found myself getting upset rather easily.	0	1	2	3
<b>12.</b> I felt that I was using a lot of nervous energy.	0	1	2	3

<b>13.</b> I felt sad and depressed.	0	1	2	3
<b>14.</b> I found myself getting impatient when I was delayed in any way.	0	1	2	3
<b>15.</b> I had a feeling of faintness.	0	1	2	3
<b>16.</b> I felt that I had lost interest in just about everything.	0	1	2	3
<b>17.</b> I felt I wasn't worth much as a person.	0	1	2	3
<b>18.</b> I felt I was rather touchy.	0	1	2	3
<b>19.</b> I perspired noticeably in the absence of high temperatures or physical exertion.	0	1	2	3
<b>20.</b> I felt scared without any good reason.	0	1	2	3
<b>21.</b> I felt that life wasn't worthwhile.	0	1	2	3
<b>22.</b> I found it hard to wind down.	0	1	2	3
<b>23.</b> I had difficulty in swallowing.	0	1	2	3
<b>24.</b> I couldn't seem to get any enjoyment out of things I did.	0	1	2	3
<b>25.</b> I was aware of the action of my heart in the absence of physical exertion.	0	1	2	3
<b>26.</b> I felt down-hearted and blue.	0	1	2	3
<b>27.</b> I found that I was irritable.	0	1	2	3
<b>28.</b> I felt I was close to panic.	0	1	2	3
<b>29.</b> I found it hard to calm down after something upset me.	0	1	2	3
<b>30.</b> I feared that I would be "thrown" by some trivial, but unfamiliar task.	0	1	2	3
<b>31.</b> I was unable to become enthusiastic about anything.	0	1	2	3

32. I found it difficult to tolerate interruptions to what I was doing.	0	1	2	3
33. I was in a state of nervous tension.	0	1	2	3
34. I felt I was pretty worthless.	0	1	2	3
35. I was intolerant of anything that kept me from getting on with what I was doing.	0	1	2	3
36. I felt terrified.	0	1	2	3
37. I could see nothing in the future to be hopeful about.	0	1	2	3
38. I felt that life was meaningless.	0	1	2	3
39. I found myself getting agitated.	0	1	2	3
40. I was worried about situations in which I might panic and make a fool of myself.	0	1	2	3
41. I experienced trembling (e.g. in the hands).	0	1	2	3
42. I found it difficult to work up the nerve to do things.	0	1	2	3

**Depression items:** 3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, 42

**Anxiety items:** 2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40, 41

**Stress items:** 1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35, 39

APPENDIX G  
Anger Rumination Scale

Please read each statement and circle a number 1, 2, 3, or 4 which indicates how much the statement applies to you.

	Almost Never			Almost Always
<b>1.</b> I re-enact the anger episodes in my mind after it has happened.	1	2	3	4
<b>2.</b> When something makes me angry, I turn this matter over and over again in my head.	1	2	3	4
<b>3.</b> Memories of even minor annoyances bother me for a while.	1	2	3	4
<b>4.</b> Whenever I experience anger, I keep thinking about it for a while.	1	2	3	4
<b>5.</b> After an argument is over, I keep fighting with this person in my imagination.	1	2	3	4
<b>6.</b> Memories of being aggravated pop up into my mind before I fall asleep.	1	2	3	4
<b>7.</b> I have long living fantasies of revenge after the conflict is over.	1	2	3	4
<b>8.</b> When someone makes me angry, I can't stop thinking about how to get back at that person.	1	2	3	4
<b>9.</b> I have daydreams and fantasies of violent nature.	1	2	3	4
<b>10.</b> I have difficulty forgiving people who have hurt me.	1	2	3	4
<b>11.</b> I ponder about the injustices that have been done to me.	1	2	3	4

Almost  
NeverAlmost  
Always

---

12. I keep thinking about events that have angered me for a long time.	1	2	3	4
13. I feel angry about certain things in my life.	1	2	3	4
14. I ruminate about my past anger experiences.	1	2	3	4
15. I think about certain events from a long time ago and they still make me angry.	1	2	3	4
16. I think about the reasons people treat me badly.	1	2	3	4
17. When someone provokes me, I keep wondering why this should have happened to me.	1	2	3	4
18. I analyze events that make me angry.	1	2	3	4
19. I have had times when I could not stop being preoccupied with a particular conflict.	1	2	3	4

---

**Angry Afterthought items:** 1, 2, 3, 4, 5, 6

**Thoughts of Revenge items:** 7, 8, 9, 10

**Angry Memories items:** 11, 12, 13, 14, 15

**Understanding of Causes items:** 16, 17, 18, 19

## APPENDIX H

### Informed Consent

- Project Title:**      Insomnia and Mental Health
- Investigator(s):**    Rebecca M. Stoia and Mark Rye, Ph.D (Faculty Advisor)
- Description of Study:**    Participants will complete a series of self-report questionnaires addressing the constructs of forgiveness, mental health, and sleep problems.
- Adverse Effects and Risks:**      No adverse effects are anticipated. However, participants will be asked to recount an incident in which they were wronged, which may possibly raise negative emotions. In addition, they will be asked to reflect on feelings of anxiety, depression, and stress. Students who are experiencing distress are encouraged to schedule an appointment at the university counseling center at 937.229.3141.
- Duration of Study:**      The study consists of one session that will take approximately one hour.
- Confidentiality of Data:**    You will not be asked to place your name on this survey, and instead your responses will be identified with a research code.
- Contact Person:**      If they have questions or problems regarding the study, you can contact Rebecca Stoia at (937.648.7871) [stoiarem@notes.udayton.edu](mailto:stoiarem@notes.udayton.edu), the faculty advisor, Mark Rye, Ph.D. at (937.229.2160) [mark.rye@notes.udayton.edu](mailto:mark.rye@notes.udayton.edu), or Charles E. Kimble, Ph.D. at (937.229.2167) [charles.kimble@notes.udayton.edu](mailto:charles.kimble@notes.udayton.edu).
- Consent to Participate:**      I have voluntarily decided to participate in this study. The investigator named above has adequately answered any and all questions I have about this study, the procedures involved, and my participation. I understand that the investigator named above will be available to answer any questions about research procedures throughout this study. I also understand that I may voluntarily terminate my participation in this study at any time and still receive full credit. I also understand that the investigator named above may terminate my participation in this study if s/he feels this to be in my best interest. In addition, I certify that I am 18 (eighteen) years of age or older.

Signature of Student	Student's Name (printed)	Date
Signature of Witness		Date

## APPENDIX I

### Debriefing Form

#### **Information about the study**

The purpose of this study is to examine the relationship between forgiveness and insomnia. Insomnia is the most common of the sleep disorders (Drake, Roehs, & Roth, 2003), and may have a negative impact on many areas of functioning including work performance, immune system functioning, and physical functioning (Sateia & Nowell, 2004). Research shows that there are several factors that contribute to insomnia such as hyperarousal, disruption of circadian rhythms, extreme temperature, noise, substance use, anxiety, or depression (Harvey & Greenall, 2003; Hauri, 2000). A cognitive process that also has been found to contribute to insomnia is rumination, which is the presence of distorted or disturbed cognitive precepts (Donaldson & Lam, 2004). Thus, coping strategies that reduce rumination, such as forgiveness, may help alleviate insomnia. Research shows that forgiveness relates to decreased physiological distress and improved mental health (Freedman & Enright, 1996; Witvliet, Ludwig, & Vander Laan, 2001).

You were asked to answer several surveys including measures of forgiveness, sleep, rumination, and negative affect. There are three specific questions that are being investigated in the present study. (1) How does forgiveness relate to insomnia? It is hypothesized that both state and trait forgiveness will be negatively correlated with amount of time before sleep onset, frequency of sleep interruption, and positively correlated with duration of sleep. (2) Does forgiveness predict insomnia beyond anxiety and depression? It is hypothesized that forgiveness will predict insomnia beyond both anxiety and depression. (3) Does rumination mediate the relationship between forgiveness and insomnia? It is hypothesized that rumination will act as a mediator in the relationship between forgiveness and insomnia. For further information about this area of research, refer to the following references.

#### **References**

- Donaldson, C., & Lam, D. (2004). Rumination, mood and social problem-solving in major depression. *Psychological Medicine*, 34(7), 1309-1318.
- Harvey, A.G., & Greenall, E. (2003). Catastrophic worry in primary insomnia. *Journal of Behavior Therapy and Experimental Psychiatry*, 34, 11-23.
- Inlander, C. B., & Moran, C.K. (1995). 67 ways to good sleep: A people's medical society book. New York, NY: Walker and Company.
- McCullough, M. E., Pargament, K. I., & Thoresen, C. E. (2000). Forgiveness: Theory, practice and research. New York, NY: Guilford Press.

#### **Assurance of Privacy**

We are seeking general principles of behavior and are not evaluating you personally in any way. Your responses will be confidential and your responses will only be identified by a participant number in the data along with other participants' numbers.

**Contact information**

If you have questions or problems regarding the study, you can contact Rebecca Stoia at (937. 648.7871) [stoiarem@notes.udayton.edu](mailto:stoiarem@notes.udayton.edu), the faculty advisor, Mark Rye, Ph.D. at (937.229.2160) [mark.rye@notes.udayton.edu](mailto:mark.rye@notes.udayton.edu), or Charles E. Kimble, Ph.D. at (937.229.2167) [charles.kimble@notes.udayton.edu](mailto:charles.kimble@notes.udayton.edu).

Thank you for your participation in this study. I will award you one research credit for your participation.



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