

# Napping: An Intervention for Sleep Deprived Undergraduate and Graduate Students

Kelly Donohue

## Abstract

Sleep is an important physiological process that plays a prominent role in the overall physical and mental health of individuals through impacting cognitive, emotional, and physical functioning (Gruber, 2012). Individuals who do not get adequate sleep are at risk to suffer from insomnia, experience overall activity impairment, and have significantly lower physical and mental productivity than individuals who achieve optimum amounts of sleep (Bolge, Doan, Kannan, & Baran, 2009). Unfortunately, many graduate and undergraduate students do not get sufficient overnight sleep (Forquer, Camden, Gabrielau, & Johnson, 2008). One possible solution for these students is to increase their napping activity. Although overnight sleep is very important, recent research shows that napping can benefit individuals who are sleep deprived (Chen, 2013). Research suggests that napping as little as ten minutes when fatigued can have many positive benefits including an increase in energy and cognitive functioning (Tietzel & Lack, 2002). Although napping should not be used as a substitute for overnight sleep, it is a possible solution for students during stressful periods when they are unable to achieve optimum amounts of overnight sleep.

Sleep is an important physiological process that plays a prominent role in how people think, feel, and behave. Individuals who do not get sufficient sleep have higher levels of fatigue and tiredness, which hinders physical, cognitive and emotional functioning (Gruber, 2012). Additionally, achieving too little sleep can cause premature aging, depression, and other serious health issues (Wong, Lau, Wan, Cheung, Hui, & MOK, 2013). However, despite the importance of sleep and its many implications for psychological and physical wellness, many undergraduate and graduate students do not obtain sufficient levels of sleep. Sleep patterns for this population are inconsistent. During times of high stress, such as exams, sleep quality and quantity are not efficient (Forquer, Camden, Gabrielau, & Johnson, 2012). Although overnight sleep is very important, recent research shows that napping can have several benefits for individuals who are sleep deprived. Naps as short as ten minutes have been shown to increase

**Kelly Donohue** is a doctoral student in Counseling Psychology at Northern Arizona University. Correspondence concerning this article should be sent to Kelly Donohue at [kcd66@nau.edu](mailto:kcd66@nau.edu).

attention as well as improve overall mood (Chen, 2013). Hou, Huangfu, Zhang, & Miao (2007) performed a study and used an analysis of variance (ANOVA) with repeated measures to determine if napping has positive impacts on cognition and subjective mood. Hou et al. concluded cognitive performance and positive mood increase when sleep deprived individuals napped versus did not nap. This finding provides an alternative for students who are busy with course work, working, and managing their daily lives. Although napping should not be used as a substitute for overnight sleep, it can be a productive alternative for individuals who do not have stable sleeping patterns and are unable to achieve sufficient amounts of sleep during an overnight period (Chen, 2013).

The focus of this paper is on the benefits of sleep for overall wellness and how naps can be used as a temporary enhancement when overnight sleep time is diminished. Sleep is important in order to achieve optimum levels of cognition, emotion, and physical productivity. Despite the importance of sleep, undergraduate and graduate students are consistently receiving less than ideal sleep levels. This paper analyzes an alternative for this population in order to increase productivity and improve mood.

### **Why Sleep is Important**

Efficient amount and quality of sleep provides many benefits that affect individuals in their ability to function on a daily basis. Sleep affects cognitive, emotional, and physical functioning (Gruber, 2012). Research has shown that sleep deprivation degrades overall memory and has negative impacts on a person's ability to perform verbal learning and visual memory tasks (Stickgold & Walker, 2005). Sleep deprivation also negatively impacts emotional regulation and causes impulsivity and high levels of anxiety and stress. Increased levels of anxiety and stress are also correlated with difficulties sleeping, creating a cycle decreasing quality of sleep and increasing irritability and stress (Dahl & Lewin, 2002). Lastly, sleep deprivation has negative effects on overall health. Decrease in sleep quality has negative effects on the body's immune system and ability to fight off bacterial infections and viruses (Gruber, 2012). For undergraduate and graduate students this can also be a cyclic affect. When this

population of individuals becomes sick, they are likely to have an increased level of stress trying to complete assignments, further increasing stress and anxiety levels and decreasing quality of sleep (Gruber, 2012).

Too little sleep over an extended period of time can have serious consequences. Individuals who suffer from insomnia experience overall activity impairment, and significantly lower physical and mental productivity than individuals without insomnia (Bolge, Doan, Kannan, & Baran, 2009). Insomnia is described by the Diagnostic and Statistical Manual of Mental Disorders (4<sup>th</sup> edition, text revision, 2000) as experiencing problems falling asleep, staying asleep, waking too early, and/or not feeling rested even after ample amount of time in bed. Insomnia can significantly decrease the quality of life for an individual and impact overall functioning. Graduate and undergraduate students are at risk for insomnia because of the lower levels of sleep they obtain while in school (Bolge, Doan, Kannan & Baran, 2009).

A study done by Forquer et al. (2008) researched the sleep quality and quantity of undergraduate and graduate students at a public university. This study found that there was no significant difference between undergraduate and graduate students' sleep patterns. The study also found that 33% of students take 30 minutes or more to fall asleep, 43% wake more than once nightly, and 33% report feelings of fatigue and tiredness throughout the day (Forquer et al., 2008). This suggests that more than 1/3 of undergraduate and graduate students display symptoms related to insomnia. Furthermore, Chen (2013) emphasizes that women are at the highest risk for nighttime and daytime drowsiness. Students who exhibit these sleeping behaviors are at risk for decrease in physical, cognitive and emotional productivity.

Sleep has many implications for overall wellness of an individual. Degraded levels of both quality and quantity of sleep are associated with degraded levels of emotional, physical and cognitive productivity. In order to maximize productivity, undergraduate and graduate students must obtain sufficient levels of sleep.

### **Solution for Sleep Deprived Students**

Recent research suggests that napping can be used as a substitute for sleep deprived individuals. Small amounts of sleep, as little as ten minutes, have been shown

to increase focus, creativity, memory, and overall mental alertness (Chen, 2013). This observation is important for undergraduate and graduate students struggling to find time to sleep at night. Taking short naps during the day may assist in rejuvenating productivity and ability to perform academically during stressful time periods of the semester.

### **Napping Defined**

A nap is any period of time less than one half of the amount of time slept the previous night and usually lasts between 15 minutes to 2 hours (Tietzel & Lack, 2002). Naps are used to rejuvenate energy when an individual is feeling fatigued. There is no specific time an individual should nap, other than when noticing a dip in energy level. Napping should be kept to a maximum of two hours so regular sleeping patterns are not disturbed (Tietzel & Lack, 2002).

### **Length of Time a Nap Should Last**

Short naps are rich in slow wave sleep, which is the most restful stage of sleep where the body is able to re-energize itself. The time that napping allows for individuals to spend in slow wave sleep makes napping a good alternative to individuals who are sleep deprived (Tietzel & Lack, 2002). A study performed by Tietzel and Lack (2002) demonstrated that a ten-minute nap significantly improves an individual's alertness and cognitive performance when they are deprived of sleep the night before. However, shorter naps (lasting 30 seconds to 90 seconds) do not show any benefits. This suggests that the quantity of time spent napping does matter, and should be a minimum of ten minutes.

Additionally, the amount of time spent napping should depend on how sleep deprived an individual is. Longer naps are needed to follow periods of extreme sleep deprivation, such as an individual staying up all night studying for exams. These longer naps should last longer than 30 minutes. Brief 10-30 minute naps are only useful to individuals who have obtained sufficient sleep and are experiencing normal energy dips, or who are mildly sleep deprived (Milner & Cote, 2008). Furthermore, longer periods of wakefulness, at least thirty minutes, are required to see the benefits of shorter naps (Milner & Cote, 2008). When an individual wakes from a nap they often experience

feelings of tiredness and grogginess. It takes time for the benefits of a nap to be seen, and they are not immediate upon waking. In contrast, longer naps take less time to recuperate from than shorter naps. This is important to consider when an individual is engaging in napping behavior. It is not in the best interest of the individual to wake immediately before a task has to be completed (Milner & Cote, 2008).

### **Benefits of Napping**

Individuals perform best when they are not fatigued. When fatigued, a person is less able to focus on work and perform to maximum capacity. Napping can be used to restore energy levels quickly, and increase personal productivity (Milner & Cote, 2009). Naps are also shown to provide better improvement in productivity than caffeine supplements such as energy drinks which are commonly used by undergraduate and graduate students (Bonnet et al., 1995). Napping is an easy way for students to regain energy levels and increase productivity when they are sleep deprived due to an increase in stress and workload. Benefits of napping include physical, emotional, and cognitive benefits (Bonnet et al., 1995).

**Cognitive benefits.** Cognitive benefits of napping include an increase in capacity of working memory and ability to perform cognitive tasks. Lahl, Wispel, Willigens and Pietrowsky (2007) conducted a study that emphasized the improvement napping can have on encoding declarative memories. This study tested free recall for two groups of individuals that had learned the same list of words, one group napped before participating in recall and the other group did not. Individuals who had napped performed significantly better on the free recall task than did individuals who had not napped, ( $t = 2.57$ ;  $P = 0.008$ ). This finding was true for individuals who napped between six and thirty minutes (Lahl et al., 2007).

Likewise, Lau, Tucker and Fishbein (2010) found similar results when conducting a study measuring the effects of napping on declarative memories. This study focused on both relational memory and rote memory. Similarly to Lahl et al. (2007), Lau et al. (2010) found that napping during the day can significantly improve declarative memories. This study was also able to correlate improvement in relational memories with slow wave sleep occurring during periods of daytime napping (One-way ANCOVA,

$F_{1,29} = 5.15, p = 0.03, \text{partial } \eta^2 = 0.16$ ). The finding suggests that napping does not only assist in rote memories but also with the cognitive activities involving relational memories (Lau et al., 2010).

**Emotional benefits.** A short daytime nap can improve overall mood and emotional wellbeing (Chen, 2013). This improvement is demonstrated in a study performed by Inoue and Luo (2000) which focused on the effects of daytime napping on mental states. Inoue and Luo (2000) conducted their study using a mix of females and males averaging a napping period of 30.5 minutes and a post-nap wake-up period averaging 14 minutes. The results demonstrated improved mental states in participants, specifically focusing on moderating levels of anger, joy, relaxation, and sadness. The study concluded that after napping, the participants had overall improved mental states and were better able to monitor their own emotions. The emotional benefits from napping allow individuals to be able to monitor their own emotions and relieve feelings of anxiety and sadness (Dahl & Lewin, 2002).

**Physical benefits.** A short daytime nap lasting less than 30 minutes can provide a boost of energy lasting up to 3 hours. This energy boosts allows for more productivity and alertness throughout the day (Chen, 2013). Additionally, napping can decrease stress levels, which are harmful to the immune system. Through decreasing levels of stress the immune system is less susceptible to bacteria and viruses (Gruber, 2012).

### **Nap Conclusions**

Naps differ in length between individuals, and naps of varying lengths are shown to have benefits for both sleep deprived and non-sleep deprived individuals. Napping for as little as ten minutes can increase mood and cognitive functioning as well as have other physical benefits. Napping is a useful method for undergraduate and graduate students to re-energize after being sleep deprived during stressful periods of a semester. Napping, and allowing for a period of wakefulness after a nap, can improve memory and performance for this population.

### **Concluding Comments**

Undergraduate and graduate students often do not receive adequate amounts of sleep for maximum performance (Forquer et al., 2008). This lack of sleep may be due

to stress related to studying and completing schoolwork. It may also be due to staying up late to complete course work, managing social lives, and being members of the work force. Overall, sleep is an important physiological function, and getting insufficient sleep can have detrimental effects for any individual (Bonnet et al., 1995).

Sleep deprivation is associated with higher levels of anxiety, stress, fatigue, and compromised immune systems. Sleep deprivation can have negative impacts on memory including a decrease in ability to recall and form new memories (Gruber, 2012). If undergraduate and graduate students are sleep deprived, their ability to perform in an academic setting as well as their emotional and physical wellness will diminish. It is important for this population to have a means of rejuvenating energy and alertness during time periods when sleep is limited (Gruber, 2012).

One solution for undergraduate and graduate students is to take short naps during the day before or after a period of sleep deprivation. Recent studies have shown that napping can improve mood and regulation of emotions (Inoue & Luo, 2000). Napping also has other cognitive benefits including improving working memory for declarative memories (Lahl et al., 2007).

Napping is a simple intervention that both undergraduate and graduate students can utilize. Students who nap for periods as short as ten minutes can experience improvement in overall functioning (Chen, 2013). This short time period will allow students to regain energy and be more productive with course work. However, individuals with increased levels of sleep deprivation need longer periods of napping in order to regain energy. Napping should not be used as a substitute for nighttime sleep, but in congruence with nightly rest or as a means to regain energy during periods where sleep time is limited (Chen, 2013).

## References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Bolge, S., Doan, J., Kannan, H., & Baran, R. (2009). Association of insomnia with

- quality of life, work productivity, and activity impairment. *Quality of Life Research*, 8(4), 415-422.
- Bonnet, M. H., Gomez, S., Wirth, O., & Arand, D. L. (1995). The use of caffeine versus prophylactic naps in sustained performance. *Sleep*, 18, 97-104.
- Chen, J. (2013). The napping revolution. *Marie Claire (US)*, 20(30), 356-359.
- Dahl, R.E., Lewin, D.S. (2002). Pathways to adolescent health: Sleep regulation and behavior. *Journal of Adolescent Health*, 1, 175–184.
- Forquer, L. M., Camden, A. E., Gabriau, K. M. & Johnson, L. (2008). Sleep patterns of college students at a public university. *Journal of American College Health*, 56(5), 563-565.
- Gruber, R. (2013). Making room for sleep: The relevance of sleep to psychology and the rationale for development of preventative sleep education programs for children and adolescents in the community. *Canadian Psychology*, 54(1), 62-71.
- Hou, Y., Huangfu, E., Zhang, L., & Miao, D. (2007). Changes in cognition and mood due to sleep inertia after 30-hour sleep deprivation. *Internet Journal of Mental Health*, 4(1), 3.
- Inoue, S., & Luo, Z. (2000). A short daytime nap modulates levels of emotions objectively evaluated by the emotion spectrum analysis method. *Psychiatry & Clinical Neurosciences* 54(2), 207-212.
- Lahl, O., Wispel, C., Willigens, B., & Pietrowsky, R. (2008). An ultra short episode of sleep is sufficient to promote declarative memory performance. *Journal of Sleep Research*, 17(1), 3-10.
- Lau, H. H., Tucker, M. A., & Fishbein, W. W. (2010). Daytime napping: Effects on human direct associative and relational memory. *Neurobiology of Learning & Memory*, 93(4), 554-560.
- Milner, C. E. & Cote, K. A. (2008). A dose-response investigation of the benefits of napping in healthy young, middle-aged, and older adults. *Sleep and Biological Rhythm*, 6(1), 2-15.
- Milner, C. E. & Cote, K. A. (2009). Benefits of napping in health adults: Impact of nap length, time of day, age, and experience with napping. *Journal of Sleep*



*Research* 18(12), 272-281.

Stickgold, R., Walker, P. (2005). Sleep and memory: The ongoing debate. *Sleep*, 28(10), 1225-1227.

Tietzel, A. J., & Lack, L. C. (2002). The recuperative value of brief and ultra-brief naps on alertness and cognitive performance. *Journal Of Sleep Research*, 11(3), 213-218.

Wong, M., Lau, E., Wan, J., Cheung, S., Hui, C., & MOK, D. (2013). The interplay between sleep and mood in predicting academic functioning, physical health and psychological health: A longitudinal study. *Journal of Psychosomatic Research*, 74(4), 271-277.