

Sleep Quality and its Impact on Levels of Trait Anxiety and Perceived Stress

Ezra Gray^a, Debra Lemke^a

One in four college students experience overwhelming sleep problems throughout their college career. Many studies have determined significant connections between sleep quality and issues of mental and emotional health, namely those involving stress and anxiety. In the fall of 2015 this self-administered survey was used to examine the possible impact sleep quality could have on both levels of trait anxiety and levels of perceived stress. Using systematic random sampling, a sample of 416 rooms were selected for participation from a population of 1311 campus residents attending a small liberal arts college in the mid-Atlantic region. Of the 416 selected dorms, 280 completed the survey, resulting in a response rate of 67.31%. The results indicate statistically significant relationships between both sleep quality and levels of trait anxiety and sleep quality and levels of perceived stress, supporting both hypotheses.

Keywords: Sleep Quality; Trait Anxiety; Perceived Stress

Introduction

Sleep is one of only four biological necessities human bodies require to survive, the others being air, water, and food (Gilbert and Weaver 2010). The average human being can survive longer without food than without sleep, yet “sleep deprivation is so common and pervasive these days that it’s now considered a public health epidemic, according to the...[Center for Disease Control]” (Bender 2015:2). Furthermore, there is a widespread inattention to sleep quality across America. Sleep quality, as defined by the Pittsburgh Sleep Quality Index (PSQI), is comprised of seven components, including subjective sleep quality, sleep latency (how long it takes to fall asleep), habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. Studies suggest that around 70 million Americans suffer from poor quality sleep, and additionally that only a third of Americans actually get the 7-9 hours recommended by the National Sleep Foundation (Buscher 2014). This is highly disconcerting, considering how essential high quality sleep is to an individual’s psychological, emotional, and physical health and well-being. In fact, many studies have linked chronically poor sleep quality to the development of psychological disorders such as depression and anxiety (Sowder 2015). “Literature suggests that...[poor sleep] is a significant risk factor for poor health, functional impairment...poor quality of life, and mortality” (Martin et al 2010:829). However, regardless of all this evidence, people still go about their lives sleeping poorly as though nothing is wrong, and as bad as it is in the rest of society, it is far worse with college students.

Gilbert and Weaver (2010:296) discovered that “university students report at least twice as many sleep difficulties as the general population.” Many recent studies have found startling numbers of students that are considered poor quality sleepers. One such study found that in their sample of over one thousand college students, over 60% qualified as being poor quality sleepers, while another study, with a smaller sample, had findings that indicated as many as 70% qualify as sleep deprived (Sadigh, Himmanen, and Scepanisky 2014).

Furthermore, college life is fraught with both anxiety and stress. Students are thrust into a life full of uncomfortable social situations, given strict academic schedules, and this causes immense internal pressure. Coupled with the fact that “factors relating to anxiety and stress are...[some] of the most important concomitants of sleep complaints,” (Buysse et al 1989:193-213) it is no wonder that Galambos, Howard, and Maggs (2010:342) reported that “lower quality sleep...[is] associated with poorer mental health in university students.” This study will aim to examine the relationship between sleep quality and trait anxiety, as well as the relationship between sleep quality and perceived stress.

Overview

Sleep quality is a combination of subjective aspects of sleep, such as depth and restfulness of sleep, and quantitative aspects such as duration and sleep latency. Many studies use the term sleep quality only to mean subjective sleep quality and fail to include the quantitative aspects. There is nothing inherently wrong with this approach, but there is a multitude of evidence linking these quantitative aspects with subjective sleep quality. For instance, Sadigh et al (2014) found that participants who spend a longer time falling asleep have a reduction in quality of sleep. Therefore, sleep quality will be conceptualized according to the definition provided by the PSQI.

People in all stages of life, children, adolescents, and adults alike, are all greatly damaging their health through lack of quality sleep (Sowder 2015). Heart disease, diabetes, obesity, and many forms of premature death have been linked to chronically poor sleep (Sowder 2011). For the elderly, studies have shown that poor sleep is associated with declining functional status and poor quality of life (Martin et al 2010), while in the general population, one study found that “people who don’t sleep enough are at higher risk for cardiovascular disease...regardless of age, weight, smoking...[or] exercise habits” (National Sleep Foundation 2015:1).

a. Department of Sociology, McDaniel College, Westminster, MD, 21157

Furthermore, many studies have established that, in addition to the major impact it has on students' health and well-being, poor sleep quality can also significantly interfere with their academic abilities (Sadigh et al 2014). "Research...has shown that diminished sleep...quality is related to compromised cognitive functioning...[and in turn] school performance" (Buckhalt et al 2007:30). The brain uses sleep to consolidate, reorganize, and restructure skills and memories (Sowder 2015). Therefore, it is no great surprise that a lack of quality sleep can significantly affect students' cognitive functioning in class the next day, making them far less productive, particularly in terms of processing information, and difficulties in concentration and recall (Sadigh et al 2014). Many students may actually be compromising their education, and in turn sabotaging their future by not getting enough quality and restorative sleep (Sadigh et al 2014).

As well as risking their physical health, people with a lack of regard for sleep quality have far greater tendencies towards developing psychological disorders. One study found that for older individuals, poor sleep quality is associated with significantly more symptoms of depression, while another study found that excessive or insufficient sleep were linked to an increased risk of depression (Martin et al 2010; Hamilton et al 2007). Additionally, individuals with poor sleep quality "report significantly higher levels of depression...and exhibit greater pathological tendencies," (Gray and Watson 2002:178). Therefore, it is no surprise that poor overall sleep quality has been shown to increase symptoms of depression in students both adolescent and college-aged (Adams and Kisler 2013).

Sleep Quality and Trait Anxiety

Trait anxiety will be defined according to the State-Trait Anxiety Inventory (STAI). The STAI is divided into two subscales (state and trait). The State Anxiety Subscale evaluates the participants' current state of anxiety, while the Trait Anxiety Subscale determines the participants' general proneness to anxiety tendencies (Julian 2011). In this study, the focus will be on trait anxiety, because it is more indicative of how the participants interact with anxiety on a general basis. State anxiety, while important in many situations, is not necessarily suggestive of the participant's normal levels of anxiety. Therefore, trait anxiety will be defined as one's general predisposition towards anxiety.

It is no secret that anxiety is related to keeping people up at night. "Individuals who are...anxious often experience decreased sleep quality due to symptoms of insomnia" (Adams and Kisler 2013:26). However, there is also much evidence suggesting that sleep quality also impacts levels of anxiety. "Sleep quality disturbances are frequently reported in essentially all psychiatric disorders, including...anxiety" (Buysse 1989:193-213). In one study, Galambos et al (2010) found that poorer quality sleep was associated with higher levels of anxiety the next day, while in another, Gray and Watson (2002) discovered that poor quality sleepers tend to report significantly higher levels of anxiety. It seems pertinent then to further explore the subject, particularly in the case of college students, especially considering their sleep habits, along with the fact that one study found that around 19% of

students have been diagnosed with anxiety disorders (Adams and Kisler 2013).

Sleep Quality and Perceived Stress

Stress will be defined according to the 4-item version of the Perceived Stress Scale (PSS-4). The PSS-4 is a shortened version of "the most widely used psychological instrument for measuring the perception of stress" (Cohen 1994:1). The purpose of this scale is to measure how stressful participants perceive their lives to be. This is based on the idea that an individual's stress level is accurately measured by their perception. Therefore, stress will be defined as how stressful one perceives his or her life experiences (Cohen 1994).

Many researchers agree that sleep quality is very closely linked to levels of stress. "Research shows that getting less than five hours of sleep at night can make you feel more stressed [out the next day]" (Bender 2015:4). In addition, Galambos et al (2010) found that higher quality of sleep on any given night was indicative of lower levels of stress the next day. Furthermore, many studies have found that higher quality sleep is necessary in order to properly deal with issues of stress reactivity, and that it actually enables enhanced enjoyment of challenging opportunities. In fact, many research groups are now suggesting that sleep be thought of as a resource for stress management (Hamilton et al 2007). Needless to say, it is highly important to find out the relevance of this information in a college setting.

All in all, most research shows that a lack of adequate sleep quality is highly pervasive and heavily entrenched in millions of individuals throughout American society, but even more so in a college setting (Buscher 2015; Sadigh et al 2014). Furthermore, a multitude of studies have found significant correlations between poor quality sleep and a decline in many aspects of the human experience. One study found that over time, chronically poor sleep could lead to many serious medical conditions such as diabetes, obesity, heart disease, and eventually death (Sowder 2015). Meanwhile, Lehto and Uusitalo-Malmivaara (2013:419) discovered evidence that a lack of quality sleep "impairs the capacity to learn and has a...[significant] effect on academic performance." However, this study will focus on the many effects poor sleep habits have on mental and emotional well-being. Buysse et al (1989) found that sleep quality is related to nearly every psychiatric malady, but the most prevalent were issues surrounding levels of anxiety and stress. Considering that, on average, studies involving sleep and college students find significant sleep quality disturbances in around 50-70% of their participants, compounded with the significant stressors and anxieties students regularly experience, it seems pertinent to test the effects sleep quality has on levels of trait anxiety and perceived stress levels. Thus, this study hypothesizes that:

1. Sleep quality may impact levels of trait anxiety.
2. Sleep quality may impact levels of perceived stress.

Methods

This cross-sectional research study was conducted in the fall of 2015 at a small liberal arts college in the mid-Atlantic region. Using systematic random sampling, a sample of 416

rooms was selected from a sampling frame of 1324 campus rooms given by the housing office. From this list, 13 rooms were subtracted in order to remove the rooms of the researchers and those used during the pretest, leaving a total population of 1311 campus residents. The 416 rooms were selected by choosing every third dorm from a random start of 774. The sample size itself was determined using a 95% confidence level and a confidence interval of 4. Of the 416 dorms chosen, 280 participated in the survey, giving a response rate of 67.31%. This high response rate gives the individual level data the validity needed to generalize it to college students across America.

This self-administered survey was given out by the individual researchers who designed it. Each person had a selection of rooms given to him or her based on geographic location. To avoid complications of integrity, each researcher was required to go to their assigned rooms with a partner. Additionally, all researchers took measures to protect

participants' anonymity by having each participant place their completed consent form in a brown envelope and having them seal the completed surveys in unmarked white envelopes. Furthermore, once a survey was given out, no researcher was allowed to touch them, having the participants' place the already sealed surveys in a bigger envelope themselves. These measures allowed the researchers to operate from a place of complete ethical integrity, and prevented any possible biases.

The variables in question for this study include the independent variable sleep quality as defined by the Pittsburgh Sleep Quality Index (PSQI), along with the dependent variables levels of trait anxiety, as defined by the State-Trait Anxiety Inventory (STAI), and levels of perceived stress, as defined by the Perceived Stress Scale (PSS-4). Sleep quality, trait anxiety, and perceived stress will be assessed using modified versions of the PSQI, the Trait Anxiety Subscale from the STAI, and the PSS-4 respectively.

Results

Table 1: Sample/Population Comparison

Demographic	Population Fall 2015	Sample Fall2015
Sex		
Male	46%	45.6 %
Female	54%	54.4 %
Race/Ethnicity		
White	73%	67.1 %
Black	15%	16.6 %
Asian	5%	5.8 %
Hispanic	6%	6.1 %
Other	1%	4.4%
Residential	79%	
Class Rank		
First Year Students	26%	37.0 %
Sophomore	22%	16.7 %
Junior	25%	21.7 %
Senior	27%	24.6 %

For this study, 79% of the student body is residential and only 21% are commuter students (Table 1). As seen in Table 1, the sample is largely representative of the campus demographics. There are some differences, but they are, for the most part, thought to be insignificant enough that they do not effect representation. The only category where there was real overrepresentation was the First Year Students, which was overrepresented by 11% (Table 1). However, overall the sample accurately represents the student population.

Table 2: Frequencies for Modified PSQI

During the past month, how often have you had trouble sleeping because you:	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. Cannot get to sleep within 30 minutes	20.7%	29.7%	27.9%	21.7%
b. Wake up in the middle of the night or early morning	16.4%	29.6%	30.7%	23.4%
c. Have to get up to use the bathroom	35.4%	32.8%	21.0%	10.7%
d. Cannot breathe comfortably and or snore	70.3%	14.7%	8.4%	6.6%
e. Feel too cold or too hot	29.5%	26.9%	28.0%	15.6%
f. Have bad dreams	50.7%	26.6%	12.8%	9.9%
g. Have pain	59.2%	23.5%	10.7%	6.6%
h. Other reason (s), please describe, including how often you have had trouble sleeping because of this reason (s):	66.5%	12.7%	8.7%	12.1%
During the past month, how often have you				
i. taken medicine to help you sleep?	76.6%	8.9%	7.4%	7.1%
j. had trouble staying awake during daytime activity?	37.1%	31.5%	18.0%	13.5%
k. How often have you had problems staying motivated?	22.4%	28.5%	27.4%	21.7%
l. During the past month, how would you rate your sleep quality overall?	Very bad 5.3%	Fairly bad 26.3%	Fairly good 59.4%	Very good 9.0%
m. How long (in minutes) has it taken you to fall asleep each night?	<15 min 27.5%	16-30 min 42.5%	31-60 min 20.9%	>60 min 9.2%
n. How many hours of actual sleep did you get at night?	<6 hr 30.7%	5-6 hr 47.0%	6-7 hr 13.3%	>7 hr 8.9%

Table 2 displays the frequencies for the majority of the questions from the modified version of the PSQI. The two questions not represented are “What time have you usually gone to bed?” and “What time did you usually get up in the morning?” respectively, and are not depicted in tables because of the wide variation in answers given. These questions represent multiple variables that, when put together, give an accurate representation of the subjects’ sleep quality. Questions m and a measure sleep latency, question l measures subjective sleep quality, question n, along with the two not shown measure sleep duration, question i measures use of sleeping medications, questions j and k measure daytime dysfunction, and b through h measure sleep disturbances. The data represented by these tables indicates for the most part: a relatively low percentage of sleep disturbances, moderate subjective sleep quality (59.4% fairly good and 26.3% fairly bad), fairly poor sleep latency, moderate levels of daytime dysfunction, very infrequent use of sleeping medications, and moderate sleep duration (Table 2). Furthermore, in order for a scale to be reliable, the Cronbach’s Alpha must be at least 0.60 for exploratory research and the Cronbach’s Alpha for this modified version of the PSQI is 0.675. Combined this information is highly indicative of an overall moderate level sleep quality throughout the population.

Table 3: Frequencies for Modified STAI Trait Anxiety Subscale

Please indicate your level of agreement with the following statements:	Almost Never	Sometimes	Often	Almost Always
a. I worry too much over something that doesn't really matter	12.8%	43.8%	25.9%	17.5%
b. I feel that difficulties are piling up so that I cannot overcome them	25.1%	46.5%	20.4%	8.0%
c. I am “calm, cool, and collected”	12.1%	41.4%	37.7%	8.8%
d. I feel satisfied with myself	16.5%	38.5%	38.8%	6.2%
e. I feel nervous and restless	16.1%	55.1%	21.5%	7.3%
f. I feel confident	17.9%	36.9%	38.3%	6.9%
g. I make decisions easily	9.5%	29.3%	39.2%	22.0%
h. Disappointments weighs heavily on my mind	18.6%	39.4%	22.3%	19.7%

Table 3 shows the percentage of the population to answer almost never, sometimes, often, or almost always to each question in the modified STAI Trait Anxiety Subscale. The questions in the scale all are designed to measure the subjects' tendency towards anxiety, but this is done from two angles. The first evaluates the subjects' composure and stability, measured by questions c, d, f, and g. The second gauges the subjects' instability, measured by questions a, b, e, and h. The data in Table 6 shows that, for both sets of questions, the majority of participants answered sometimes or often, indicating that most of the population has at least moderate levels of trait anxiety. Furthermore, the Cronbach's Alpha for this modified version of the STAI Trait Anxiety Subscale is 0.847. Well over the necessary score of 0.60 required for exploratory research, a Cronbach's Alpha of 0.847 marks this modified scale as exceptionally reliable.

Table 4: Frequencies for PSS-4

In the last month, how often have you felt:	Never	Almost Never	Sometimes	Fairly Often	Very Often
a. Unable to control important things in your life?	9.2%	24.2%	42.1%	16.8%	7.7%
b. Confident about your ability to handle your personal problems?	17.6%	39.0%	33.5%	8.1%	1.8%
c. That things were going your way?	7.0%	31.6%	45.6%	14.0%	1.8%
d. Difficulties were piling up so high you could not overcome them?	N/A	25.1%	46.5%	20.4%	8.0%

Table 4 displays the frequencies for each question in the PSS-4. Each question is designed to measure the subjects' levels of perceived stress. The data indicates that the majority of the population has moderate or higher levels of perceived stress, leaning towards the higher side. Only 9.9% of the population reported feeling confident about their ability to handle their personal problem often or very often in the past month, and only 15.8% of the population felt that things were going their way (Table 7). Although the frequencies for questions a and d were both more moderate, the data as a whole is highly indicative of a high-stress population. Furthermore, the Cronbach's Alpha for the PSS-4 is 0.697, a more than adequate reliability score for exploratory studies such as this one.

Table 5: Levels of Perceived Stress as Impacted by Levels of Sleep Quality

Levels of Perceived Stress	Levels of Sleep Quality		
	Good Sleep Quality (9 and Below)	Moderate Sleep Quality (10-13)	Poor Sleep Quality (14 and Above)
Low Stress (5 and Below)	44.7%	26.4%	17.1%
Moderate Stress (6-7)	32.9%	26.4%	24.4%
High Stress (8 and Above)	22.4%	47.3%	58.5%

Chi-Square = 24.275 Asymp. Sig. = 0.000 Cramer's V = 0.221 Approx. Sig. = 0.000

Table 5 displays a statistically significant relationship between levels of perceived stress and levels of sleep quality, supporting the hypothesis that sleep quality may impact levels of perceived stress. Good sleep quality is indicative of low stress (44.7%), while both moderate and poor sleep quality are indicative of high stress (47.3% and 58.5% respectively) (Table 5). The Chi-Square for this relationship is 24.275 with a p-value of 0.000. The Cramer's V is 0.221 with a p-value of 0.000. This signifies that levels of sleep quality accounts for 4.884% of the variance in levels of perceived stress.

Table 6: Levels of Trait Anxiety as Impacted by Levels of Sleep Quality

Levels of Trait Anxiety	Levels of Sleep Quality		
	Good Sleep Quality (9 and Below)	Moderate Sleep Quality (10-13)	Poor Sleep Quality (14 and Above)
Low Anxiety (16 and Below)	51.3%	28.6%	18.3%
Moderate Anxiety (17-21)	38.2%	33.0%	35.4%
High Anxiety (22 and Above)	10.5%	38.5%	46.3%

Chi-Square = 31.373 Asymp. Sig. = 0.000 Cramer's V = 0.251 Approx. Sig. = 0.000

Table 6 shows a statistically significant relationship between levels of trait anxiety and levels of sleep quality, supporting the hypothesis that sleep quality may impact levels of trait anxiety. Good sleep quality is suggestive of low anxiety (51.3%), while both moderate and poor sleep quality are suggestive of high anxiety (38.5% and 46.3% respectively) (Table 6). The Chi-Square for this relationship is 31.373 with a p-value of 0.000. The Cramer's V is 0.251 with a p-value of 0.000. This indicates that level of sleep quality explains 6.300% of the variance in levels of trait anxiety.

Discussion

The purpose of this study was to examine the possible impact sleep quality could have on both levels of trait anxiety and levels of perceived stress. The two tested hypotheses were sleep quality may impact levels of trait anxiety and sleep quality may impact levels of perceived stress. After collecting and analyzing the data, it can be concluded that sleep quality significantly impacts levels of trait anxiety and levels of perceived stress, supporting both hypotheses.

The explanation for this significance is entirely medical. As mentioned earlier, sleep is one of the four biological necessities humans need to survive (Gilbert and Weaver 2010). Furthermore, sleep is incredibly important for maintenance of a wide variety of mental faculties such as memory and general cognitive functioning. It therefore stands to reason that sleep quality would impact people psychologically as well, especially in a setting inherently filled with anxiety, stress, and poor sleep habits such as college.

All in all, acquiring knowledge on the impacts sleep quality can have on psychological well-being is vital to bringing awareness to the greater population, especially that of college students. Greater awareness about the necessity for maintaining positive sleep habits is the first step towards finding a solution. For future research, it may be pertinent to check the generalizability of the findings of this study by conducting a similar study in alternative settings such as a big state university, or going even further and testing it against results of a study on the greater population. Researchers could go even further still by conducting sleep studies in a controlled environment where they can monitor subjects' brain activity and evaluate their psychological well-being on a regular basis. It is imperative that a solution be found, especially for college students, in order to prevent them from more permanent psychological harm.

References

1. Adams, Sue K. and Tiffani S. Kisler. 2013. "Sleep Quality as a Mediator Between Technology-Related Sleep Quality, Depression, and Anxiety." *Cyberpsychology, Behavior, and Social Networking* 16(1):25-30.
2. Alapin, Iris, Catherine S. Fichten, Eva Libman, Laura Creti, Sally Bailes, and John Wright. 2000. "How is good and poor sleep in older adults and college students related to daytime sleepiness, fatigue, and ability to concentrate?" *Journal of psychosomatic research*, 49(5):381-90.
3. Aurora University. "Sleep Quality Assessment (PSQI)." Aurora, IL: Aurora University. Retrieved September 15, 2015. (www.aurora.edu/documents/wellness/toolbox/assessment.pdf).
4. Bender, Rachel G. 2015. "Your Body After a Night of Not-Enough Sleep" *Yahoo Health*, September 10. Retrieved October 21, 2015. (<http://www.yahoo.com/health/your-body-after-a-night-1253770364583990.html>).
5. Buckhalt, Joseph A., Mona El-Sheikh, Peggy S. Keller, E. Mark Cummings, and Christine Acebo. 2007. "Child Emotional Insecurity and Academic Achievement: The Role of Sleep Disruptions." *Journal of Family Psychology* 21(1):29-38.
6. Buscher, Jaci. 2014. "The Ugly Truth: Drowsy Driving vs. Drunk Driving" *The Insurance Place Inc*, July 30. Retrieved October 21, 2015 (<http://www.insplace.com/0814drowsydriving.html>).
7. Buysse, Daniel J., Charles F. Reynolds III, Timothy H. Monk, Susan R. Berman, and David J. Kupfer. 1989. "The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research." *Psychiatric Research* 28(2):193-213.

8. Cohen, Sheldon. 1994. "Perceived Stress Scale." *Mind Garden Inc.*, Retrieved September 15, 2015. (www.mindgarden.com/documents/PerceivedStressScale.pdf).
9. CBS News. 2013. "CDC: Nearly 9 million Americans use prescription sleep aids." *CBS News*, August 29. Retrieved September 24, 2015 (<http://www.cbsnews.com/news/cdc-nearly-9-million-americans-use-prescription-sleep-aids/>).
10. Galambos, Nancy L., Andrea L. Howard and Jennifer L. Maggs, 2010. "Rise and Fall of Sleep Quantity and Quality With Student Experiences Across the First Year of University." *Journal of Research on Adolescence*, 21 (2): 342-349.
11. Gaultney, Jane F. 2010. "The Prevalence of Sleep Disorders in College Students: Impact on Academic Performance." *Journal of American College Health* 59(2).
12. Gilbert, Steven P. and Cameron C. Weaver. 2010. "Sleep Quality and Academic Performance in University Students: A Wake-Up Call for College Psychologists." *Journal of College Student Psychology* 24(4):295-306.
13. Gray, Elizabeth K. and David Watson. 2002. "General and Specific Traits of Personality and Their Relation to Sleep and Academic Performance." *Journal of Personality* 70(2):177-206.
14. Hamilton, Nancy A., C. A. Nelson, N. Stevens, and Heather Kitzman, 2007. "Sleep and Psychological Well-Being" *Social Indicators Research*, 81 (1): 147-163.
15. Julian, Laura J. 2011. "Measures of Anxiety." Bethesda, MD: National Center for Biotechnology Information, U.S. National Library of Medicine. Retrieved September 15, 2015 (www.ncbi.nlm.nih.gov/pmc/articles/PMC3879951/).
16. Lehto, J. E., and L. Uusitalo-Malmivaara, 2013. "Sleep-related factors: associations with poor attention and depressive symptoms." *Child: care, health, and development*, 40 (3): 419-425.
17. Martin, Jennifer L., Lavinia Fiorentino, Stella Jouldjian, Karen R. Josephson, and Cathy A. Alessi. 2010. "Sleep Quality in Residents of Assisted Living Facilities: Effect on Quality of Life, Functional Status, and Depression." *Journal of the American Geriatrics Society* 58(5):829-836.
18. National Sleep Foundation. 2015. "How Sleep Deprivation Affects Your Heart." Arlington, VA: National Sleep Foundation. Retrieved September 21, 2015 (<http://sleepfoundation.org/sleep-news/how-sleep-deprivation-affects-your-heart>).
19. Sadigh, Micah R., Sharon A. Himmanen, and James A. Scepansky. 2014. "An Investigation of the Prevalence of Insomnia in College Students and its Relationship to Trait Anxiety." *College Student Journal* 48(3).
20. Sowder, Jules. 2015, "Benefits of Sleep." *Better-Sleep-Better-Life.com*, September 21. Retrieved October 21, 2015 (<http://www.better-sleep-better-life.com/benefits-of-sleep.html>).
21. Spielberger, Charles D., R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs. 1977. "State-Trait Anxiety Inventory for Adults." Redwood City, CA: Mind Garden Inc. Retrieved September 15, 2015. (yogabharati.org/public_download/Yoga_SN_2014/State_Trait_Anxiety_Inventory_for_adults.pdf).
22. Trockel, Mickey T., Michael D. Barnes, Dennis L. Egget. 2000. "Health-Related Variables and Academic Performance Among First-Year College Students: Implications for Sleep and Other Behaviors." *Journal of American College Health* 49(3).