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USING THE INTEGRATIVE MODEL TO PREDICT INITIATION OR

MAINTENANCE OF RECOMMENDED SLEEP BEHAVIOR IN COLLEGE

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USING THE INTEGRATIVE MODEL TO PREDICT INITIATION OR
MAINTENANCE OF RECOMMENDED SLEEP BEHAVIOR IN COLLEGE
STUDENTS

A THESIS APPROVED FOR THE
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Abstract

Introduction: Sleep deprivation is a serious public health concern in the United States that often goes unnoticed, particularly among college students and young adults. Government initiatives such as Healthy People 2020 and Healthy Campus 2020 have set goals for decreasing the occurrence of sleep deprivation and the adverse effects of sleep deprivation in adults and college students. This study utilized the Integrative Model to explore the relationships between attitudes, perceived norms and perceived behavioral control for intentions towards meeting, or continuing to meet, the recommended 7-9 hours of sleep per night among college students. The purpose of this study was to explore the utility of the Integrative Model towards meeting the 7-9 hours of recommended sleep for a "maintenance group" (those who are already getting 7-9 hours of sleep) and an "initiation group" (those who are not getting 7-9 hours of sleep).

Methods: An elicitation phase was conducted with a sample from the target population (n=100) to establish all the following salient beliefs about both behaviors, for both groups: behavioral, injunctive normative, descriptive normative and control. Afterwards, an instrument was developed to measure the IM constructs related to the behavior. Once the instrument was complete, it was evaluated for face and content validity by a panel of 6 experts. The instrument was next evaluated by a convenience sample (n=48) of the target population for overall readability. The statistical methods of this investigation include multiple regression and correlation procedures to explore relationships between attitudes towards the behavior, perceived norms and perceived behavioral control and intentions to sleep 7-9 hours per night for either the next 30 days (initiation group) or the next 6 months (maintenance group). Two models of regression

were used to understand the determinants of intentions (dependent variable). In models 1 and 2 the independent variables were attitidues, perceived norms (PN), and perceived behavioral control (PBC). In models 3 and 4 the indepdent variables were instrumental and experiential attiudes, injunctive and descriptive norms, capacity, and autonomy.

Results: The survey was distributed online to all students in the fall of 2016 at the University of Oklahoma, and 610 responses were used for data analysis (Maintenance=300, Initiation=310) Two rounds of linear regression were performed using a stepwise method of regression on both the maintenance and initiation groups. The most influential predictor of intentions to initiate and maintain the recommended 7-9 hours of sleep per night was PBC (model 1), and more specifically, capacity (model 2). In the first initaition model, PBC was the main predictor of intentions with an unstandardized Beta coefficient of 0.426, followed by PN with an unstandardized Beta coefficient of 0.372, and lastly attitudes, with an unstandardized Beta coefficient of 0.300. In model the standard model for maintenance, PBC was the main predictor of intentions with an unstandardized Beta coefficient of 0.482, followed by PN with an unstandardized Beta coefficient of 0.244. Together, they explain 32.6% of the variance in intentions in the standard model format.

Conclusion: Future practice should focus on increasing capacity, or self-efficacy, in college students to decrease sleep deprivation and increase adherence to CDC sleep standards. Additionally, future research should focus on the IM as a framework for targeting sleep behavior as a prospective study.

Chapter 1: Introduction

Background

Lack of sleep in young adults is a growing problem in the United States. An estimated 83.6 million American adults sleep less than 7 hours each night (***Behavioral Risk Factor Surveillance System Survey Data***, 2014). In addition, 4.7% of all adults reported nodding off while driving in the preceding month (Morbidity and Mortality Weekly Report (MMWR) *Unhealthy Sleep-Related Behaviors*, 2011). Sleep deprivation has been associated with a number of detrimental health and social effects. To illustrate, data from the 2005-2008 National Health and Nutrition Examination Survey (NHANES) showed that 25.1% of adults aged 20-39 had trouble concentrating during weekdays or workdays (MMWR, *Unhealthy Sleep-Related Behaviors*, 2011). This age group also had the highest problem concentrating at work (25.1%) compared to the other age categories such as middle aged adults [40-59 years (24.5%)] and older adults [>60 years (18%)]. Within this same age group, 10.3% reported trouble performing their employed or volunteer work. This was greater than the other two age groups previously mentioned [middle aged adults (10%); older adults (3.5%)].

In 2015, the American Academy for Sleep Medicine (AASM) and Sleep Research Society (SRS) published a report to reach a consensus for recommending an appropriate amount of sleep per night, for all age groups (Watson et al., 2015). Results from this report indicated young adults should sleep between 7 to 9 hours per night. The Center for Disease Control and Prevention (CDC) also recommends the average adult should receive 7 to 9 hours of sleep per night (Center for Disease Control, 2015). While healthy sleep is oftentimes defined as a set duration, Watson et al. (2015) has

also stated that healthy sleep requires consistent quality, length, and regularity of schedule. Healthy sleep is also defined as being free from disturbances or disorders, such as sleep apnea (Watson et al., 2015).

Besides the AASM, SRS and CDC, Healthy People 2020, a government initiative that sets health related goals for the nation, also prioritizes sleep. Healthy People (HP) 2020 has a goal set to increase the amount of adults that get enough sleep by 1.2% [current rate of adults with health sleep 69.6% of adults; HP2020 goal 70.8% of adults]. Currently, there are 2.7 vehicular crashes per 100 million miles traveled, and the HP 2020 goal is to decrease this to 2.1 vehicular crashes per 100 million miles traveled. Within HP 2020 is another initiative with goals and objectives for college students in the United States, named Healthy Campus (HC) 2020. Like HP 2020, HC 2020 has sleep related objectives (American College Health Association, 2012). Currently, 20% of college students report that sleep difficulties adversely impact their performance in school (adverse academic performance was defined as: "receiving a lower grade on an exam or an important project; receiving a lower grade in a course; receiving an incomplete or dropping a course; or experiencing a significant disruption in thesis, dissertation, research, or practicum work.") The HC 2020 goal is to reduce this problem to 18% of students (American College Health Association, 2012).

As demonstrated, many college students do not receive adequate amounts of sleep on a regular basis, therefore health promotion interventions that can predispose, enable and reinforce healthy sleep behaviors are greatly needed. Concurrently, such health promotion interventions should be based upon theoretical underpinnings, given the inherent benefits theory-based approaches possess. To evaluate significant theory-

based predictors of healthy sleep behaviors among college students, the Integrative Model (IM) will be used in this study.

Purpose of the Study

While for some college students getting enough sleep is difficult, for others who can get enough sleep, it can be difficult to maintain the behavior over an extended period of time. Therefore, to promote healthy sleep behaviors among college students, two approaches may be warranted: For college students not meeting sleep recommendations, initiating the behavior is critical, and for those who are currently meeting sleep recommendations, maintaining the behavior is critical. This concept is similar to the stages of change in the Transtheoretical Model, which suggests behavior change happens over a series of stages, and different processes of change help people through the behavior change process (Glanz, 2008). Therefore, the purpose of the study was two-fold. The first purpose of this study was to determine significant predictors of intentions to meet sleep recommendations for college students who are not currently meeting recommendations. The second purpose of this study was to determine significant predictors of intentions to continue meeting sleep recommendations for college students who are currently meeting recommendations. These findings can serve as foundational research that can guide the development of a comprehensive health promotion intervention that could take place on a college campus to better target college students to meet and maintain sleep recommendations.

Research Questions

The following will be investigated in this study:

RQ1. What constructs of the IBM serve as significant predictors of intentions for maintaining 7-9 hours of sleep each night for the next six months among college students?

RQ2. What constructs of the IBM serve as significant predictors of intentions for initiating 7-9 hours each night for the next 30 days among college students?

RQ3: Are there differences in predictors of intentions between the two groups?

Research Hypotheses

There are 2 sets of hypotheses for this study. The first set of hypotheses are for the maintenance group; the second set of hypotheses are for the initiation group.

SET I: Initiation Group

Hypothesis 1: Attitudes, Perceived Norms, and Perceived Behavioral Control will have a significant positive relationship with Behavioral intentions meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Null Hypothesis 1: Attitudes, Perceived Norms, and Perceived Behavioral Control will have no significant relationship with Behavioral intentions for meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Alternative hypothesis 1: Attitudes, Perceived Norms, and Perceived Behavioral Control will have a significant negative relationship with Behavioral intentions meeting

the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Hypothesis 2: The product of each Behavioral belief and Outcome Evaluation will have a significant positive relationship with Attitudes towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Null Hypothesis 2: The product of each Behavioral belief and Outcome Evaluation will have no significant relationship with Attitudes towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Alternative hypothesis 2: The product of each Behavioral belief and Outcome Evaluation will have a significant negative relationship with Attitudes towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Hypothesis 3: The product of each Injunctive normative belief and motivation to comply will have a significant positive relationship with Perceived Norms towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Null hypothesis 3: The product of each Injunctive normative belief and motivation to comply will have no significant relationship with Perceived Norms towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Alternative hypothesis 3: The product of each Injunctive normative belief and motivation to comply will have a significant negative relationship with Perceived Norms towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Hypothesis 4: The product of Descriptive normative beliefs and identification with referents will have a significant positive relationship on Perceived Norms towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Null hypothesis 4: The product of Descriptive normative beliefs and identification with referents will have no significant relationship on Perceived Norms towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Alternative hypothesis 4: The product of Descriptive normative beliefs and identification with referents will have a significant negative relationship on Perceived Norms towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Hypothesis 5: The product of each Control belief and Perceived power will have a significant positive relationship on Perceived Behavioral Control towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Null hypothesis 5: The product of each Control belief and Perceived power will have no significant relationship on Perceived Behavioral Control towards meeting the

recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

Alternative hypothesis 5: The product of each Control belief and Perceived power will have a significant negative relationship on Perceived Behavioral Control towards meeting the recommended amount of sleep in the next 30 days among college students who are currently not currently meeting sleep recommendations.

SET II: Maintenance group

Hypothesis 6: Attitudes, Perceived Norms, and Perceived Behavioral Control will have a significant positive relationship with Behavioral intentions to continue meeting the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Alternative hypothesis 6: Attitudes, Perceived Norms, and Perceived Behavioral Control will have a significant negative relationship with Behavioral intentions to continue meeting the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Null Hypothesis 6: Attitudes, Perceived Norms, and Perceived Behavioral Control will have no significant relationship with Behavioral intentions to continue meeting the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Hypothesis 7: The product of each Behavioral belief and Outcome Evaluation will have a significant positive relationship with Attitudes towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Null Hypothesis 7: The product of each Behavioral belief and Outcome Evaluation will have no significant relationship with Attitudes towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Alternative hypothesis 2: The product of each Behavioral belief and Outcome Evaluation will have a significant negative relationship with Attitudes towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Hypothesis 8: The product of each Injunctive normative belief and motivation to comply will have a significant positive relationship with Perceived Norms towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Null hypothesis 8: The product of each Injunctive normative belief and motivation to comply will have no significant relationship with Perceived Norms towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Alternative hypothesis 8: The product of each Injunctive normative belief and motivation to comply will have a significant negative relationship with Perceived Norms towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Hypothesis 9: The product of Descriptive normative beliefs and identification with referents will have a significant positive relationship on Perceived Norms towards

continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Null hypothesis 9: The product of Descriptive normative beliefs and identification with referents will have no significant relationship on Perceived Norms towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Alternative hypothesis 9: The product of Descriptive normative beliefs and identification with referents will have a significant negative relationship on Perceived Norms towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Hypothesis 10: The product of each Control belief and Perceived power will have a significant positive relationship on Perceived Behavioral Control towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Null hypothesis 10: The product of each Control belief and Perceived power will have no significant relationship on Perceived Behavioral Control towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Alternative hypothesis 10: The product of each Control belief and Perceived power will have a significant negative relationship on Perceived Behavioral Control towards continuing to meet the recommended amount of sleep for 6 months among college students who are currently meeting sleep recommendations.

Significance

Receiving the recommended amount of sleep each night can be difficult for college students. Many studies have shown that the long term health effects of inadequate sleep have severe consequences (Colton, & Altevogt, 2006). Despite the theory-based research that has been done in this area, no study has operationalized the IBM to predict sleep behaviors for college students. Furthermore, studies often do not group students into Behavioral categories such as 'initiation' or 'maintenance'. Thus, the significance of this study was to utilize the IBM to identify significant predictors of the behavior for two groups of college students. Results from this investigation could help establish theoretical underpinnings of future sleep interventions or campaigns targeting students to maintain 7-9 hours of sleep each night or targeting students that will need to start sleeping 7-9 hours each night.

Delimitations

Delimitations to this study should be as follows:

- All participants will be current college students ages 18-24.

- All participants will take the survey within the same semester.

- All participants will be able to take survey without a time limit.

- The IBM will allow for predetermined constructs and measures of Attitudes, Perceived Norms, Perceived Behavioral Control, and intention.

Limitations

Limitations exist for this study. They are as follows:

- Results was self-reported. Therefore, results may be biased or dishonest.

- This survey was cross-sectional.

- The sampling method was convenience sampling taken place at the University of Oklahoma, and this can create limits to the diversity and results cannot be generalized to all college students.

Assumptions

This study required several assumptions about the research method as well as the research participants. They are as follows:

- Participants are capable of reading the survey at a collegiate reading level.

- Participants respond honestly and accurately to all questions.

- Participants do not succumb to an optimistic bias about their sleeping behavior.

- All surveys are reliable, and valid for measuring the constructs of the IBM and categorizing the sleep behavior of participants.

Operational Definitions

1. **Behavior** is an observable event that contains a *Target, Action, Context, and Time.*

2. **Intention** is an individual's readiness to engage in a particular behavior.

3. **Attitudes** is the overall feeling of favorableness or un-favorableness towards a behavior.

    a. **Instrumental Attitudes** is the overall cognitive evaluation of the behavior (or the *thoughtful* response).

    b. **Experiential Attitudes** is the overall affective evaluation of the behavior (or the *emotional* response).

    c. **Behavior beliefs** is the belief that Behavioral performance is associated

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with certain attributes or outcomes.

    d. Outcome Evaluations is the value attached to a Behavioral outcome or attribute.

4. **Perceived Norms** is the pressure one feels to enact a behavior.

    a. Injunctive Norms are an individual's perception that most people who are important to him/her think he/she should or should not perform a particular behavior.

    b. Descriptive Norms are the perceptions that others are or are not performing the behavior in question.

    c. Injunctive/Descriptive Normative Beliefs are beliefs that a particular referent individual or group thinks I should or should not perform the behavior in question

        d. Motivation to Comply/Identification with Referents the person knowing if a particular referent individual's Behavioral instruction may put little or no pressure on them to carry out that behavior.

5. **Perceived Behavioral Control** is someone's perception of the degree to which they are capable of, or have Control over, performing a given behavior.

    a. **Perceived Capacity** (oftentimes referred to as Self-Efficacy) is the ability one has to perform a behavior that is, to the belief that one can, is able to, or is capable of performing the behavior.

    b. Perceived Autonomy is the degree of Control to perform the behavior (Example: How much Control do you have over whether you perform the behavior? no Control/complete Control

c. **Control beliefs** is the Perceived likelihood of occurrence of each facilitating or constraining condition.

d. **Perceived power** is the Perceived effect of each condition in making performance difficult or easy.

6. **Skills and Abilities:** This **volitional** Control in the performance of a behavior and in the attainment of Behavioral goals. In this study, this construct has been operationalized as "I know how to" directed towards the behavior.

7. **Environment** is the environmental constraints preventing Behavioral performance.

8. **Sleep latency** is the time between going to bed and falling asleep (Tsai and Li, 2004).

9. **Sleep hygiene** is good sleep behaviors that a person can do to achieve good sleep including maintaining regular sleep schedules, avoiding going to bed thirsty/hungry, or having anxiety while trying to sleep (Kor and Mullan, 2010).

Figure 1.1. The Integrative Model
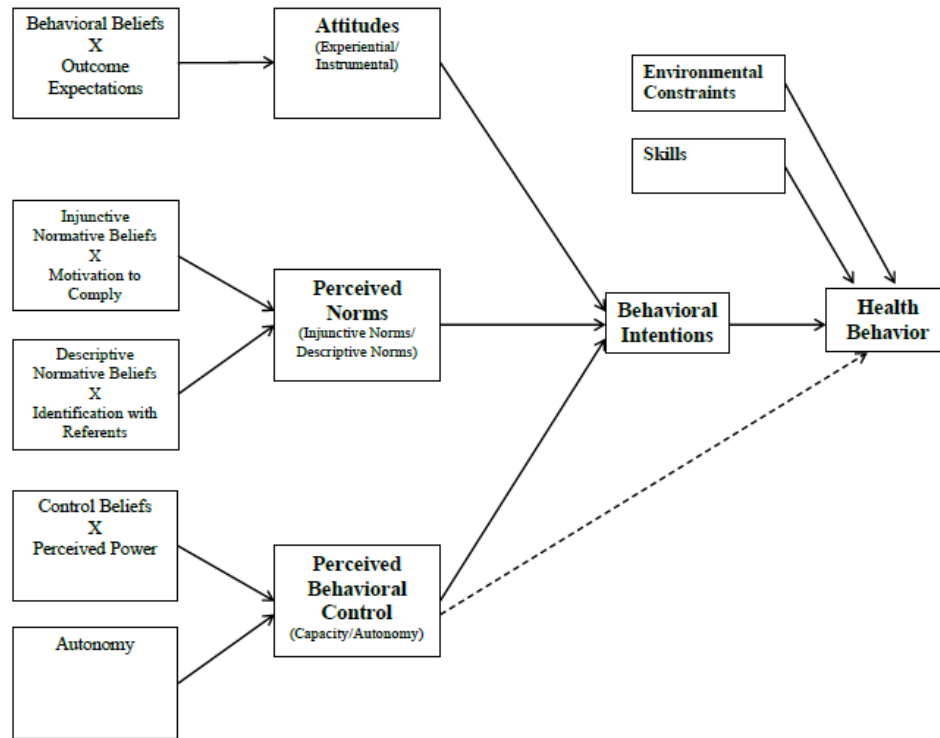
Chapter 2: Literature Review

Introduction

     This literature review will outline and analyze a collection of sleep studies that will culminate into the justification for this study. The following chapter is categorized by topic and will highlight the search process, sleep deprivation, prevalence, causes, consequences, campaigns, measurements, and the use of the IBM with sleep.

Literature Search Process

     A systematic search on evidence-based and theory-based studies and interventions was conducted using the University of Oklahoma Libraries website. The search included peer-reviewed articles from 2001 to present, and limited by ages 19-44, English language only. Using a Boolean Style search on Academic Search Elite, CINAHL Plus with Full Text, Communication Source, ERIC, Health Source: Nursing/Academic Edition, and Medline databases a search was done using key words the key words found below. Additionally, a search was done on Icek Ajzen's website, one of the co-developers of the TPB and IBM, for which he maintains a personal bibliography of studies related to the TPB. Keywords for the search were combined using the following: college, sleep deprivation, causes, consequences, predictors, integrative, behavior, model, transtheoretical, stages, change, self, report, measures, direct, and indirect. Results took a significant amount of narrowing to find articles that were appropriate for use. When "college," "sleep," and "deprivation" were searched on the databases mentioned above there were 22 results and 5 of them met inclusion criteria. "Causes," "sleep," "deprivation," and "college" yielded 35 results with 7 meeting inclusion criteria. Three of 36 results were included when "consequences,"

"sleep," "deprivation," and "college" were searched together. Lastly, 8 of 111 results were kept for review when "predictors," "sleep," "college," "students," and "deprivation" were used as search terms.

Sleep Deprivation

There are many sleep disorders that can develop over the lifespan. Sleep deprivation is not a diagnosable sleep disorder, but can be defined as disordered sleep. According to the Cleveland Clinic and National Sleep Foundation, there are over 80 types of sleep disorders (Institute of Medicine, 2006). The most common are insomnia, sleep apnea, restless leg syndrome, and narcolepsy. Fifty to seventy million Americans suffer from some sort of sleep or wakefulness disorder (Institute of Medicine, 2006). Sleep disorders are diagnosed in several ways. Sleep deprivation is simply defined as not getting enough sleep. For this study, sleep deprivation is defined as individuals that consistently receive less than 7 hours of sleep per night.

Recently a report was published releasing the results of a consensus between the American Academy of Sleep Medicine and the Sleep Research Society on sleep recommendations for adults (Watson et al., 2015). These results were drawn from a review of 5,314 published articles, by 15 experts, and took over a year to complete. There were no limitations on date, but the age limitation was between 18 and 60 years. This review found that less than 7 hours of sleep caused short term and chronic adverse health outcomes, such as gaining weight, being diagnosed with diabetes, developing hypertension or heart disease, having a stroke, becoming depressed, impairing immune function, increasing pain, impairing performance, increasing errors, and ultimately, increasing risk for death (Watson et al., 2015). The cut-off for no more than 9 hours of

sleep per night was determined for a few reasons. One, some meta-analyses with large cohort studies found that long sleep (>8-9 hours) was associated with some incidences of cardiovascular disease, just as short sleep (<5-6 hours). Another observational study of over 56,000 people found that sleep greater than or equal to nine hours increased risk for pneumonia, and there was no certainty that nine or more hours of sleep would be beneficial to health. After three rounds of voting, the panel decided that 7-9 hours was appropriate for healthy adults. It should be noted however, that the report mentioned some adults may require over 9 hours of sleep per night and that concern about excessive sleep should be discussed with a health care provider (Watson et al., 2015).

Sleep Deprivation Prevalence

The prevalence of sleep disorders in college students and the subsequent effect on academic performance has been well studied. Results from one study reported that 27% of college students are at risk for at least one sleep disorder. There was also a large discrepancy in students between weekday and weekend sleep quantity. The average sleep time on weekdays was reported as 6.79 hours, and on weekends it was reported as 9.30 hours. Nineteen percent of college students reported that they worry "rather too much" about whether or not they received adequate sleep, yet 59% percent of adults age 18-29 claim to be "night owls." The researchers concluded that a "substantial" number of college students are at risk for sleep disorders and exhibit poor sleep hygiene (Gaultney, 2010). In another review, it was found that 50% of college students report daytime sleepiness and that 70% attain insufficient sleep (Hershner, Chervin 2014).

In another study, sleep patterns of students (n=237) of various majors and ages 18-24 were examined as part of a "Sleep Management" course. Students used a 7-day

sleep log and the Pittsburgh Sleep Quality Index to measure and evaluate sleep quality

(Tsai & Li, 2004). Researchers hypothesized a relationship between gender and grades

on daily sleep patterns. The 7-day sleep log examined twelve variables: Five were self-

reported, and 7 were calculated from the self-reported variables. The self-reported

variables were: bedtime, rise time, number of awakenings, sleep quality, and naptime.

The 7 calculated variables were: sleep latency (the time difference between bedtime and

time falling asleep), time asleep (the time difference between time falling asleep and

time waking up), time in bed (the time difference between bedtime and rise time), sleep

efficiency (time asleep×100/time in bed), total sleep (the sum of sleep time at night and

naptime during the day), bedtime regularity (standard deviation of bedtime over the 7-

day recording period), and rise time regularity (standard deviation of rise time over the

7-day recording period) . A Pearson correlation was calculated between sleep quality

and sleep variables, and a one group t tests were used to determine whether the means

of the z scores were significant. Independent samples t tests were used to evaluate

gender differences, and post hoc comparisons used Tukey's test. Results from the study

found that there were gender differences in sleep patterns and sleep difficulties. For

example, women had earlier bedtimes on weekdays (WD) and weekends (WE) (WD

1:27am +/-57 minutes, WE 1:21am +/-69 minutes; p=0.022) and rise times (WD

8:27am +/-61, WE 9:12 +/- 79 minutes; p=0.043) compared to men [bedtime WD

1:40am +/-55minutes, WE 1:45am +/- 82 minutes; rise time (WD 8:39 +/- 57 minutes,

WE 9:39am +/- 87 minutes)]; in addition to longer sleep latency (meaning it took them

longer to fall asleep after going to bed) (p=.028), more awakenings during the night

(p<.001), lower ratings on sleep quality (p=.002); and longer naptimes (p=.019).

Overall, this study showed that a large number of college students are at a high risk for sleep disorders and are receiving inadequate sleep as 48% of them had a short sleep time (Tsai, et al., 2004).

The first document to ever publish estimates from all 50 states of self-reported data on sleep deprivation was presented in the CDC Morbidity and Mortality Weekly Report in February 2016. Respondents to the 2014 Behavioral Risk Factor Surveillance Survey (BRFSS) were asked, "on average, how many hours of sleep do you get in a 24-hour period?" (***Behavioral Risk Factor Surveillance System Survey Data***, 2014). Age adjusted prevalence and a confidence level of 95% of 7-9 hours of sleep were calculated by state and projected from the US population in 2000 to attain the most accurate and significant information. Hawaii reported the least amount of healthy sleep with 56.1% of residents getting greater than or equal to 7 hours per night (95% Confidence Interval 54.3–57.8), and South Dakota reported the healthiest sleep at 71.6% (95% Confidence Interval 69.6–73.5). Overall, results showed that 65.2% of Americans received at least 7 hours of sleep per 24-hour period (Liu et al. 2016).

Consequences

Sleep deprivation can aid in the etiology of chronic diseases. It can also lower cognitive function and reduce memory Capacity among other mental problems (Taylor & Bramoweth, 2010). Other consequences of inadequate sleep are very dangerous, and under extreme conditions, can be deadly. In one study, researchers examined the patterns and consequences of inadequate sleep as it relates to substance abuse and motor vehicle accidents (Taylor & Bramoweth, 2010). Over 1,000 students kept a sleep diary for one week, and upon preliminary assessment, there were no significant differences

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between ethnicity, gender, or class rank on total sleep time. There was a large discrepancy however between what students reported as an ideal amount of sleep and their actual sleeping behaviors, in that they reported a sufficient total sleep time yet did not actually sleep the recommended amount. Results from the study indicated that there was a high use of alcohol (11.36% reported use) and sleep aids for sleep (6.83% reported use), stimulants for alertness (60% reported use), and high rates of falling asleep (16%) while driving. These consequences are grave, and the researchers report the need for future interventions to prevent drowsy driving (Taylor & Bramoweth, 2010).

In another review of sleep issues in college students, researchers reviewed a number of issues such as sleep deprivation, daytime sleepiness, and irregular sleep schedules. Students who prefer to be social, work, or study at night may put themselves at risk for delayed sleep-phase disorder (DSPD). Delay sleep-phase disorder is characterized by sleep-onset insomnia, difficulty waking up at desired time, and missed morning classes. Prevalence of DSPD in college students may be anywhere from 6.7%-17% of college students. This review also reported the effects sleep deprivation or drowsiness has on driving. Sixty-six percent of college students reported driving while drowsy; 16% have reported falling asleep at the wheel, and 2% have been involved in accidents due to falling asleep at the wheel. Sleep deprivation has very similar effects as driving while intoxicated. As an extreme example, one study showed that after adults had been awake for 17 hours, they had cognitive delays equivalent to a blood alcohol content of 0.05%, and after 24 hours of being awake, it would be the equivalent of having a blood alcohol content of 0.10% (Hershner, Chervin 2014). Finally, the

consequence of sleep deprivation from this article review is the effect of sleep deprivation on mood and mental Capacity, as sleep deprivation can cause depressive symptoms (Hershner, Chervin 2014).

Causes of sleep deprivation

Sleepiness is defined as "inability or difficulty in maintaining alertness during the major wake period of the day, resulting in unintended lapses into drowsiness or sleep" (Hershner & Chervin, 2014). The primary causes of sleep deprivation are physiological or Behavioral. Physiological causes of sleep deprivation refer to homeostatic sleep drive and the circadian rhythms due to changes with age. Regulation and learning about these two components of sleep are important to obtaining adequate amounts of sleep. The amount of time someone spends studying is not the most important contributing factor to memorization and learning. Sleep is an important factor in learning or memorization as well. Behavioral causes of inadequate sleep include alcohol, poor sleep hygiene, and poor sleep latency as well as a variety of other causes (Hershner, Chervin 2014).

In another study, researchers characterized sleep patterns/predictors of poor sleep quality in a large population of college students, and extended it to an examination of sleep in early adolescence (Lund, Reider, Whiting, & Prichard, 2010). Overall, participants between the ages of 17 and 24 (n=1125) at a large private university in Midwestern United States were given an online questionnaire to evaluated five established scales related to sleep, mood, and stress [Pittsburgh Sleep Quality Index (PSQI), the Epworth Sleepiness Scale (ESS), the Horne-Ostberg Morningness Eveningness Scale (MES), the Subjective Units of Distress Scale (SUDS), and the

Profile of Mood States (POMS)]. Basic demographic information was collected as well to assess academic performance, drug use, exercise, illness, caffeine consumption, cigarette use, and other lifestyle characteristics. College students consistently reported having restricted sleep, as 25% of students reported getting less than 6.5 hours of sleep a night and only 29.4% get more than 8 total hours. Poor sleep was significantly associated with negative moods (p<.001), physical illness (p<.05), use of prescription drugs (p<.001), use of alcohol (p<.03), and increased stress (p<.001). The study demonstrates the extent of the problem of insufficient sleep ranging from adolescents to college students.

The Integrative Model, Theory of Planned Behavior and Sleep

The Integrative Model (IM) was developed at a workshop in 1991 by a group of leading health theory experts such as Albert Bandura, Marshall Becker, Martin Fishbein, Fredrick Kanfer, and Harry Triandis, and it is the most recent adaptation of the reasoned action approach (Fishbein & Ajzen, 2010). Martin Fishbein's early work of health theory involved the relationships between Attitudes, beliefs, and intentions towards health behavior which eventually became the Theory of Reasoned Action. Icek Ajzen later developed the Theory of Planned Behavior which added Perceived Behavioral Control as a direct determinant to intentions (alongside attitude and Norms) and behavior (alongside intentions). The integrative model evolved again in 2000 with the addition of skills and environmental barriers as potential supplements to the intentions-behavior relationship. Using the IM constructs can be measured directly (Attitudes towards a behavior, Perceived Norms about a behavior, or Perceived behavior Control regarding a behavior) and indirectly (through Behavioral Beliefs

which influence attitude, Injunctive and Descriptive normative beliefs which influence Perceived Norms, and Control beliefs which influence Perceived Behavioral Control) (Fishbein & Ajzen, 2010). This study will measure direct and indirect determinants of the recommended sleep behavior among college students.

There have been some studies that used the Theory of Planned Behavior and the Integrative Model to predict sleep behaviors. Knowlden, et al (2012) conducted a study using constructs of the Theory of Planned Behavior (TPB) to predict the sleep intentions and behaviors of undergraduate students (Knowlden, Sharma, & Bernard, 2012). Undergraduate (n=197), unmarried students (18 to 24 years) without kids, who did not live with a guardian participated in this study, which was conducted in three phases. The first phase was a "semi-structured" interview eliciting Behavioral, subjective (Injunctive) normative and Control beliefs related to the constructs of TPB. The second phase consisted of data collection to establish test-retest reliability of the survey, and the third phase included data collection to predict sleep intentions and behaviors. Sleep behavior was operationally defined using the TACT principle (*Target, Action, Context, Time*) [(target) getting 420-480 minutes (7-8 hours; time) of sleep (action) every night (context)]. Results showed that sleep behavior and Perceived Behavioral Control had a strong relationship (p<.001), whereas subjective norm (p< .066) and attitude (p= .684) were not significantly related to sleep behavior (Knowlden, Sharma, & Bernard, 2012).   In another study, researchers used the IBM to examine predictors of intentions in order to create the most successful sleep behavior intervention for college students (Robbins & Niederdeppe, 2015). In the study, researchers operationalized both direct and indirect measures of the IM, meaning they

used outcome expectancy beliefs, Injunctive/Descriptive normative beliefs, and barriers/enablers for Perceived Behavioral Control. This research was conducted in two phases. First, thirty-one college students participated in an elicitation survey with open-ended questions to identify Behavioral Beliefs, normative beliefs (same beliefs were used for Injunctive and Descriptive Norms), and Control beliefs about sleep behavior. The second phase was an on-campus questionnaire given to students (n=361) between 18 and 25 years. Indirect Attitudes were significantly related to both intentions and sleep behavior (p<.001). Direct Attitudes were significantly related to intention (p<.01) but not to sleep behavior (p>.05). Injunctive normative beliefs were significantly but negatively related to behavior (p<.05) and not associated with intentions at all (p>.05). Descriptive normative beliefs were significantly related to intention and behavior (both p<.05). Three types of Perceived Norms (PN) were measured. PN1 predicted intentions (p<.05) but not behavior (p>.05). PN2 predicted neither (both p>.05). PN3 predicted intention (p<.001) but not behavior (p>.05). There were four Behavioral Control beliefs measured and three of them ("having less stress," "efficient time management," and "having a lot of work") were strongly correlated with intention (p<.001). Results showed that Perceived Control was the most important predictor of healthy sleep behavior. The authors recommend that future research should have in-depth interviews with semantic differential pairs in order to better understand and characterize the dimensions of sleep behavior in the mind of college students. Further investigation could be done to discover the most persuasive way to maximize communication about sleep behavior towards college students (Robbins & Niederdeppe, 2015).

A recent study used the Theory of Planned Behavior to investigate healthy sleep behaviors in college students (Lao et al. 2015). It extended the theory to use two other constructs – parental nurturance and Perceived invulnerability. Parental nurturance was proposed to influence Injunctive and Descriptive Norms, and Perceived invulnerability was proposed to influence attitude. The study used 362 respondents because they limited participants to 18-25 year old college students with no sleep disorders or emotional disturbances. Some survey items were taken from the Chinese version of the PSQI, and the rest of the items were measured on a 7-point Likert scale as Fishbein and Ajzen's (2010) guidelines indicate. Parental nurturance was measured using the 24-item Parental Nurturance Scale, and Perceived invulnerability were measured using the Adolescent Invulnerability Scale. Sleep latency and sleep disturbance were determined by PSQI scale when choosing whether or not to exclude a participant. Results showed that Behavioral intention was positively associated with attitude, Perceived Norms, and Perceived Behavioral Control. Attitude and intention were positively associated (β=.26; $p<.01$), and there was a positive association between parental nurturance and sleep intention mediated by Perceived Norms (β =.19 Descriptive; β=.20 Injunctive; $p<.01$) and Perceived Behavioral Control (β =.29; $p<.01$). Parental nurturance was positively associated with Injunctive (β =.22; $p<.01$) and Descriptive Norms (β =.20; $p<.01$), but Perceived invulnerability was negatively correlated with attitude (β = -.22; $p<.01$). Intention and PBC accounted for 19% of the variance of the sleep behavior, and Attitudes, Norms (Descriptive and Injunctive), and PBC accounted for 43% of the variance of intentions (Lao et al.,2015). Overall, this study supported the use of the TPB to understand college sleep behavior whilst using two other Behavioral

constructs.However since it was a path analysis the constructs do not relate to each other in ways that TPB or IM authors would advise (Fishbein & Ajzen, 2010).

Another study used the Theory of Planned Behavior to predict sleep hygiene behaviors and investigate Perceived Autonomy support, past behavior, and response inhibition (Kor & Mullan, 2011). Twenty-four students were used for preliminary elicitation questions that asked students to define sleep hygiene in their own words and rank the importance of sleep behaviors. After elicitation, researchers gave two online questionnaires to undergraduate students (n=273) at two points in time. The first questionnaire was developed with TPB guidelines to measure Attitudes, subjective Norms, Perceived Behavioral Control, and intention. Participants also took an online computer task assessment called Go/NoGo that measured response inhibition. After one week, participants were asked questions about their sleep behavior and past sleep behavior with an additional Perceived Autonomy support scale and the PSQI. Results from this study showed that the overall TPB model of measuring Attitudes, subjective Norms, Perceived Behavioral Control together as they predict intentions was significant ($p < .001$) (Kor & Mullan, 2011). Attitudes was not a significant predictor of intentions, while subjective Norms and Perceived Behavioral Control were significant predictors of intentions. Perceived Autonomy support was measured in this second phase of regression also, but the results were contrary to the researchers' hypothesis. It was not a significant predictor of intentions. When behavior was added to the regression equation, intention and PBC only accounted for 7.3% of the variance, and past behavior only accounted for 3.5% of the variance (Kor & Mullan, 2011). This study was the first of its kind to measure sleep hygiene behavior using the TPB. There were some

limitations to this study that may not be transferable to other sleep studies. For example, 79% of the respondents still lived at home with their parents, and 78.6% of respondents were female (Kor & Mullan, 2011).

Summary

This review has covered the current knowledge base related to sleep, including the prevalence of sleep disturbances, the consequences of inadequate sleep, and the causes of inadequate sleep. It also reviews previous studies that use the Theory of Planned Behavior or the Integrated Behavior Model as it relates to sleep behaviors among college studies. Given this review, a number of gaps in the literature emerge, for which this current study intends to explore. First, no study has evaluated participants based on current sleeping patterns, and their subsequent goals. That is, no study has been conducted using a branching feature that measures both 'maintenance' and 'initiation' of sleep adherence in college students. Second, no study has borrowed from the Transtheoretical Model to identify a timeframe for which the behaviors should occur. Third, not many studies have used indirect measures of the IM in addition to the direct measures of the theory. For the study that did measure the indirect measures, the analyses were not done as Fishbein and Azjen (2010) recommend for three reasons. The Robbins study (2015) used the same Descriptive and Injunctive normative beliefs, which may be as a result that they did not elicit responses appropriately during the elicitation phase of research. Next, they conducted multivariate regression on indirect and direct measures which is not advised (Fishbein & Ajzen, 2010). Finally, this study correlated indirect measures with intentions and behaviors which again is not advised:

indirect measures of constructs should be correlated with direct measures of the same construct.

Chapter 3: Methods

Introduction

This chapter will discuss the research design, population, instrumentation, data collection, and data analysis procedures.

Independent and Dependent Variables

For this study, four sets (two for maintenance, two for initiation) of regression models were used to measure the relationships between constructs and intentions. The dependent variable (DV) is the intentions to start sleeping 7-9 hours each night in the next 30 days (model 1), or the intentions to get 7-9 hours of sleep each night for the next 6 months (model 3). The independent variables (IV) for both sets are Attitudes, Perceived Norms (PNs) and Perceived Behavioral Control (PBC). In the expanded models (model 2 and 4), the dependent variable is intentions and the independent variables for both sets are Instrumental Attitudes, Experiential Attitudes, Injunctive Norms, Descriptive Norms, Capacity and Autonomy. The remainder of the analyses was correlations between the direct and indirect measures of the core IM constructs. Attitudes, PNs, and PBC were the dependent variables, and their corresponding determinants were the independent variables. Attitudes (DV) were correlated to the product of each Behavioral belief and outcome expectation pair. Perceived Norms (DV) were correlated to the product of each Injunctive normative beliefs and motivation to comply pair, and the product of Descriptive normative belief and identification with referent pair. Perceived Behavioral Control (DV) were correlated with each Control belief, and Perceived power pair.

Sample & Research Design

Sample: The target population was college students attending the University of Oklahoma. College students can range from first year freshmen to graduate or professional degree students as long as they are between ages 18-24. The sampling procedure for this study consists of a voluntary, convenience sample. A meta-analysis of the Theory of Planned Behavior (a precursor model to the IM) gave the expected effect sizes between constructs: intentions with (Attitudes at ρ = .57, subjective Norms at ρ = .40, and PBC at ρ = .54) and intentions with behavior (ρ = .43) (McEachen, Conner, Taylor & Lawton, 2011). (*Note ρ is interpreted as (.1 to .3) is a small; (.3 to .5) is medium; (.5-1.0) is large). Since the smallest effect size was 0.40 (ρ), this current study used a medium effect size in an a priori sample size determination using G-Power. The G-power analysis using linear multiple regression – fixed model, f-test with 6 predictors, 0.15 effect size (f^2), .05 alpha value, and 0.80 power yielded at least 98 for each group (G*POWER 3.1). Experts also recommend having at least 300 participants for factor analysis, which will also be done in this study to determine the construct validity of the newly developed scales (Tabachnick & Fidell, 2013). Therefore, a total of 600 participants were needed for this study (300 in both groups).

Participants were excluded if they exceed the CDC recommendation of 7-9 hours, or did not complete at least 80% of the survey. Participants had no time limit to complete the survey. Inclusion criteria for the sample population included all students at the University of Oklahoma between the ages of 18-24. The survey was sent via an email with a link to a Qualtrics survey to all OU student email addresses. Consent was obtained on the Qualtrics survey, and participants were able to quit the survey at any

time. Minors (<17 years) were not allowed to take the survey. Participants were not compensated for their participation in the survey, but they were offered to be entered into a raffle to win one of ten, $10 gift cards.

Research Design: This study had three phases of data collection. Phase I was an elicitation phase, in which data were collected to elicit salient Behavioral, Injunctive normative, Descriptive normative and Control beliefs towards either maintaining or initiating a healthy sleep behavior. Questions were asked in an open-ended, bullet-point style format. This information was used to develop the instrument for Phase II. During Phase II of this study, the instrument was developed and tested for three types of validity (face, content and construct) and two types of reliability (stability and internal consistency). During Phase III, data were collected to assess how the IM can be used to predict intentions towards sleep initiation or maintenance.

Possible threats to validity include testing effects, instrumentation errors, interaction effects between maintenance and initiation groups, and multiple treatment interference. Participants self-selecting for this study also served as a threat to external validity and decreased the chance for generalizability. Possible threats to reliability could be variance in test-retest reliability, and a lack of equivalence. Psychometric procedures were used to verify the validity and reliability of the instrument.

Instrumentation

A survey was developed to evaluate all constructs of the IBM for both sleep behaviors: maintenance to continue meeting sleep recommendations and initiation towards starting to meet sleep recommendations. Both behaviors can be specified using a target, action, context, and time frame: maintenance behavior (college students will

continue getting 7-9 hours of sleep each night for the next 6 months) and initiation behavior (college students will start getting 7-9 hours of sleep each night in the next 30 days). To make sure participants completed the correct survey, the first question asked students, "On average, how many hours of sleep do you get per night?" Respondents who answered less than 7 hours take the initiation survey; participants who answered greater than or equal to 7 and less than or equal to 9 take the maintenance; and participants who answered 9 hours or more were disqualified. Currently, there are no known studies that divide sleep behaviors into these categories using IBM guidelines. Therefore, a new instrument was developed using guidance from Fishbein and Ajzen (Fishbein and Ajzen, 2009).

After Phase I of this study (elicitation of beliefs), the initial draft of the instrument was developed. Next, the instrument was evaluated by a panel of 6 experts in the field of sleep in college students (2 experts), the IM (2 experts), and in survey development (2 experts). The instrument was also pilot tested with a sample within the target population (n=45; 26 in the maintenance group and 19 in the initiation) to give further comments about clarity and readability.

The survey operationalized constructs within the IM using Fishbein & Ajzen's (2010) recommendation for survey development. Every question used a 7-point semantic differential scale, unless otherwise noted. Indirect measures for the IM constructs were evaluated using the following questions. For Attitudes, Behavioral Beliefs were measured from "Unlikely (1) to Likely (7)" (Example: "If I start sleeping 7-9 hours every night in the next 30 days, I will…"). Outcome Evaluations were then matched to each Behavioral belief (Example: "For me feeling rested is…) and scaled

from "Slightly Good (-3) to Extremely Good (+3)." Perceived Norms were indirectly

measured by Injunctive normative beliefs, scaled from Strongly Disagree (1) to

Strongly Agree (7) (Example: "My _____ think(s) that I should start sleeping 7-9

hours every night in the next 30 days."). Motivation to comply items were then

matched to each Injunctive normative belief and scaled from "Strongly Disagree" (-3)

to "Strongly Agree" (+3) (Example: "For matters related to health, I want to do what

my _____ think(s) I should do."). Descriptive normative beliefs were also scaled from

"Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "_____ sleep 7-9 hours

every night."). Identification with referents were then matched to each Descriptive

normative belief and scaled from "Nothing Like Them" (-3) to "Extremely Like Them"

(+3) (Example: "For matters related to health, I am similar to…"). Perceived Behavioral

Control was indirectly measured with Control belief strength items which were scaled

from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "I will have…a job/lots

of homework/social events"). Power of Control factors were then matched to each

Control belief and scaled from from "Strongly Disagree" (-3) to "Strongly Agree" (+3)

(Example: "Having _____will *PREVENT/ENABLE* me from starting to sleep 7-9

hours every night in the next 30 days").   The values of each of these indirect measures

were multiplied with its pair with a possible range from -21 to +21 in the following

combinations: (Behavioral Beliefs X Outcome Evaluations); (Injunctive normative

beliefs X motivation to comply); (Descriptive normative beliefs X identification with

referents); (power of Control factors X Control belief strength).

Attitudes were directly measured with two Instrumental and Experiential

Attitudes for each scale (Example: Getting 7-9 hours of sleep every night for next 6

months will be…"). These responses were then on a 7-point bipolar scale. (ex. "Unpleasant (1) to Pleasant (7)" and "Bad (1) to Good (7)") with the total Attitudes possible score ranging from -3 to 21, with -3 representing strong negative Attitudes and 21 representing strong positive Attitudes. Perceived Norms were directly measured with Injunctive Perceived Norms scaled from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "Most people who are important to me want me to start sleeping 7-9 hours every night, in the next 30 days…") and Descriptive Perceived Norms were scaled from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "Most people like me sleep 7-9 hours every night"), with the total Perceived Norms possible score ranging from -3 to 21, with -3 representing strong negative Perceived Norms and 21 representing strong positive Perceived Norms. Perceived Behavioral Control was directly measured with items measuring Capacity to perform the behavior and scaled from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "I am confident that I can start sleeping 7-9 hours every night in the next 30 days.") and Autonomy items scaled from "No Control at All" (1) to "Complete Control" (7) (Example: "How much Control will you have over whether or not you can start sleeping 7-9 hours every night, in the next 30 days?"). The total Perceived Behavioral Control possible score ranged from 4 to 28, with 4 representing strong negative Perceived Behavioral Control and 28 representing strong positive Perceived Behavioral Control. Three items measured intentions, scaled from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "I intend to start sleeping 7-9 hours every night in the next 30 days."). The total possible for intentions score ranged from 3 to 21, with 3 representing strong negative Perceived Behavioral Control and 21 representing strong positive Perceived Behavioral Control. The skills questions refer to

the ability to perform the recommended sleep behavior and were scaled from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "I have the skills needed to start sleeping 7-9 hours every night in the next 30 days."). The total possible score for skills ranged from 2 to 14, with 2 representing strong negative Perceived Behavioral Control and 14 representing strong positive Perceived Behavioral Control. Environment refers to the place where the students fulfill the sleep recommendations. These questions are scaled from "Strongly Disagree" (1) to "Strongly Agree" (7) (Example: "There are barriers in the environment that will keep me from starting to sleep 7-9 hours every night in the next 30 days."). The total score for environment ranged from 2 to 14, with 2 representing strong negative Perceived Behavioral Control and 14 representing strong positive Perceived Behavioral Control.

The following figure lists the corresponding questions on each form of the survey to the

construct it is intended to measure (see Figure 3.1).

Figure 3.1 Instrument Scale

Maintenance Survey	Initiation Survey
PSQI Sleep Quantity Question	PSQI Sleep Quantity Question
Indirect Measures	**Indirect Measures**
Attitudes	Attitudes
-Behavioral Beliefs 1-5	-Behavioral Beliefs 1-7
- Outcome Evaluations 10-14	- Outcome Evaluations 12-18
Perceived Norms	Perceived Norms
-Injunctive Beliefs 15-18	-Injunctive Beliefs 19-22
-Motivation to comply 19-22	-Motivation to comply 23-26
-Descriptive beliefs 23-26	-Descriptive beliefs 27-31
-Identification with referents 27-30	-Identification with referents 32-6
Perceived Behavioral Control	Perceived Behavioral Control
-Power of Control factors 31-36	-Power of Control factors 37-41
-Control belief strength 37-42	-Control belief strength 42-46
Direct Measures	**Direct Measures**
Attitudes	Attitudes
-Instrumental 8-9	-Instrumental 10-11
-Experiential 6-7	-Experiential 8-9
Perceived Norms	Perceived Norms
-Injunctive 47-48	-Injunctive 49-50
-Descriptive 49-50	-Descriptive 51-52
Perceived Behavioral Control	Perceived Behavioral Control
-Capacity 43-44	-Capacity 47-48
-Autonomy 45-46	-Autonomy 53-54
Intentions 51-53	Intentions 55-57
Skills/Abilities 54-55	Skills/Abilities 58-59
Environment 56-57	Environment 60-61
Demographics 88-91	Demographics 88-91
PSQI 62-87	PSQI 62-87

In addition to the questions developed from the IM, the survey instrument

includes questions 1-9 of the Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds,

Monk, Berman, & Kupfer, 1989), demographic questions, a question about naps, and a

question about work per the advice of the panel of experts since many students may work late night shifts or take long naps in the day time.

Measuring sleep

One of the most popular ways sleep is measured is through the Pittsburgh Sleep Quality Index (PSQI). The PSQI was introduced in 1988 with four main goals: to provide a reliable and standardized way to measure sleep: to categorize individuals as "good" or "bad" sleepers: to provide a good sleep index for participants, researchers, and clinicians to use: and to have a brief and clinically useful assessment of sleep disturbances that can affect sleep quality. The PSQI measures sleep quality score based on the responses to 19 questions, measuring 7 different components. The PSQI measures sleep duration, sleep latency, sleep quality, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction (Buysse, et al., 1989).

Data Collection & Analysis Procedures

Data collection, management & procedures: Institutional Review Board approval was obtained before any recruitment or distribution of surveys tookplace. All surveys were distributed through the University of Oklahoma's mass emailing. Those who chose to complete the survey were able to on any computer, tablet, or smart phone with email access. SPSS (Statistical Package for the Social Sciences) version 22 was used for data analyses in this study

Instrument Psychometrics

Construct validity for each scale was established using confirmatory factor analysis. This study used the maximum likelihood method, which computes correlation

between items and produces factor scores. Only the factors that had an Eigenvalue greater than 1 were retained, and the scale was considered 'construct valid' (Sharma & Petosa, 2014). To assure each item significantly loaded on the correct scale, factor loadings were examined. Tabachninck and Fidell recommend a factor loading of 0.32 with a sample of 300 (Tabachnick and Fidell, 2013). Internal consistency reliability for each scale was established using Cronbach's alpha values, and values $\geq.70$ were considered adequate. Stability for each scale will be calculated through test/retest results collected from a small sample participants who completed the survey twice (two-weeks between testing). Correlation coefficients greater than or equal to .70 were considered acceptable.

Determinants of Attitudes, Perceived Norms, and Perceived Behavioral Control

To evaluate the determinants of Attitudes, Perceived Norms, and Perceived Behavioral Control for sleep, a Pearson's correlation coefficient test was done to determine the strength of association between the indirect paired measures (belief x evaluation) on the corresponding direct measure. Listed below is an abbreviated version of Figure 1.1 to specifically show the determinants of Attitudes, Perceived Norms, and Perceived Behavioral Control.

Table 3.1: Determinants of Attitudes, Perceived Norms and Perceived Behavioral Control
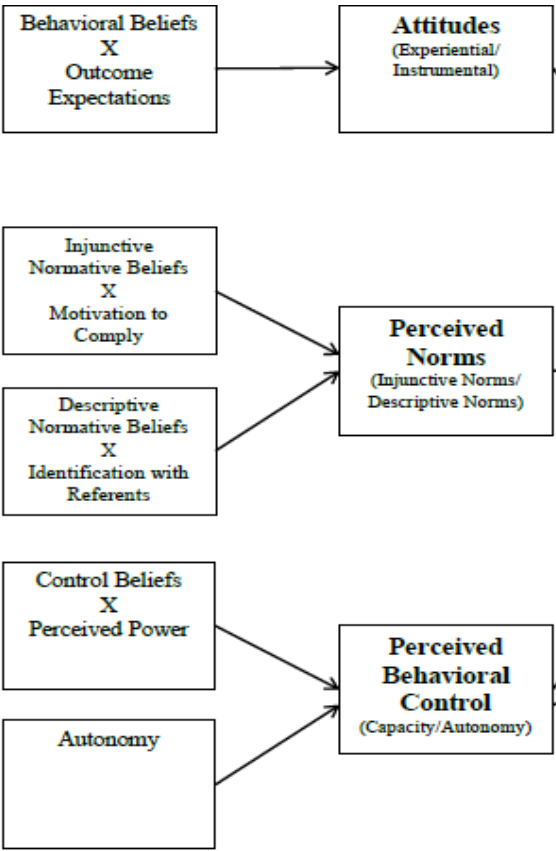
Determinants of Behavioral Intentions

Correlations between constructs were be performed to show how they are interrelated for both groups. Stepwise multiple regression was used to evaluate which constructs of the IM account for the variance of intentions for both sleep behaviors. The first regression procedure determined how the constructs of Attitudes, Perceived Norms, and Perceived Behavioral Control related to intentions to maintain sleep behavior. The second regression procedure measured the determinants of each construct. These models were done in the same way, but they found which sub-construct (2 for each construct) predicted the most variance in intention. For the regression models, the alpha value for the independent variables will be chosen at less than and equal to 0.05 and

will be greater than or equal to 0.10. The following assumptions were considered when performing a multiple regression: outliers, linearity, normality, multicollinearity, and homoscedasticity. Any values greater than four standard deviations from the mean were considered outliers and were thoroughly reviewed in the data analysis. Outliers are not likely to happen while collecting data since the range for each item is only 1-7 or -3 to 3. Normality was tested through skewness and kurtosis. Homoscedasticity was considered through a revised scatter plot in SPSS between the predicted dependent variable scores and errors of prediction. All variables were assessed for linearity.

Chapter 4: Results

Introduction

This chapter presents the findings from this study. In this chapter, the following will be covered: missing data and how it was accounted for, how the data was tested for outliers, linearity, normality, multicollinearity and homoscedasticity, and how the survey instruments were evaluated for validity and reliability. Finally, the results of the direct and indirect measures from the Integrative Model are presented for both behaviors focused upon sleep, along with statistical tests that evaluated the determinants of intentions, and the determinants of Attitudes, Perceived Norms and Perceived Behavioral Control. Demographics and quantitative PSQI information will also be presented. All results from this survey were taken from Qualtrics and processed in SPSS Version 22.

Missing Data

Missing data were first identified by running a frequency test on each item. The only items that were expected to be missing were items with a N/A option, which was intentional. These applied to Injunctive normative beliefs on the maintenance survey. Overall, there was very little missing data, and in rare cases, the mean-replacement method was used. However, it was found that there was a large amount of missing data (10.7%) for items measuring Attitudes on the "maintenance" survey. This was largely unexpected since the items were part of the normal survey flow, so it was decided to compute the missing Attitudes items and use the mean replacement method. To assure this did not represent some systematic problem, an independent samples t-test was used to compare the Perceived Norms and Perceived Behavioral Control variables between

participants who had a missing Attitudes variable to those who did not have a missing Attitudes variable. No difference was found for either variable. Table 4.1a shows results of missing direct measures initiation data and Table 4.1b shows results of missing indirect measures maintenance data. Table 4.2a shows the missing indirect measures initiation data, and Table 4.2b shows the results of missing indirect measures maintenance data.

Table 4.1a Direct measures summary of missing and N/A data: Initiation

Construct and Item #	Number of Missing data (Percent of total data)	Number of N/A data (Percent of total data)	Total
Direct Measures:			
Attitudes	0	0	0
Instrumental	1 (.3)	0	1 (.3)
Experiential	1 (.3)	0	1 (.3)
Perceived Norms			
Item 1	16 (5.2)	0	16 (5.2)
Item 2	9 (2.9)	0	9 (2.9)
Item 3	5 (1.6)	0	5 (1.6)
Item 4	5 (1.6)	0	5 (1.6)
Injunctive Norms	0	0	0
Descriptive Norms	0		
Perceived Behavioral Control	0	0	0
Capacity	0	0	0
Item 1	1 (0.3)	0	1 (0.3)
Item 2	4 (1.3)	0	4 (1.3)
Autonomy	0	0	0
Item 1	6 (1.9)	0	6 (1.9)
Item 2	6 (1.9)	0	6 (1.9)
Intentions			0
Item 1	5 (1.6)	0	5 (1.6)
Item 2	5 (1.6)	0	5 (1.6)
Item 3	5 (1.6)	0	5 (1.6)
Skills/Abilities			0
Item 1	7 (2.3)	0	7 (2.3)
Item 2	7 (2.3)	0	7 (2.3)
Environment	0	0	0
Item 1	5 (1.6)	0	5 (1.6)
Item 2	6 (1.9)	0	6 (1.9)

Table 4.1b Direct measures summary of missing and N/A data: Maintenance

Construct and Item #	Number of Missing data (Percent of total data)	Number of N/A data (Percent of total data)	Total
Direct Measures:			
Attitudes			
Instrumental			
Item 1	32 (10.7)	0	32(10.7)
Item 2	32 (10.7)	0	32 (10.7)
Experiential			
Item 1	32 (10.7)	0	32 (10.7)
Item 2	32 (10.7)	0	32 (10.7)
Perceived Norms			
Injunctive Norms			
Item 1	7 (2.3)	0	7 (2.3)
Item 2	7 (2.3)	0	7 (2.3)
Descriptive Norms			
Item 1	7 (2.3)	0	7 (2.3)
Item 2	7 (2.3)	0	7 (2.3)
Perceived Behavioral Control			
Capacity			
Item 1	2 (.7)	0	2(.7)
Item 2	12 (4.0)	0	12 (4.0)
Autonomy			
Item 1	8 (2.7)	0	8 (2.7)
Item 2	7 (2.3)	0	7 (2.3)
Item 3	10 (3.3)	0	10 (3.3)
Intentions			
Item 1	1 (0.2)	0	1 (0.2%)
Item 2	7 (2.3)	0	7 (2.3)
Item 3	10 (3.3)	0	10 (3.3)
Skills/Abilities			
Item 1	11 (3.7)	0	11 (3.7)
Item 2	8 (2.7)	0	8 (2.7)
Environment			
Item 1	9 (3.0)	0	9 (3.0)
Item 1	9 (3.0)	0	9 (3.0)

Table 4.2a Indirect measures summary of missing and N/A data: Initiation

Construct and Item #	Number of Missing data (Percent of total data)	Number of N/A data (Percent of total data)	Total
Indirect Measures:			
Attitudes			
Behavioral Beliefs			
Item 2	3 (1.0)	0	3 (1.0)
Item 3	2 (.6)	0	2 (.6)
Item 4	2 (.6)	0	2 (.6)
Item 6	5 (1.6)	0	5 (1.6)
Outcome Evaluation			
Item 2	2 (.6)	0	2 (.6)
Item 4	1 (.3)	0	1 (.3)
Item 5	3 (1.0)	0	3 (1.0)
Item 6	2 (.6)	0	2 (.6)
Perceived Norms			
Injunctive Normative Beliefs			
Item 1	22 (7.1)	0	22 (7.1)
Item 2	28 (9.0)	0	28 (9.0)
Item 3	101 (32.6)	0	101 (32.6)
Item 4	69 (22.3)	0	69 (22.3)
Motivation to Comply			
Item 1	26 (8.4)	0	26 (8.4)
Item 2	30 (9.7)	0	30 (9.7)
Item 3	78 (25.2)	0	78 (25.2)
Item 4	68 (21.9)	0	68 (21.9)
Descriptive Normative Beliefs			
Item 1	3 (1.0)	0	3 (1.0)
Item 2	3 (1.0)	0	3 (1.0)
Item 3	3 (1.0)	0	3 (1.0)
Item 4	3 (1.0)	0	3 (1.0)
Identification with Referents			
Item 2	5 (1.6)	0	5 (1.6)
Item 3	13 (4.2)	0	13 (4.2)
Item 4	7 (2.3)	0	7 (2.3)
Item 5	5 (1.6)	0	5 (1.6)
Perceived Behavioral Control			
Control Beliefs			
Item 2	2 (.6)	0	2 (.6)
Item 3	21 (6.8)	0	21 (6.8)
Item 4	5 (1.6)	0	5 (1.6)
Item 5	2 (.6)	0	2 (.6)

Table 4.2b Indirect measures summary of missing and N/A data: Maintenance

Construct and Item #	Number of Missing data (Percent of total data)	Number of N/A data (Percent of total data)	Total
Indirect Measures:			
Attitudes			
Behavioral Beliefs			
Item 2	1 (.3)	0	1 (.3)
Item 3	1 (.3)	0	1 (.3)
Item 4	1 (.3)	0	1 (.3)
Item 5	1 (.3)	0	1 (.3)
Outcome Evaluation			
Item 1	1 (.3)	0	1 (.3)
Item 2	2 (.7)	0	2 (.7)
Item 3	1 (.3)	0	1 (.3)
Item 4	5 (1.7)	0	5 (1.7)
Item 5	1 (.3)	0	1 (.3)
Perceived Norms			
Injunctive Normative Beliefs			
Item 1	5 (1.7)	13 (4.3)	18 (6.0)
Item 2	2 (.7)	23 (7.7)	25 (8.4)
Item 3	2 (.7)	77 (25.7)	79 (26.4)
Item 4	3 (1.0)	46 (15.3)	49 (16.3)
Motivation to Comply			
Item 1	1 (.3)	11 (3.7)	12 (4.0)
Item 2	1 (.3)	18 (6.0)	19 (6.3)
Item 3	1 (.3)	49 (16.3)	50 (16.6)
Item 4	1 (.3)	39 (13.0)	40 (13.3)
Descriptive Normative Beliefs			
Item 3	1 (.3)	2 (.7)	3 (1.0)
Identification with Referents			
Item 2	0	1 (.3)	1 (.3)
Item 3	1 (.3)	5 (1.7)	6 (2.0)
Item 4	0	6 (2.0)	6 (2.0)
Perceived Behavioral Control			
Control Beliefs			
Item 1	2 (.7)	0	2 (.7)
Item 2	2 (.7)	0	2 (.7)
Item 3	2 (.7)	0	2 (.7)
Item 4	3 (1.0)	0	3 (1.0)
Item 5	2 (.7)	0	2 (.7)
Item 6	3 (1.0	0	3 (1.0
Perceived Power			
Item 1	3 (1.0)	0	3 (1.0)
Item 2	3 (1.0)	0	3 (1.0)
Item 3	1 (.3)	0	1 (.3)
Item 4	1 (.3)	0	1 (.3)
Item 5	1 (.3)	0	1 (.3)

Reverse Coding

Most items ranged from 1-7 with the exception of some open response questions, and the sliding scale for "hours slept." The only items that were reverse coded were the first items on each survey that measured environment. The question read "There are barriers in my environment that keep me from getting 7-9 hours of sleep per night in (TIME)." If a person were to respond "Strongly Agree" (7), this would indicate a negative value because it verifies barriers in the environment. Therefore, environment item 1 was reverse coded for both initiation and maintenance. No outliers were detected on the instrument.

Validity & Reliability

Internal consistency reliability was found using Cronbach's alpha see Table 4.3a for initiation and 4.3b for maintenance. The following recommendations (George, & Mallery, 2003) were used to interpret the results: α > 0.7 was deemed *adequate.* All scales were deemed good or acceptable with a few rated as questionable (Descriptive Norms for initiation and maintenance) or poor (i.e. Perceived Norms and environment for initiation). No scale was unacceptable. Pearson's r was used to find the test-retest reliability by correlating responses from a separate set of participants. Participants were given a paper-pencil form of the survey, and two weeks later took the same survey. The initiation test-retest correlation coefficients were significant at p<0.001 for Injunctive Norms, Capacity, Autonomy, intentions, and skills. The maintenance test-retest correlation coefficients were significant at p<0.001 for Descriptive Norms, Injunctive Norms, Capacity, Autonomy, intentions, skills, and environment. However, after analyzing the data most scales were found outside the 0.7 criteria. Therefore to

demonstrate stability, a dependent t-test was run to compare pre-test and post-test data. Perceived Norms, Injunctive Norms, and intentions were the only items with a Pearson's r greater than 0.7, but Capacity remained the most stable construct (0.016) in the t-test comparisons. Since all items in the maintenance group were below .7 a dependent t test was run to check stability, and Attitudes (0.042), Instrumental Attitudes (0.018), and Capacity (0.005) were the stable constructs. Significant differences demonstrate a change between the two times.

Confirmatory factory analysis was performed using maximum likelihood extraction method to find the validity of each construct on the scales. Scales needed an Eigenvalue greater than 1 with a factor loading for each item greater than .32 (Tabachnick and Fidell, 2013). All Eigenvalues were greater than 1, indicating a 1-factor solution, except for Perceived Norms for both the maintenance and initiation groups. Perceived Norms had a two factor solution which was somewhat expected considering the scale included both Injunctive Norms and the Descriptive Norms.

Direct Measures Results:

Intentions: Three items measured intentions for both maintenance and initiation. An example of an item is "I intend to sleep 7-9 hours each night in the next 6 months." Cronbach's alpha was 0.826 and 0.756 for initiation and maintenance respectively. The subscale for intentions was analyzed for construct validity (Table 4.4a and Table 4.4b). The Eigenvalue for all three items loaded on one factor was 2.250 (initiation) and 2.037 (maintenance). The individual factor loadings were between .630 and .967 within the initiation group, and all items were retained. The factor loadings for the maintenance group were between .566 and .921, thus they were retained.

Attitudes: Four items measured Attitudes for both maintenance and initiation. Two items measured Instrumental Attitudes and two items measured Experiential Attitudes. An example of an item is, "For me, getting 7-9 hours of sleep each night in the next 30 days is…Bad/Good." The Cronbach's alpha for initiation was 0.861 and for maintenance was 0.968. When analyzed for construct validity, the Eigenvalue for initiation Attitudes was 2.842 and for maintenance Attitudes was 3.603. This demonstrates a one-factor solution. The factor loadings for initiation ranged from 0.610 to 0.885 and for maintenance ranged from 0.922 to 0.941.

Perceived Norms: Four items measured Perceived Norms for both groups. Two items measured Descriptive Norms and two items measured Injunctive Norms. An example of an item is, "Most college students get 7-9 hours of sleep each night." The Cronbach's alpha for initiation was 0.535, but when split into Descriptive and Injunctive categories, the Cronbach's alphas were 0.653 and 0.763 respectively. This was also the case for the maintenance group where the Cronbach's alpha was 0.543 for just Perceived Norms, but when split, Descriptive was 0.696 and Injunctive was 0.725. Eigenvalues for Perceived Norms were two-factor solutions, meaning that the items loaded onto two different factors (Descriptive and Injunctive Norms).

Perceived Behavioral Control: Four items measured Perceived Behavioral Control for each group. Two items measured Capacity, and two items measured Autonomy. The Cronbach's alpha for the initiation group was 0.769, and the Cronbach's alpha value for maintenance was 0.786. The Eigenvalues were 2.395 and 2.49 for the initiation and maintenance groups, respectively. This demonstrates a one

factor solution with values ranging from 0.465 to 0.865 (initiation) and 0.597 to 0.793 (maintenance).

Skills/abilities: Skills/abilities was measured by two items "I have the skills" and "I have the ability." The Cronbach's alpha values for the initiation and maintenance groups were 0.759 and 0.722. This scale had a one factor solution with Eigenvalues of 1.612 and 1.572.

Environment: Environment was measured by two items. They were worded as "I live in an environment where I can sleep…" and "There are barriers in my environment that prevent me from sleeping…" The item measuring barriers was reverse coded. Cronbach's alpha values for initiation and maintenance were 0.571 and 0.579. Eigenvalues for the environment items were 1.400 and 1.413 with an obvious one-factor solution.

All values are summarized in tables 4.3a, 4.3b, 4.4a, and 4.4b.

Summary of Validity & Reliability

Table 4.3a Direct measures validity and reliability: Initiation

Construct	Time 1 x Time 2 Pearson r	Cronbach's alpha	Paired Samples t-test (p-value)
Attitudes	0.257	0.861	0.883
Instrumental Attitudes	0.291	0.850	0.800
Experiential Attitudes	0.215	0.884	0.512
Perceived Norms	0.809**	0.535	0.927
Descriptive Norms	0.411	0.653	0.927
Injunctive Norms	1.00**	0.763	N/A
Perceived Behavioral Control	0.589**	0.769	0.183
Capacity	0.619**	0.770	0.016
Autonomy	0.680**	0.883	0.863
Intentions	0.813**	0.826	0.557
Skills/Abilities	0.650**	0.759	0.350
Environment	0.132	0.571	0.452

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

Table 4.3a Direct measures validity and reliability: Maintenance

Construct	Time 1 x Time 2 Pearson r	Cronbach's alpha	Paired Samples t-test (p-value)
Attitudes	0.364*	0.968	0.042
Instrumental Attitudes	0.384*	0.937	0.018
Experiential Attitudes	0.348*	0.945	0.251
Perceived Norms	0.605**	0.543	0.130
Descriptive Norms	0.670**	0.696	0.118
Injunctive Norms	0.470**	0.725	0.395
Perceived Behavioral Control	0.592**	0.786	0.034
Capacity	0.532**	0.795	0.005
Autonomy	0.557**	0.766	0.443
Intentions	0.584**	0.756	0.158
Skills/Abilities	0.542**	0.722	0.144
Environment	0.418**	0.579	0.346

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

Table 4.4a Direct measures summary of factor analysis for establishing construct validity
(Initiation)

Variable	Eigenvalue	Factor Loadings
Intention	2.250	
I intend to do the behavior		0.967
I will do the behavior		0.786
I will try to do the behavior		0.630
Attitudes		
Instrumental:	2.842	
Doing the behavior is		
Good/Bad		0.739
Important/Unimportant		0.610
Experiential:		
Doing the behavior is		
Pleasant/Unpleasant		0.885
Enjoyable/Frustrating		0.857
Perceived Norms	1.696 & 1.437	
Injunctive Norms:		
Most people who are important to me think I should…		0.703
Most people I respect want me to…		0.892
Descriptive Norms:		
Most people I respect…		0.123
Most college students		0.101
Perceived Behavioral Control	2.395	
Capacity:		
For me, to do the behavior will be…		0.465
Difficult/Easy		0.488
I am confident that I can do the behavior.		
Autonomy:		
How much Control do you have to do the behavior?		0.865
No Control/Complete Control		0.817
Skills/Abilities	1.612	
I have the skills needed to sleep 7-9 hours…		
I have the ability to sleep 7-9 hours…		
Environment	1.400	
There are barriers in the environment that keep me from getting 7-9 hours of sleep…*		
I live in an environment where I can get 7-9 hours of sleep each night.		

Note: Maximum likelihood estimation used for all subscales
*Reversed Coded
Behavior: to start sleeping 7-9 hours each night in the next 30 days.

Table 4.4b Direct measures summary of factor analysis for establishing construct validity (maintenance)

Variable	Eigenvalue	Factor Loadings
Intention	2.037	
I intend to do the behavior		0.921
I will do the behavior		0.689
I will try to do the behavior		0.566
Attitudes		
Instrumental:	3.603	
Doing the behavior is		
Bad/Good		0.944
Harmful/Beneficial		0.930
Experiential:		
Doing the behavior is		
Unpleasant/Pleasant		0.921
Unsatisfying/Satisfying		0.931
Perceived Norms	1.7 & 1.428	
Injunctive Norms:		
Most people who are important to me…		0.902
Most people whose opinions I value want me to…		0.639
do the behavior		
Descriptive Norms:		
Most people like me…		0.151
Most college students…		0.806
Perceived Behavioral Control	2.49	
Capacity:		
For me, to do the behavior will be…		
Difficult/Easy		0.621
I am confident that I can do the behavior.		0.597
Autonomy:		
How much Control do you have to do the behavior?		0.778
No Control/Complete Control		
Getting sleep is completely up to me…		0.793
Skills/Abilities	1.572	
I have the skills needed to sleep 7-9 hours…		
I have the ability to sleep 7-9 hours…		
Environment	1.413	
There are barriers in the environment that keep me from getting 7-9 hours of sleep…*		
I live in an environment where I can get 7-9 hours of sleep each night.		

Note: Maximum likelihood estimation used for all subscales
*Reversed Coded
Behavior: to stop drinking regular soda and other sugary drinks for the next 6 months.

Descriptive Data

Table 4.5a and Table 4.5b show the possible ranges and observed ranges for the items on the direct measures, as well as the means and the standard deviations. All items ranged the possible minimum and maximum except Perceived Behavioral Control and Capacity (initiation only), and Attitudes and Instrumental Attitudes (maintenance only). Table 4.6a and Table 4.6b show the demographics for the participants in each group. The tables proceeding demographics contain quantitative information from the PSQI items. Table 4.8a and Table 4.8b are matrices showing the correlations between all the significant constructs of the Integrative Model. Intentions were positively correlated and statistically significant with every item in the initiation matrix. In the maintenance matrix, intentions were not statistically significant when correlated with Attitudes, Instrumental Attitudes, or Experiential Attitudes.

PSQI information is presented in tables with the quantitative data. The PSQI contains questions that are open-ended or have an option to write "other." These items were not included in the data analysis because they were not considered important to this research, but rather they were included for the use of the PSQI in its entirety.

Table 4.5a Mean and Standard Deviations for IM constructs (Initiation)

Theoretical Construct	Possible Minimum-Maximum	Observed Minimum-Maximum	Mean (SD)
Attitudes	-3 to 3	-3 to 3	2.27 (1.05)
Instrumental	-3 to 3	-3 to 3	2.36 (1.10)
Experiential	-3 to 3	-3 to 3	2.17 (1.23)
Perceived Norms	-3 to 3	-3 to 3	-0.11 (.95)
Injunctive Norms	-3 to 3	-3 to 3	1.32 (1.30)
Descriptive Norms	-3 to 3	-3 to 3	-1.53 (1.27)
Perceived Behavioral Control	-3 to 3	-3 to 2.5	-1.00 (1.15)
Capacity	-3 to 3	-3 to 2.5	-1.86 (1.18)
Autonomy	-3 to 3	-3 to 3	-.15 (1.54)
Intentions	-3 to 3	-3 to 3	-.55 (1.36)
Skills/Abilities	1 to 7	1 to 7	3.40 (1.49)
Environment	1 to 7	1 to 7	3.64 (1.55)

Table 4.5b Mean and Standard Deviations for IM constructs (Maintenance)

Theoretical Construct	Possible Minimum-Maximum	Observed Minimum-Maximum	Mean (SD)
Attitudes	-3 to 3	-2.17 to 3	2.05 (1.00)
Instrumental	-3 to 3	-1.33 to 3	2.67 (0.72)
Experiential	-3 to 3	-3 to 3	1.44 (1.57)
Perceived Norms	-3 to 3	-3 to 3	0.59 (1.45)
Injunctive Norms	-3 to 3	-3 to 3	0.66 (1.87)
Descriptive Norms	-3 to 3	-3 to 3	0.47 (1.50)
Perceived Behavioral Control	-3 to 3	-3 to 3	1.25 (1.42)
Capacity	-3 to 3	-3 to 3	0.21 (1.44)
Autonomy	-3 to 3	-2.5 to 3	0.99 (1.39)
Intentions	-3 to 3	-3 to 3	1.61 (1.42)
Skills/Abilities	1 to 7	1 to 7	5.07 (1.34)
Environment	1 to 7	1 to 7	4.38 (1.44)

Table 4.6a A summary of demographics (Categorical) (Initiation)

Gender
        Female – 212 (68.4)
        Male – 87 (28.1)
        Other- 2 (.6)
        Missing – 9 (2.9)
Race
        Caucasian -- 210 (67.7)
        African American -- 8 (2.6)
        Hispanic -- 20 (6.5)
        Asian -- 22 (7.1)
        Native American or American Indian -- 9 (2.9)
        Pacific Islander -- 1 (.3)
        Other -- 9 (2.9)
        Multi-racial -- 7 (2.3)
        Missing-- 24 (7.7)
Age
        18 -- 76 (24.5)
        19 -- 69 (22.3)
        20 -- 49 (15.8)
        21 -- 50 (16.1)
        22 -- 33 (10.6)
        23 -- 16 (5.2)
        24 -- 7 (2.3)
 *Mean 19.9 (1.64)

Classification in School
        Freshmen--95 (30.6)
        Sophomore--61 (19.7)
        Junior--60 (19.4)
        Senior--66 (21.3)
        Graduate Student--17 (5.5)
        Missing--11 (3.5)

Do you have a job?
        Yes – 169 (54.5)
        No – 137 (44.2)
        Missing – 4 (1.3)

Is your job day shift, night shift or both?
        Night shift – 30 (9.7)
        Day shift- 84 (27.1)
        Both- 59 (19.0)

Do you take naps?
        No – 100 (32.3)
        Yes – 206 (66.5)
        Missing (4 (1.3)

Table 4.6b A summary of demographics (Categorical) (Maintenance)

Gender
    Female – 196 (68.3)
    Male – 85 (28.3)
    Other – 2 (.7)
    Missing – 17 (5.7)

Race
    Caucasian – 223 (74.3)
    African American – 4 (1.3)
    Hispanic -- 13 (4.3)
    Asian – 16 (5.3)
    Native American or American Indian – 7 (2.3)
    Other – 5 (1.7)
    Multi-racial -- 7 (2.3)
    Missing-- 25 (7.7)
Age
    18--67 (22.3)
    19--66 (22)
    20--55 (18.3)
    21--36 (12.0)
    22--24 (8.0)
    23--13 (4.3)
    24--19 (6.3)
    *Mean 20.0 (1.78)

  Classification in School
    Freshmen--88 (29.3)
    Sophomore--56 (18.7)
    Junior--58 (19.3)
    Senior--43 (14.3)
    Graduate Student--37 (12.3)
Do you have a job?
    Yes-- 136 (45.3)
    No--154 (51.3)
    Missing--10 (3.3)

Is your job day shift, night shift or both?
    Night Shift--14 (4.7)
    Day Shift--93 (31.0)
    Both--35 (11.7)

Do you take naps?
    No--128 (42.7)
    Yes--161 (53.7)
    Missing--11 (3.7)

Table 4.7a PSQI Initiation

Pittsburgh Sleep Quality Index (PSQI) questions (scales)
During the past month, how often have you had trouble sleeping because you . . .

PSQI 4: Cannot get to sleep within 30 minutes
Not during the past month – 63 (20.3)
Less than once a week – 59 (19.0)
Once or twice a week – 58 (18.7)
Three or more times a week -- 94 (30.3)
Missing – 36 (11.6)

PSQI 5: Wake up in the middle of the night or early morning
Not during the past month – 60 (19.4)
Less than once a week – 66 (21.3)
Once or twice a week – 81 (26.1)
Three or more times a week – 94 (30.3)
Missing – 9 (2.9)

PSQI 6: Have to get up to use the bathroom
Not during the past month – 130 (41.9)
Less than once a week – 85 (27.4)
Once or twice a week – 50 (16.1)
Three or more times a week – 36 (11.6)
Missing – 9 (2.9)

PSQI 7: Cannot breathe comfortably
Not during the past month – 201 (64.8)
Less than once a week – 56 (18.1)
Once or twice a week – 32 (10.3)
Three or more times a week – 14 (4.5)
Missing – 7 (2.3)

PSQI 8: Cough or snore
Not during the past month – 201 (64.8)
Less than once a week – 44 (14.2)
Once or twice a week – 41 (13.2)
Three or more times a week – 17 (5.5)
Missing – 7 (2.3)

PSQI 9: Feel too cold
Not during the past month – 144 (46.5)
Less than once a week – 69 (22.3)
Once or twice a week – 65 (21.0)
Three or more times a week – 24 (7.7)
Missing—8 (2.6)

PSQI 10: Feel too hot
Not during the past month –91 (29.4)
Less than once a week – 70 (22.6)
Once or twice a week – 89 (28.7)
Three or more times a week – 53 (17.1)
Missing – 7 (2.3)

PSQI 11: Had bad dreams
        Not during the past month – 137 (44.2)
        Less than once a week – 81 (26.1)
        Once or twice a week – 51 (16.5)
        Three or more times a week – 33 (10.6)
        Missing – 8 (2.6)

PSQI 12: Have pain
        Not during the past month – 170 (54.8)
        Less than once a week – 59 (19.0)
        Once or twice a week – 49 (15.8)
        Three or more times a week – 24 (7.7)
        Missing – 8 (2.6)

PSQI 13a: other
        Not during the past month – 163 (52.6)
        Less than once a week – 15 (4.8)
        Once or twice a week – 26 (8.4)
        Three or more times a week – 48 (15.5)
        Missing – 58 (18.7)

PSQI 14: How often during the past month have you had trouble sleeping because of this (other cause)?
        Not during the past month – 26 (8.4)
        Less than once a week –13 (4.2)
        Once or twice a week – 25 (8.1)
        Three or more times a week --55 (17.7)
        Missing* -- 191 (61.6)
        **answer not necessary

PSQI 15: During the past month, how would you rate your sleep quality overall?
        Very good – 13 (4.2)
        Fairly good – 134 (43.2)
        Fairly bad – 126 (40.6)
        Very bad – 16 (5.2)
        Missing – 21 (6.8)

PSQI 16: During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?
        Not during the past month – 217 (70)
        Less than once a week – 40 (12.9)
        Once or twice a week – 25 (8.1)
        Three or more times a week – 18 (5.8)
        Missing – 10 (3.2)

PSQI 17: 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 – 88 (28.4)
        Less than once a week – 90 (29)
        Once or twice a week – 83 (26.8)
        Three or more times a week – 40 (12.9)
        Missing – 9 (2.9)

PSQI 18: During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all – 23 (7.4)
Only a very slight problem – 75 (24.2)
Somewhat of a problem – 128 (41.3)
A very big problem – 75 (24.2)
Missing – 9 (2.9)

Table 4.7b PSQI Maintenance

Pittsburgh Sleep Quality Index (PSQI) questions (scales)

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

PSQI 4: Cannot get to sleep within 30 minutes
Not during month--41 (13.7)
Less than once a week--82 (27.3)
Once or twice a week--71 (23.7)
Three or more times a week--53 (17.7)
Missing--53 (17.7)

PSQI 5: Wake up in the middle of the night or early morning
Not during month--54 (18.0)
Less than once a week--85 (28.3)
Once or twice a week--83 (27.7)
Three or more times a week--59 (19.7)
Missing--19 (6.3)
PSQI 6: Have to get up to use the bathroom
Not during month--126 (42.0)
Less than once a week--73 (24.3)
Once or twice a week--49 (16.3)
Three or more times a week -33 (11.0)
Missing--19 (6.3)

PSQI 7: Cannot breathe comfortably
Not during month--217 (72.3)
Less than once a week--45 (15.0)
Once or twice a week--16 (5.3)
Three or more times a week--7 (2.3)
Missing--15 (5.0)

PSQI 8: Cough or snore
Not during month--212 (70.7)
Less than once a week--40 (13.3)
Once or twice a week--27 (9.0)
Three or more times a week--5 (1.7)
Missing--16 (5.3)

PSQI 9: Feel too cold
Not during month--141 (7.0)
Less than once a week--86 (28.7)
Once or twice a week--43 (14.3)
Three or more times a week--15 (5.0)
Missing--15 (5.0)

PSQI 10: Feel too hot
Not during month--86 (28.7)
Less than once a week--81 (27)
Once or twice a week--86 (28.7)
Three or more times a week--30 (10)
Missing--17 (5.7)

PSQI 11: Had bad dreams
     Not during month--151 (50.3)
     Less than once a week--77 (25.7)
     Once or twice a week--41 (13.7)
     Three or more times a week--16 (5.3)
     Missing--15 (5.0)

PSQI 12: Have pain
     Not during the past month – 209 (69.7)
     Less than once a week – 46 (15.3)
     Once or twice a week – 18 (6.0)
     Three or more times a week – 11 (3.7
     Missing – 16 (5.3)

PSQI 13a: other
     Not during the past month – 192 (64.0)
     Less than once a week – 16 (5.3)
     Once or twice a week – 20 (6.7)
     Three or more times a week – 13 (4.3)
     Missing – 59 (19.7)

PSQI 14: How often during the past month have you had trouble sleeping because of this (other cause)?
     Not during the past month – 30 (10)
     Less than once a week –18 (6.0)
     Once or twice a week – 29 (9.7)
     Three or more times a week –13 (4.3)
     Missing* -- 210 (70.0)
     **answer not necessary

PSQI 15: During the past month, how would you rate your sleep quality overall?
     Very good – 48 (16.0)
     Fairly good – 186 (62.0)
     Fairly bad – 35 (11.7)
     Very bad – 2 (.7)
     Missing – 29 (9.7)

PSQI 16: During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?
     Not during the past month – 226 (75.3)
     Less than once a week – 32 (10.7)
     Once or twice a week – 13 (4.3)
     Three or more times a week – 12 (4.0)
     Missing – 17 (5.7)

PSQI 17: 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 – 135 (45.0)
     Less than once a week – 85 (28.3)
     Once or twice a week – 50 (16.7)
     Three or more times a week – 12 (4.0)
     Missing – 18 (6.0)

PSQI 18: During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

       No problem at all – 36 (12.0)

       Only a very slight problem – 95 (31.7)

       Somewhat of a problem – 110 (36.7)

       A very big problem – 41 (13.7)

       Missing – 18 (6.0)

Table 4.8a Pairwise correlation analyses of the Integrative Model constructs (Initiation)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Hours	-												
2. Bin	.095	-											
3. Att	.064	.283***	-										
4. IA	.082	.281***	.908***	-									
5. EA	.030	.222***	.884***	.606***	-								
6. PN	.018	.348***	.164**	.122*	.174**	-							
7. IN	-.071	.249***	.253***	.204***	.253***	.741***	-						
8. DN	.099	.263***	-.015	-.026	.000	.728***	.079	-					
9. PBC	.106	.403***	.029	.066	-.018	.148**	.008	.212***	-				
10. CAP	.147**	.475***	.030	.073	-.025	.195***	-.008	.297***	.795***	-			
11. AUT	.046	.239***	.021	.043	-.008	.072	.017	.090	.885***	.422***	-		
12. ENV	.009	.174**	.007	.049	-.042	.015	-.036	.060	.353***	.237***	0.346***	-	
13. SA	.0188***	.522***	.132*	.161**	.070	.213***	.098	.216***	.606***	.514***	0.511***	0.344***	-

Notes: ***$p \leq$.001, **$p \leq$.01, *$p \leq$.05. BIN (Behavioral Intentions); Att (Attitudes); IA (Instrumental Attitudes); EA (Experiential Attitudes); PN (Perceived Norms); IN (Injunctive Norms); DN (Descriptive Norms); PBC (Perceived Behavioral Control); CAP (Capacity); AUT (Autonomy); SA (Skills and Abilities); ENV (Environment)

Table 4.8b Pairwise correlation analyses of the Integrative Model constructs (Maintenance)

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.	Hours	-	.202***	.128*	.144*	.105	-.063	.007	-.089	.186***	.258***	.059	.179**	0.067
2.	Bin		-	.106	.125	.082	.276***	.279***	.148**	.546***	.619***	.317***	.720***	.315***
3.	Att			-	.977***	.976***	.038	.132*	-.053	.124*	.123*	.091	.122*	.073
4.	EA				-	.906***	.043	.140**	-.052	.134*	.141*	.09	.119*	.078
5.	IA					-	.03	.118*	-.052	.108	.098	.087	.119*	.063
6.	PN						-	.661***	.809***	.182**	.171**	.143*	.224***	.103
7.	IN							-	.094	.016	-.007	.036	.156**	.045
8.	DN								-	.230***	.233***	.162**	.176**	.102
9.	PBC									-	.867***	.857***	.661***	.422***
10.	CAP										-	.485***	.659***	.365***
11.	AUT											-	.473***	.367***
12.	ENV												-	.469***
13.	SA													-

Notes: ***p≤.001, **p≤.01, *p≤.05. BIN (Behavioral Intentions); Att (Attitudes); IA (Instrumental Attitudes); EA (Experiential Attitudes); PN (Perceived Norms); IN (Injunctive Norms); DN (Descriptive Norms); PBC (Perceived Behavioral Control); CAP (Capacity); AUT (Autonomy); SA (Skills and Abilities); ENV (Environment)

Regression Analysis and Pairwise Comparisons

Two rounds of linear regression were performed using a stepwise method of regression on both the maintenance and initiation groups. The first round used intentions as the dependent variable and Perceived Behavioral Control, Attitudes, and Perceived Norms as the independent variables. The next round used intentions as the dependent variable and Perceived Behavioral Control, Capacity, Autonomy, Perceived Norms, Injunctive Norms, Descriptive Norms, Attitudes, Instrumental Attitudes, and Experiential Attitudes as the independent variables.

Assumption Testing

Three assumptions were tested for performing multiple regression: normality, multicollinearity, and homoscedasticity. Normality was tested using skewness and kurtosis. The variance inflation factor (VIF) was used to test for multicollinearity in the models. Tables 4.9a, 4.9b, 4.10a, 4.10b, 4.11a, 4.11b, 4.12a, and 4.12b show the scatterplots and VIF values for the regression models. (All tables "a" are initiation; all tables "b" are maintenance.) The scatterplots in each set of tables shows the homoscedasticity of residuals. All scatterplots show that homoscedasticity was maintained.

Figure 4.9a Scatter Plot of the Regression Standardized Residuals for intentions predicted by Perceived Behavioral Control, Attitudes, and Perceived Norms (Initiation)

Scatterplot
Dependent Variable: Total_I_INT
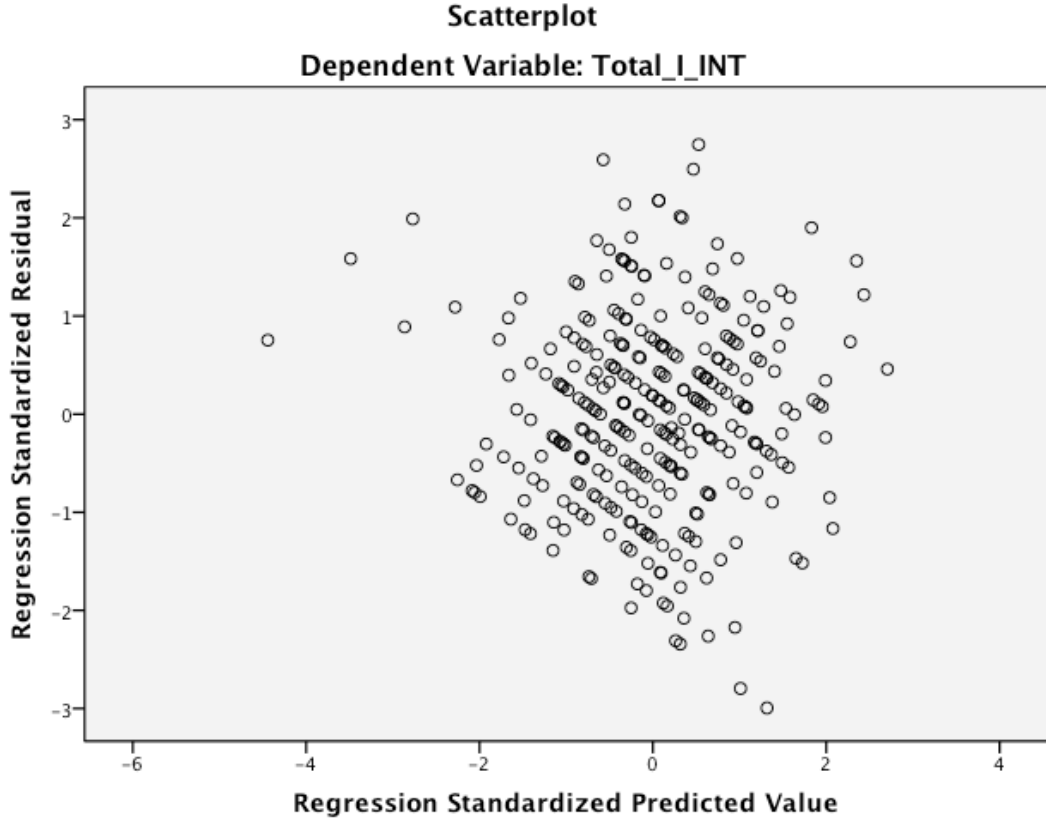
Table 4.10a Variance Inflation Factors for Intentions as Predicted by Perceived Behavioral Control, Perceived Norms, and Attitudes (Initiation)

Independent Variables	Variance Inflation Factor
Perceived Behavioral Control	1.022
Perceived Norms	1.050
Attitudes	1.027
Dependent Variable: Intentions	

Figure 4.9b Scatter Plot of the Regression Standardized Residuals for intentions predicted by Perceived Behavioral Control, Attitudes, and Perceived Norms (Maintenance)
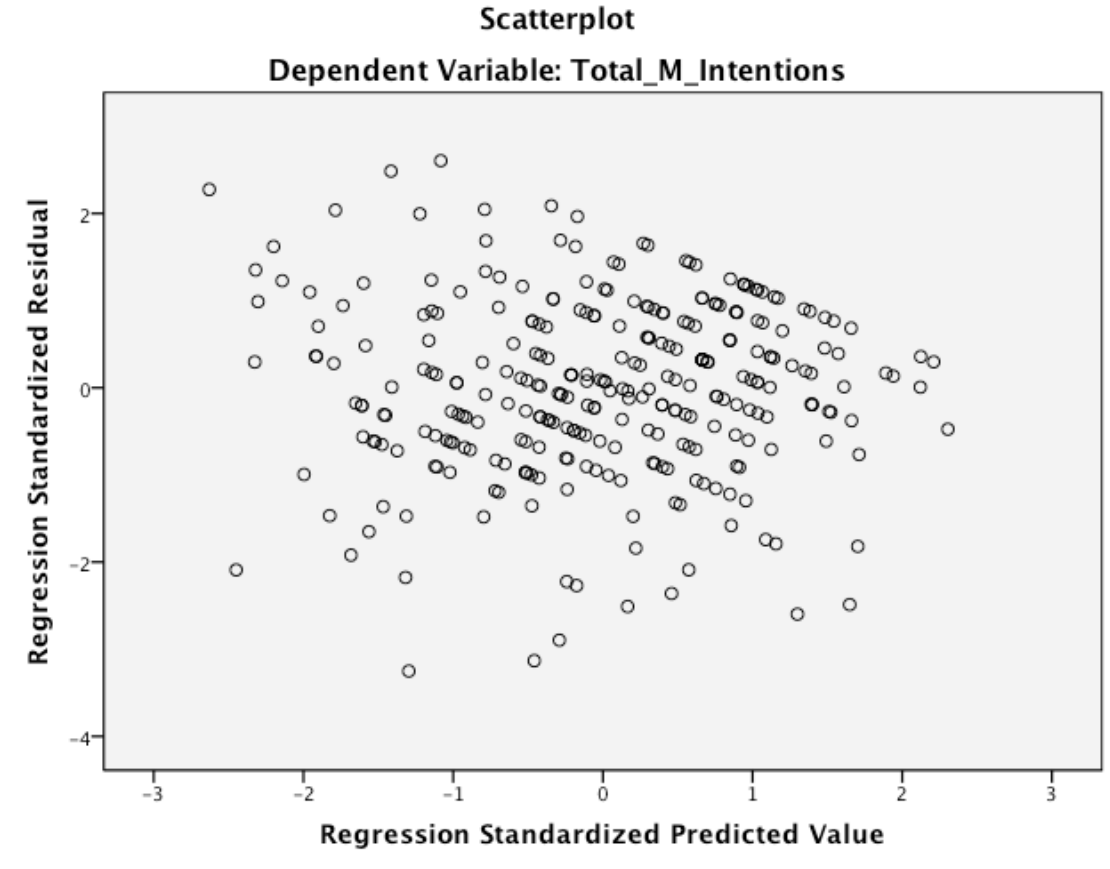
Table 4.10b Variance Inflation Factors for Intentions as Predicted by Perceived Behavioral Control, Perceived Norms, and Attitudes (Maintenance)

Independent Variables	Variance Inflation Factor
Perceived Behavioral Control	1.034
Perceived Norms	1.034
Dependent Variable: Intentions	

Figure 4.11a Scatter Plot of the Regression Standardized Residuals for intentions predicted by Capacity, Autonomy, Injunctive Norms, Descriptive Norms, Instrumental Attitudes, and Experiential Attitudes (Initiation)
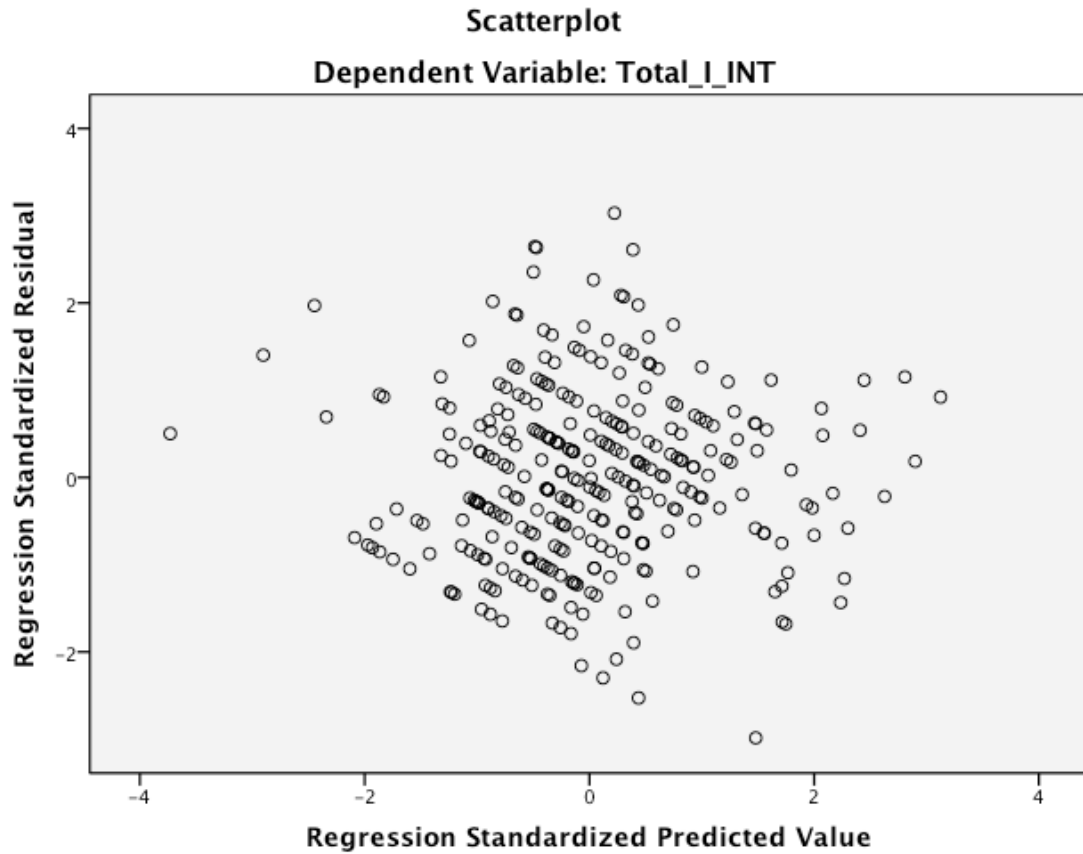
Table 4.12a Variance Inflation Factors for Intentions as Predicted by Capacity, Autonomy, Injunctive Norms, Descriptive Norms, Instrumental Attitudes, and Experiential Attitudes (Initiation)

Independent Variables	Variance Inflation Factor
Capacity	1.107
Injunctive Norms	1.054
Instrumental Attitudes	1.054
Descriptive Norms	1.110
Dependent Variable: Intentions	

Figure 4.11b Scatter Plot of the Regression Standardized Residuals for intentions predicted by Capacity, Autonomy, Injunctive Norms, Descriptive Norms, Instrumental Attitudes, and Experiential Attitudes (Maintenance)
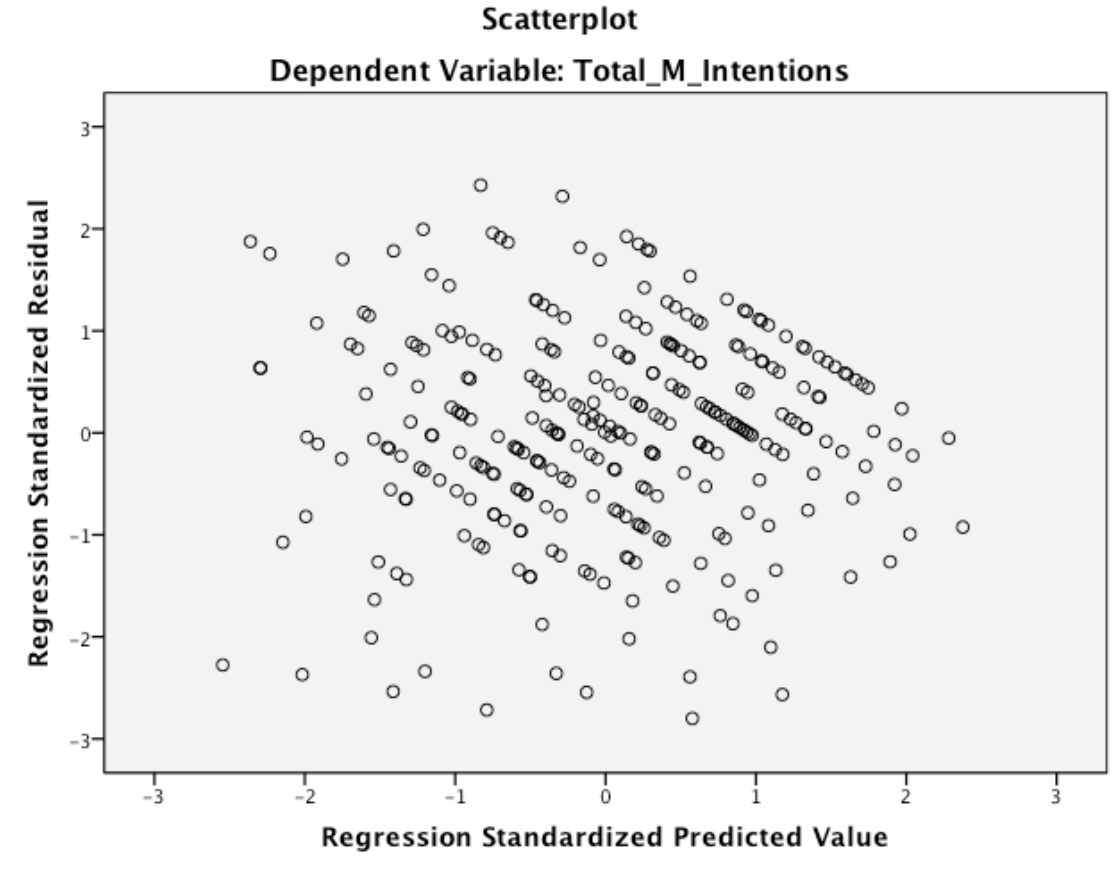
Table 4.12b Variance Inflation Factors for Intentions as Predicted by Capacity, Autonomy, Injunctive Norms, Descriptive Norms, Instrumental Attitudes, and Experiential Attitudes (Maintenance)

Independent Variables	Variance Inflation Factor
Capacity	1.000
Injunctive Norms	1.000
Dependent Variable: Intentions	

Model 1: Predicting intentions with Attitudes, Perceived Norms, and Perceived Behavioral Control within the initiation group. According to the IM, Attitudes, Perceived Norms, and Perceived Behavioral Control predict intentions. All three constructs predicted 29.3% of the variance of intentions. All variables were significant in the initiation regression model. When evaluating the standardized beta-coefficients, PBC (0.359) was the most influential variable, followed by Perceived Norms (0.258) and Attitudes (0.230). All values were significant with a p-value of <0.001.

Model 2: Predicting intentions with Attitudes, Perceived Norms, and Perceived Behavioral Control with the maintenance group. Results were different in the maintenance model. Only Perceived Norms and Perceived Behavioral Control predicted 32.6% of the variance of intentions. Attitudes were not a significant predictor of intentions. PBC was the most influential variable with a standardized beta-coefficient of 0.513 and Perceived Norms had a beta coefficient of 0.182. Both were significant with a p-value of <0.0001.

Table 4.13a Initiation Group Parameter Estimates from the Final Regression Model for Intentions as Predicted by Perceived Behavioral Control, Perceived Norms, and Attitudes: (Adjusted $R^2 = 0.293$) (n=310)

	Unstandardized coefficients B	Std. error	Standardized coefficients Beta	t	p-value
Constant	0.824	0.069			
PBC	0.482	0.045	0.513	10.615	0.001
PNorms	0.244	0.065	0.182	3.777	0.001

Table 4.13b Maintenance Group Parameter Estimates from the Final Regression Model for Intentions as Predicted by Perceived Behavioral Control, Perceived Norms, and Attitudes: (Adjusted $R^2 = 0.326$) (n=300)

	Unstandardized coefficients B	Std. error	Standardized coefficients Beta	t	p-value
Constant	-0.757	0.169			
PBC	0.426	0.057	0.359	7.42	0.001
PNorms	0.372	0.071	0.258	5.25	0.001
ATT	0.300	0.063	0.230	4.74	0.001

Model 3: Predicting Intentions with Instrumental Attitudes, Experiential Attitudes, Descriptive Norms, Injunctive Norms, and Perceived Behavioral Control. According to the IM, intentions is predicted by Attitudes, Perceived Norms, and Perceived Behavioral Control. In this model, the constructs of Attitudes were split between Instrumental and Experiential Attitudes, Perceived Norms were split into Injunctive and Descriptive Norms, and Perceived Behavioral Control was split between Capacity and Autonomy. Only four constructs predicted 32.5% of the variance of intentions in the initiation model – Capacity, Injunctive Norms, Descriptive Norms, and Instrumental Attitudes. All variables were significant with a p-value of <0.001 except Descriptive Norms with a p-value of <0.01. Capacity was the most influential with a standardized beta-coefficient of 0.423, then Instrumental Attitudes (0.213), Injunctive Norms (0.199), and Descriptive Norms (0.127).

Model 4: Predicting intentions with Instrumental Attitudes, Experiential Attitudes, Descriptive Norms, Injunctive Norms, and Perceived Behavioral Control. The maintenance regression model, was somewhat similar to the initiation model. Capacity and Injunctive Norms were the only two of the six constructs that predicted variance in intentions (46%). Just like in the initiation group, Capacity predicted the most with a standardized beta-coefficient of 0.621, followed by Injunctive Norms (0.283).

Table 4.14a Parameter Estimates from the Final Regression Model for Intentions as Predicted by Perceived Behavioral Control, Injunctive Norms, Descriptive Norms, Instrumental Attitudes, and Experiential Attitudes for the Initiation Group: (Adjusted R² = 0.325) (n=310)

	Unstandardized coefficients B	Std. error	Standardized coefficients Beta	t	p-value
Constant	- 0.214	0.179			
Cap	0.490	0.056	0.423	8.67	0.001
Inj Norms	0.208	0.050	0.199	4.17	0.001
Inst	0.236	0.053	0.213	4.48	0.001
Desc Norms	0.137	0.052	0.127	2.61	0.010

Table 4.14b Parameter Estimates from the Final Regression Model for Intentions as Predicted by Capacity, Autonomy, Injunctive Norms, Descriptive Norms, Instrumental Attitudes, and Experiential Attitudes for the Maintenance Group: (Adjusted R² = 0.460) (n=300)

	Unstandardized coefficients B	Std. error	Standardized coefficients Beta	t	p-value
Constant	.606	0.096			
Cap	0.495	0.034	0.621	14.619	0.001
Inj Norms	0.320	0.048	0.283	6.666	0.001

Determinants of Attitudes, Perceived Norms, and Perceived Behavioral Control

Attitudes: Belief Strength, Outcome Evaluation, Belief-Evaluation Product, and Correlations of Belief-Evaluation Product with Direct Attitude Measure. Seven items evaluated Behavioral Beliefs and seven items evaluated the corresponding Outcome Evaluations with the initiation group. These items are the indirect measures of Attitudes and can be found in Table 4.15a and Table 4.15b. The maintenance group had five Behavioral Beliefs and five Outcome Evaluations. As previously discussed, each Behavioral belief was multiplied by an Outcome Evaluation, and then correlated to total Attitudes, total Instrumental Attitudes, and total Experiential Attitudes. Most items were positively and significantly correlated in both the initiation and maintenance groups.

Table 4.15a Indirect Attitudes: Belief Strength, Outcome Evaluation, Belief-Evaluation Product, and Correlations of Belief-Evaluation Product with Direct Attitude Measure (N = 410) (Initiation)

Behavioral Belief	Belief Strength (bb_i)		Outcome evaluation (oe_i)		bb_i x oe_i		Correlation bb_ioe_i with		
	M	SD	M	SD	M	SD	TA	TIA	TEA
Feel Rested	5.73	1.41	2.1	1.17	12.49	7.56	0.342***	0.244***	0.377***
Have more energy	5.64	1.42	2.29	0.94	13.25	6.59	0.417***	0.342***	0.410***
Not miss out on important activities	5.64	1.42	2.01	1.40	11.76	8.46	0.245***	0.177**	0.267***
Have better focus	5.69	1.28	2.34	1.01	13.74	6.69	0.442***	0.345***	0.452***
Think clearly	5.67	1.30	2.44	0.94	14.24	6.49	0.428***	0.342***	0.431***
Be able to study more	4.24	1.93	2.06	1.29	9.03	7.06	0.313***	0.322***	0.235 ***
Have better health	5.88	1.28	2.11	1.25	13.00	8.51	0.308***	0.275***	0.278***

Note. Belief strength can range from 1 to7 and Outcome Evaluation can range from -3 to +3, and bb x oe can range from -21 to 21. TA means total Attitudes, TIA means total Instrumental Attitudes, and TEA means total Experiential Attitudes.

* Significant; ***significant at p < .001; ** at p < .01; and * at p. < .05.

Table 4.15b Indirect Attitudes: Belief Strength, Outcome Evaluation, Belief-Evaluation Product, and Correlations of Belief-Evaluation Product with Direct Attitude Measure (N = 410) (Maintenance)

Behavioral Belief	Belief Strength (bb) M	SD	Outcome evaluation (oe) M	SD	bb x oe M	SD	Correlation bb oe with TA	TIA	TEA
Feel rested	5.26	1.6	2.64	0.77	14.08	5.8	0.399***	0.349***	0.43***
Have more energy	5.12	1.56	2.58	0.76	13.45	5.81	.389***	.341***	.417***
Not miss out on other important activities	4.91	1.62	2.03	1.18	10.28	7.1	0.101	0.101	0.097
Have better focus	5.29	1.53	2.58	0.74	13.95	5.83	.382***	.346***	.399***
Think clearly	5.42	1.38	2.64	0.72	14.51	5.57.	.362***	.335***	.371***

Note. Belief strength can range from 1 to7 and Outcome Evaluation can range from -3 to +3, and bb x oe can range from -21 to 21. TA means total Attitudes, TIA means total Instrumental Attitudes, and TEA means total Experiential Attitudes.
* Significant; ***significant at p < .001; ** at p < .01; and * at p. < .05.

Injunctive Norms: Injunctive Normative Beliefs, Motivation to Comply, Belief-Comply Product, and Correlations of Belief-Comply Product with Direct Injunctive Measure.

Table 4.17a and Table 4.17b show the indirect Injunctive Norms items to predict Perceived Norms. The initiation group had four Injunctive normative belief items and four motivation to comply items. The maintenance group had four of each, as well. Injunctive normative belief was multiplied by motivation to comply to get a score between -21 and 21. In the initiation group, every item was positively and significantly correlated with intentions. In the maintenance group, only the first two items were significantly correlated, however all were positively correlated.

Descriptive Norms: Descriptive Normative Beliefs, Identification with Referents, Belief-Referents Product, and Correlations of Belief-Referents Product with Direct Descriptive Measure. Five items measured Descriptive Norms for the initiation group, and four items measured Descriptive Norms for the maintenance group. Descriptive Norms is measured by multiplying Descriptive normative beliefs by identification with referents. In both groups, the correlations varied. "Traditional college students" was negatively and not significantly correlated with Perceived Norms in the initiation group (-0.027). "My parents was negatively and not significantly correlated with Perceived Norms in the maintenance group (-0.001).

Table 4.16a Injunctive Norms: Injunctive Normative Beliefs, Motivation to Comply, Belief-Comply Product, and Correlations of Belief-Comply Product with Direct Injunctive Measure (N = 256) (Initiation)

Normative Belief	Injunctive Normative Beliefs (inb$_i$)		Motivation to Comply (mtc$_i$)		inb$_i$ x mtc$_i$		Correlation inb$_i$ mtc$_i$	
	M	SD	M	SD	M	SD	TPN	TIN
Parents	6.19	1.16	1.33	1.53	8.64	9.91	0.186**	0.215***
Friends	4.61	1.59	0.39	1.64	2.96	7.8	0.271***	0.209***
Extended family	5.22	1.49	0.1	1.75	1.7	9.22	0.222***	0.279***
Professors	4.99	1.58	0.3	1.72	2.79	8.71	0.316***	0.352***

Note. Injunctive normative beliefs can range from 1 to 7 and motivation to comply can range from -3 to +3, and inb x mtc can range from -21 to 21. TPN means total Perceived Norms and TIN means total Injunctive Norms.
* Significant; ***significant at p < .001; ** at p < .01; and * at p. < .05.

Table 4.17a Descriptive Norms: Descriptive Normative Beliefs, Identification with Referents, Belief-Referents Product, and Correlations of Belief-Referents Product with Direct Descriptive Measure (N = 279) (Initiation)

Normative Belief	Descriptive Normative Beliefs (dnb$_i$)		Identification with Referents (iwr$_i$)		dnb$_i$ x iwr$_i$		Correlation dnb$_i$ iwr$_i$	
	M	SD	M	SD	M	SD	TPN	TDN
Traditional college students	1.99	1.17	1.38	1.58	2.45	3.87	-.027	-0.035
Parents	4.93	1.85	-0.33	1.59	-2.23	8.48	0.070	0.155**
Kindergarten through 6th grade children	6.07	1.18	-1.57	1.37	-9.87	8.82	0.135*	0.353***
Working adults	4.07	1.52	0.32	1.53	0.73	6.62	-.038	0.070
My friends	2.80	1.44	1.24	1.45	2.75	4.74	0.099	0.075

Note. Descriptive normative beliefs can range from 1 to 7 and identification with referents can range from -3 to +3, and dnb x iwr can range from -21 to 21. TPN means total Perceived Norms and TDN means total Descriptive Norms.
* Significant; ***significant at p < .001; ** at p < .01; and * at p. < .05.

Table 4.16b Injunctive Norms: Injunctive Normative Beliefs, Motivation to Comply, Belief-Comply Product, and Correlations of Belief-Comply Product with Direct Injunctive Measure (N = 256) (Maintenance)

Normative Belief	Injunctive Normative Beliefs (inb_j)		Motivation to Comply (mtc_j)		inb_j x mtc_j		Correlation $inb_j mtc_j$	
	M	SD	M	SD	M	SD	TPN	TIN
Parents	6.29	1.11	1.7	1.38	11.37	9.1	.186**	.281***
Friends	5.03	1.38	0.41	1.69	3.2	9.22	.195***	.128*
Extended Family	5.54	1.39	0.23	1.8	2.7	10.14	0.093	0.111
Professors	5.45	1.51	0.25	1.77	2.39	10.35	0.11	0.093

Note. Injunctive normative beliefs can range from -3 to 3 and motivation to comply can range from 1 to 7, and inb x mtc can range from -21 to 21. TPN means total Perceived Norms and TIN means total Injunctive Norms.
* Significant; ***significant at p < .001; ** at p < .001; and * at p. < .05.

Table 4.17b Descriptive Norms: Descriptive Normative Beliefs, Identification with Referents, Belief-Referents Product, and Correlations of Belief-Referents Product with Direct Descriptive Measure (N =300) (Maintenance)

Normative Belief	Descriptive Normative Beliefs (dnb_j)		Identification with Referents (iwr_j)		dnb_j x iwr_j		Correlation $dnb_j iwr_j$	
	M	SD	M	SD	M	SD	TPN	TDN
Traditional college students	2.44	1.36	0.49	1.63	1.72	4.79	.159**	.251***
My parents	4.87	1.74	0.5	1.39	2.65	7.58	-0.001	0.047
Kindergarten through 6th grade children	5.9	1.35	-0.55	1.59	-3.01	9.87	0.022	0.082
Working adults	4.15	1.39	0.51	1.31	2.44	6.17	.142*	.139*

Note. Descriptive normative beliefs can range from 1 to 7 and identification with referents can range from -3 to 3, and dnb x iwr can range from -21 to 21. TPN means total Perceived Norms and TDN means total Descriptive Norms.
* Significant; ***significant at p < .001; ** at p < .001; and * at p. < .05.

Perceived Behavioral Control: Control Beliefs, Perceived Power, Belief-Power Product, and Correlations of Belief-Power Product with Direct Perceived Behavioral Control Measure. The initiation group had five indirect items and the maintenance group had six indirect items that measured Perceived Behavioral Control. Perceived Behavioral Control is measured by multiplying Control beliefs by Perceived power. Results varied by item and by group. The majority of the indirect items for the initiation group were negatively correlated but significant. The same was true for the maintenance group. The most significant correlations in the initiation group were for "I will have a consistent daily schedule." The strongest and most significant correlations in the maintenance group were for "I will have good time management skills."

Table 4.18a Perceived Behavioral Control: Control Beliefs, Perceived Power, Belief-Power Product, and Correlations of Belief-Power Product with Direct Perceived Behavioral Control Measure (N = 310) (Initiation)

Control Belief	Control Beliefs (cb_i) M	SD	Perceived Power (pp_i) M	SD	cb_ipp_i M	SD	Correlation cb_ipp_i with TPBC	TCAP	TAUT
I will have a lot of homework/studying	6.59	0.82	2.45	1.00	16.55	6.86	.248***	-.292***	-.147**
I will have a lot of social events	4.82	1.73	1.00	1.75	6.58	8.89	-.077	-.081	-.054
I will have a job	4.62	2.67	1.36	1.93	8.16	10.32	-.213***	-.208	-.158**
I will have fewer responsibilities	1.96	1.33	1.83	1.60	3.51	4.25	-.003	.092	.075
I will have a consistent daily schedule	3.30	1.73	1.18	1.78	3.64	6.88	.298***	.310***	.207***

Note. Control beliefs can range from –3 to 3, Perceived power can range from 1 to 7, and cb x pp can range from –3 to 21. TPBC means total Perceived Behavioral Control.
* Significant; significant at p < .01.

Table 4.18b Perceived Behavioral Control: Control Beliefs, Perceived Power, Belief-Power Product, and Correlations of Belief-Power Product with Direct Perceived Behavioral Control Measure (N = 300) (Maintenance)

Control Belief	Control Beliefs (cb_i) M	SD	Perceived Power (pp_i) M	SD	cb_ipp_i M	SD	Correlation cb_ipp_i with TPBC	TCAP	TAUT
I will have good time management skills	4.85	1.41	1.92	1.34	9.57	7.3	.375***	.333***	.314**
I will have a lot of stress	5.37	1.4	1.98	1.24	10.71	7.85	.026	-.003	.049
I will have a consistent daily schedule	4.2	1.53	1.83	1.5	7.54	7.27	.028	.091	-.045
I will have a lot of homework/studying	5.89	1.18	2.16	1.2	13.12	7.74	-.346***	-.298***	-.299***
I will have a lot of social events	4.52	1.51	1.25	1.67	6.86	8.09	-.201***	-.200***	-.145*
I will have a job	4.38	2.42	1.27	1.64	5.37	8.86	-.248***	-.207***	-.221***

Note. Control beliefs can range from –3 to 3, Perceived power can range from 1 to 7, and cb x pp can range from –3 to 21. TPBC means total Perceived Behavioral Control.
* Significant; significant at p < .01.

Summary

The regression models show that the most influential predictor of intentions to initiate and maintain the recommended 7-9 hours of sleep per night was Perceived Behavioral Control, more specifically Capacity. Attitudes were not significant or influential to initiating or maintaining the recommended amount in any model.

Chapter 5: Discussion

Introduction

This discussion explains the results from the preceding data analyses particularly as the data pertains to the hypotheses of this study. This chapter will also discuss limitations and recommendations for future research and for health promotion practitioners.

Research Hypotheses and Results

The 10 hypotheses will be broken into 5 major groups each representing both the initiation and maintenance groups.

Determinants of intentions: Hypotheses 1 & 6 predicting that Attitudes, Perceived Norms, and Perceived Behavioral Control are significant positive predictors of intentions

Hypothesis 1: Initiation Group

Perceived Behavioral Control was the main predictor of intentions with an unstandardized Beta coefficient of 0.426, therefore explaining 42.6% of the variance. The second greatest predictor was Perceived Norms (unstandardized $\beta=0.372$), followed by Attitudes (unstandardized $\beta=0.300$). When the model was expanded to measure the impact of each indirect measure, Capacity (unstandardized $\beta=0.490$), Instrumental Attitudes (unstandardized $\beta=0.236$), Injunctive Norms (unstandardized $\beta=0.208$), and Descriptive Norms (unstandardized $\beta=0.137$) were the greatest predictors respectively. This reveals that only one sub-construct of PBC and Attitudes were significant predictors of intentions. Additionally, one type of Norms (Injunctive) was a greater predictor than the other (Descriptive). Similar to the maintenance group, the more

Capacity someone feels to sleep, the more they feel sleep is good and beneficial, the more they feel like others want them to sleep, then ultimately the stronger their intentions will be to start sleeping 7-9 hours each night in the next 30 days.

Hypothesis 6: Maintenance Group

The main predictor of intentions for the maintenance group was Perceived Behavioral Control with an unstandardized Beta coefficient of 0.482. Perceived Norms was the second largest predictor of intentions with an unstandardized Beta coefficient of 0.244. Together, they explain 32.6% of the variance in intentions. Attitudes was not a significant predictor of intentions for the maintenance group, and therefore, the null hypothesis failed to be rejected. In terms of expanding the model to measure the indirect constructs, Capacity had an unstandardized Beta coefficient of .495, and Injunctive Norms had a B of .320. When pairwise correlation was run, PBC was moderately correlated with intentions (0.546). Perceived Norms (0.619) and environment (0.720) were most strongly correlated with intentions. This can be interpreted to mean that for those in the maintenance group the more Capacity they feel to sleep, and the more they feel like those they respect want them to sleep, then they greater their intentions will be to sleep.

When evaluating the two versions of regression (expanded and standard), it appears the expanded model provides more insight to how a health promotion program could be better customized as determined by the strongest constructs. The Robbins & Niederdeppe (2015) study was the only study in the literature review that also used the expanded model. Their findings were similar in that indirect measures for Attitudes predicted 32% of the variance in intentions, but the standard model predicted 13% of

the variance in intentions (Lao, Tao & Wu, 2015). An example in this study is Perceived Norms. For the maintenance group, the difference between the variance predicted by Perceived Norms (24.4%) and Injunctive Norms (32%), a sub-construct, is almost 8%. This means that the pressure college students feel to do what others think they should do is a greater influence on intentions than Perceived Norms alone. In the initiation group, the best example of this is between Capacity and Perceived Behavioral Control. PBC predicted 42.6% of the variance, but when expanded, Capacity (PBC sub-construct) predicted 49% of the variance. These increases in predictions can lead to more direct and influential intervention strategies because it can be more specified.

Determinants of Attitudes: Hypothesis 2 & 7 predicting that the product of Behavioral Beliefs and outcome expectations are significant positive predictors of Attitudes

Hypothesis 2: Initiation Group

All Behavioral belief and Outcome Evaluation products were significant at the $p<0.001$ level towards determining Total Attitudes (TA), Total Experiential Attitudes (TEA), and Total Instrumental Attitudes (TIA) except for "I will miss out on important activities ($p<0.01$ at TIA). Instrumental and Experiential Attitudes were strongly correlated with Attitudes (0.908) and (0.804) respectively. "Having better focus" had the strongest correlation to TA (0.442), TEA (0.452), and TIA (0.345). Strongly held Attitudes are better predictors of intentions than weak Attitudes, so interventions could be successful if they emphasized the "having better focus" belief and outcome item.

Hypothesis 7: Maintenance Group

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There were five Behavioral Beliefs and Outcome Evaluation items. Correlated to each other, all were found to be significant at the $p<0.001$ level. The only exception to this is "not missing out on important activities." This item was not significant at any level. This means that the product of each of the other Outcome Evaluation and Behavioral belief had a significant positive relationship with Total Experiential Attitudes (TEA), Total Instrumental Attitudes (TIA), and Total Attitudes (TA). This reveals that "feeling rested," "having more energy," "having better focus," and "thinking clearly" were positively and significantly related to total Attitudes. For every item (except "not missing out on important Attitudes"), the product of Behavioral Beliefs and outcome expectations were most strongly correlated with Experiential Attitudes. Practically, this means that having better focus, feeling rested, having more energy, and thinking clearly are the most favorable outcomes and beliefs regarding maintaining 7-9 hours of sleep for the next 6 months.

Robbins & Niederdeppe (2015) did not find Attitudes to be significant predictors of intentions or sleep behavior. Another study found Attitudes to be the second strongest predictor of intentions (β=.230) (Knowlden, Sharma, & Bernard, 2012). Other studies had similar elicitation answers with items such as "think more clearly," "better focus," "contribute to general health," or "miss ou t on social events," (Robbins & Niederdeppe, 2015). These items regarding elicitation were similar to the ones in the study such as "think more clearly" or "have better focus." This supports that the elicited beliefs about sleep were correctly done for this study.

Determinants of Perceived Norms

Injunctive Norms: Hypotheses 3 & 8 predicting that the product of each Injunctive normative belief and motivation to comply are significant positive predictors of Perceived Norms

Hypothesis 3: Initiation Group

All but one item was a positive and significant determinant of Total Perceived Norms (TPN) and Total Injunctive Norms (TIN) at the $p<0.001$ level except for "parents" towards PN ($p<0.01$). These items are all very strong predictors of the main constructs to predict intentions. The strongest was professors. For students who will initiate sleeping 7-9 hours in the next 30 days, the products of motivation to comply and the Injunctive normative belief about their professors are the most influential. However, this does not mean that "parents," "friends," and "extended family" would not be successful referents in future interventions. The correlation to these items were each significant, and the beliefs and motivations to comply were also significant.

Hypothesis 8: Maintenance Group

When Injunctive normative belief and motivation to comply were multiplied together, two of the four products were significantly and positively correlated with total Perceived Norms and total Injunctive Norms. "Parents" and "friends" had significant positive relationships to Total Perceived Norms (TPN) and Total Injunctive Norms (TIN). "Extended family" and "professors" did not have significant relationships to TPN or TIN on any level. This mean that for college students in this category parents and friends had the most influence on if these participants continued to sleep 7-9 hours each night.

Descriptive Norms: Hypotheses 4 & 9 predicting that the product of each Descriptive normative belief and identifications with referents are significant positive predictors of Perceived Norms

Hypothesis 4: Initiation Group

This null hypothesis cannot be rejected because only "kindergarten through 6th grade children (K-6)" was significant towards predicting Total Perceived Norms (TPN), and "parents," "K-6," and "friends" were all significant to predicting Total Descriptive Norms (TDN) but at different levels ($p<0.01$, $p<0.001$, and $p<0.05$, respectively). This means that "K-6" was the only item that is a significant predictor of both TPN and TDN. The survey item that measures identification with referents showed that on a scale from 1 to 7 the average person most identified with traditional college students (mean=3.79) and working adults (mean=3.79), but the average Descriptive normative belief for these items were very low (mean=1.09 for both). These participants most identify with traditional college students and working adults despite the low amount of sleep they believe these referents get each night. Both the maintenance and initiation groups identify most strongly with working adults and traditional college students.

Hypothesis 9: Maintenance Group

Two of the items were significant. "Traditional college students" and "working adults" were positive, significant determinants of Total Perceived Norms (TPN) or Total Descriptive Norms (TDN). "My parents" and "Kindergarten through 6th grade children" were not positive, significant determinants of TPN or TDN. This means that the participants most identified with and felt most similar to working adults and

traditional college students. In pairwise analysis, Perceived Norms were very strongly correlated to Descriptive Norms (0.809).

Professors and parents were the strongest Injunctive Norms referents in the one study that used the IM (Robbins & Niederdeppe, 2015). In the same study, parents, doctors, friends, and professors were the strongest Descriptive Norms referents, but not other students. This is different from what this study found where "traditional college students" was one of the most identified with referents. Only in one study was Perceived/subjective norm the strongest predictor of intention (Kor & Mullan, 2011). Norms were the second strongest predictor of intentions in another Theory of Planned Behavior approach to sleep behaviors (Knowlden, Sharma & Bernard, 2012). As it pertains to this study, referents for Descriptive Norms were the same for both the maintenance and initiation groups. Referents for Injunctive Norms were different between the two groups, but for both groups, Injunctive Norms explained a large portion of variance in intentions (32% for maintenance group; 20.8% for initiation group). Injunctive and Descriptive Norms should continue to be measured separately, because of their statistical differences as well as their implications for interventions.

Determinants of Perceived Behavioral Control: Hypothesis 5 & 10 predicting that the product of each Control belief and Perceived power will be a significant positive predictor of Perceived Behavioral Control

Hypothesis 5: Initiation Group

Three of five items were significant to some degree. "I will have homework/studying," "I will have a job," and "I will have a consistent daily schedule" were all significant determinants of Total Perceived Behavioral Control (TPBC), Total

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Capacity (TCAP), and Total Autonomy (TAUT). "I will have a job was not significant to TCAP, however. "I will have social events" and "I will have fewer responsibilities" were not significant predictors of any construct. This means that homework, a job, and a consistent schedule were the most significant predictors of whether or not a participant felt like they had Control over if they could start sleeping 7-9 hours each night; consistent daily schedule was the strongest. Perceived Behavioral Control was very strongly correlated with Capacity (0.795), Autonomy (0.885), and skills/abilities (0.606). Capacity and Autonomy were not strongly correlated with any item. The results of these statistics are profound and could have a large impact on getting college students to initiate healthy sleep behaviors. By increasing the PBC, more specifically Capacity that these students feel to create and establish a consistent daily schedule, the more Control they should feel towards getting the recommended amount of sleep.

Hypothesis 10: Maintenance Group

There were six items for the PBC determinants. "I will have a lot stress" and "I will have a consistent daily schedule" were not significant determinants of Total Perceived Behavioral Control (TPBC), Total Capacity (TCAP), or Total Autonomy (TAUT) for the maintenance group. "I will have good time management" was a positive, significant determinant of Total PBC, TCAP, and TAUT. "I will have a lot of homework/studying," "I will have a lot of social events," and "I will have a job" were negative but significant determinants. This makes sense because these are things that would negatively affect sleep behavior. The strongest item of the six was "I will have good time management." Perceived Behavioral Control was strongly correlated with Capacity (0.867), Autonomy (0.857), and environment (0.661). Capacity and Autonomy

also had strong relationships with environment (Capacity-environment 0.659) (Autonomy-environment 0.473). In terms of practical application, increasing Capacity and Autonomy towards having better time management skills should promote the maintenance of sleeping 7-9 hours over the next 6 months. Most of the studies previously conducted using this approach to sleep behavior found that PBC was the greatest predictor of intentions (Lao, Tao & Wu, 2015; Robbins & Niederdeppe, 2015; Knowlden, Sharma, & Bernard, 2012) with elicitation items similar to those in this study. In the Robbins study, "less stress," better "time management," and "having work" were significant towards PBC. Kor & Mullan (2011) found and emphasized the importance of interventions to target "self-regulatory Capacity" (self-regulation/self-Control) as it was the strongest predictor of behavior. These support the findings of this study that improving and developing Capacity to sleep can be the most influential factor in meeting sleep recommendations in college students.

Descriptive Data

Descriptive data for this study included demographics, quantitative PSQI information, as well as the means of each construct. The means of maintenance and initiation constructs were very different. For example, the overall mean for intentions in the maintenance group was 1.61 (on a scale from -3 to 3), however, for the initiation group, the mean was -0.55. The maintenance group had an average of strongly positive intentions, and the initiation group had an average of neutral to negative intentions. In fact, not one construct in the maintenance group had a negative average, and seven of the thirteen constructs for the initiation group had negative averages. This reveals that

the average person in the initiation group has negative Perceived Norms, negative

Perceived Behavioral Control, and only positive Attitudes, skills, and environment.

The maintenance and initiation groups had the same male-to-female ratio. Both

had 68% female and 28% male participants. Seventy-four percent of the maintenance

group was Caucasian and 67.7% of the initiation group was Caucasian. More than half

(51.3%) of the maintenance group participants do not have jobs and take naps (53.7%).

Conversely, most of the initiation group participants do have a job (54.5%) and even

more take naps (66.5%). This information about the initiation group may be useful to

consider in interventions if a majority of them work and two-thirds of them take naps.

These two items may affect their sleep quality, but more specifically their Capacity to

sleep.

Limitations

This study had some limitations that should be addressed. This study used

convenience sampling, and was not randomized. This means the results may not

generalizable to all populations. Test-retest procedures revealed that this survey is not

reliable. The Pearson's r coefficient was not at an acceptable level, and therefore this

study cannot be considered reliable. This is a major limitation to this study, but it also

shows that sleep is an unstable behavior since sleep patterns can change day-to-day.

Future research can look into how to create more reliable sleep surveys. This study was

cross-sectional so causation cannot be implied between any of the constructs. Another

limitation from this study was an error on Qualtrics did not allow participants to select

"N/A" on the initiation survey, but they were able to select it on the maintenance

survey. It is important to have the N/A option because some participants may not have

those referents with which to identify. The data on the Injunctive normative beliefs, motivation to comply, Descriptive normative beliefs, and identification with referents questions may not accurately reflect the answer of the participant. Lastly (and as previously mentioned), a large portion of data was missing for Experiential and Instrumental Attitudes questions on the maintenance survey (10.7%). This was addressed with the study panel, and an average was inputted. However, this may be an error in the physical design of the online survey that affects the results of the study.

Recommendations for Future Research

For researchers interested in studying sleep using the Integrative Model, there are a few recommendations. It would be very helpful in future research to do a prospective study operationalizing the TACT behavior in its entirety. This was also recommended by other researchers as a way to research or predict sleep behaviors beyond college and into professional life (Knowlden, Sharma, & Bernard, 2012). To establish reliability and validity, it is recommended that participants keep a two-week sleep journal to verify actual hours of sleep slept each night. Since this study was cross-sectional it is hard to know if someone would stay in the "maintenance" or "initiation" category for a sustained time period; having a prospective study would eliminate this question. Future research could be focused on simply "continuing" or "starting" to sleep 7-9 hours each night.

It would be interesting to evaluate the correlation between past sleep behaviors and intention to sleep in the future. Since students have different schedules each semester it would be important to see if getting/not getting adequate sleep in previous semesters would promote adequate sleep in the current or in future semesters.

Additionally, future test-retest surveys should be administered during the middle of the semester for the best glimpse into students' behavior. Test-retest stability needs to be more strongly established. As mentioned previously, the Pearson's R values were not in >.7 for many constructs, and future research should be done to strengthen reliability by understanding that sleep is a variable behavior as previously mentioned. However, as mentioned in chapter four, a t-test was run to compare pre and post tests and the p values were found to be insignificant, meaning there was little difference between $time_1$ and $time_2$.

Recommendations for Future Practice

Health promotion and public health practitioners should especially consider designing sleep interventions around the constructs that were the strongest according to the regression models. For both behavior categories, Capacity and Injunctive Norms were the greatest predictors of variance. This means that perhaps the difference in the groups is not a cause for an intervention, but rather a holistic intervention could take place to build and strengthen these two constructs. Since Capacity is often also referred to as "self-efficacy," and self-efficacy is often tied to confidence. Behavioral psychologist, Albert Bandura, suggests that self-efficacy can be increased through vicarious experiences (knowing other people attain recommended sleep), verbal persuasion (people saying they believe you can meet sleep recommendations), and/or performance experiences (knowing that if you got recommended sleep once you can get it again) (Bandura, 1977). Fishbein and Ajzen show that interventions involving stages of changes approaches are impactful towards increasing self-efficacy. This could also be true for this study.

Conclusions

In conclusion, college students at the University of Oklahoma have positive Attitudes about meeting the recommended amount of sleep each night. Capacity was found to be the most significant predictor of intentions so focusing on improving self-efficacy in college students can be done in interventions. Getting professors to participate in encouraging college students to sleep the recommended amount each night could be impactful. A study like this still needs more research by looking at sleep behaviors longitudinally. Research with the Integrative Model is still new, especially with the Integrative Model and the examination of two different groups of participants. Hopefully these findings will be a helpful guide to future sleep and health promotion researchers.

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SURVEY:

UNIVERSITY OF OKLAHOMA   IRB #:
_____

Beliefs Survey for Sleep Behavior

Consent & Directions: Thank you for participating in our survey. Please remember that participation is voluntary and all information from this survey will be anonymous. There are no correct or incorrect answers. Please circle the number that best describes your opinion. Thank you for your help!
……………………………………………………………………………………………………
………

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

Based upon the answer, students will be guided to either survey:

1. Survey A: Using the IM to predict student's intentions to continue sleeping 7-9 hours every night for the next 6 months
   a. This survey will only be for students who currently meet sleep recommendations. The purpose of the survey is to understand 'Behavioral maintenance'.

2. Survey B: Using the IM to predict student's intentions to start sleeping 7-9 hours every night in the next 30 days
   a. This survey will only be for students who currently not sleep recommendations. The purpose of the survey is to understand 'Behavioral initiation'.

Link to Qualtrics:

http://oucas.qualtrics.com/jfe/form/SV_bB

GB1f44bhksL77

Survey A

Beliefs Survey for Sleep Behavior for MAINTENANCE

Consent & Directions: Thank you for participating in our survey. Please remember that
participation is voluntary and all information from this survey will be anonymous. There are no
correct or incorrect answers. Please circle the number that best describes your opinion. Thank
you for your help!

**Please read each question carefully, give your honest opinion,
and know that there are no right or wrong answers.**
If a question does not apply to you, circle N/A.
The seven places on the answer scale can interpreted as follows, but please
look at individual questions for specific wording.

1	2	3	4	5	6
7

extremely   quite   slightly   neither   slightly   quite   extremely

**You indicated that you currently sleep between 7-9 hours each night. The following
questions pertain to your beliefs about continuing to get 7-9 hours of sleep each night for
the next 6 months.**

If I sleep 7-9 hours every night for next 6 months, I will…
1.   … feel rested

Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
………………………………………………………………………………………………………
2.   … have more energy.
Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
………………………………………………………………………………………………………
…
3.   … miss out on other important activities

Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
………………………………………………………………………………………………………
4.   … have better focus

Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
………………………………………………………………………………………………………
5.   … think clearly

Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
………………………………………………………………………………………………………
Getting 7-9 hours of sleep every night for next 6 months will be…

6.   Unpleasant :   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Pleasant
7.   Unsatisfying :   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Satisfying
8.   Bad :   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Good
9.   Harmful :   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Beneficial

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10. For me feeling rested is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good
11. For me having more energy is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good
12. My missing out on other important activities is…
Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good
13. For me having better focus is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good
14. For me thinking clearly is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good

My _____ think(s) that I should continue sleeping 7-9 hours a night for the next 6 months.

15 …parents…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………
…
16. …friends…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………
…
17. …extended family…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………
…
18 …professors…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A

For matters related to health, I want to do what my _____ think(s) I should do.

19. …parents…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
…
20. …friends…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
…
21. …extended family…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
…
22. …professors…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………

…

_____ get 7-9 hours of sleep every night.

23. … traditional college students…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
24. … my parents…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
…
25. …kindergarten through 6th grade children…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
…
26. …working adults…

Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
………………………………………………………………………………………………………
…

For matters related to health, I am similar to …
27. … traditional college students…

Nothing like them   1   2   3   4   5   6   7   Completely like them   N/A
………………………………………………………………………………………………………
28. …my parents…

Nothing like them   1   2   3   4   5   6   7   Completely like them   N/A
………………………………………………………………………………………………………
…
29. … kindergarten through 6th grade children …

Nothing like them   1   2   3   4   5   6   7   Completely like them   N/A
………………………………………………………………………………………………………
30. …working adults…

Nothing like them   1   2   3   4   5   6   7   Completely like them   N/A
………………………………………………………………………………………………………
Having _____will *ENABLE* me to continue getting 7-9 hours of sleep every night for the   next 6 month
31. . . …good time management skills…

        Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

………………………………………………………………………………………
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32. ….a consistent daily schedule.

       Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

………………………………………………………………………………………………

Having _____will *PREVENT* me from continuing to get 7-9 hours of sleep every night for the next 6 months

33. . .…a lot of stress
       Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

………………………………………………………………………………………………………

34. … a lot of homework/studying…
       Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

………………………………………………………………………………………………………

35. ….a lot of social events…
       Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

………………………………………………………………………………………………………
…

36. …a job…
       Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree N/A

  ………………………………………………………………………………………………………
             …

37. I will have good time management skills for the next 6 months

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

38. I will have a lot of stress in the next 6 months.

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

39. I will have a consistent daily schedule for the next 6 months.

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

40. I will have a lot of homework/studying for the next 6 months.

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

41. I will have a lot of social events for the next 6 months.

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

42. **I will have a job for the next 6 months.**

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

43. I am confident that I can get 7-9 hours of sleep each night for the next 6 months.

     Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

44. If I really wanted to, I could get 7-9 hours of sleep each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

45. Getting 7-9 hours of sleep each night for the next 6 months will be completely up to me.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

46. How much Control will you have for the next 6 months over whether or not you can sleep 7-9 hours every night?

No Control 1   2   3   4   5   6   7   Complete Control

47. Most people who are important to me want me to sleep 7-9 hours each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

48. Most people whose opinions I value would approve of my sleeping 7-9 hours each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

49. Most people like me sleep 7-9 hours every night.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

50. College students like me sleep 7-9 hours every night.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

51. I intend to sleep 7-9 hours each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

52. I will sleep 7-9 hours each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

53. I am willing to sleep 7-9 hours each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

54. I have the skills needed to 7-9 hours of sleep every night for the next 6 months.
Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

55. I am able to get 7-9 hours of sleep each night for the next 6 months.
Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

56. There are things in the environment that keep me from getting 7-9 hours of sleep every night for the next 6 months.
Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

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57. I live in an environment where I can get 7-9 hours of sleep each night for the next 6 months.

Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

Beliefs Survey for Sleep Behavior for INITIATION

<u>Consent & Directions</u>: Thank you for participating in our survey. Please remember that participation is voluntary and all information from this survey will be anonymous. There are no correct or incorrect answers. Please circle the number that best describes your opinion. Thank you for your help!

<div align="center">

<If answered <7 hours of sleep per night start here>

Please read each question carefully, give your honest opinion,
and know that there are no right or wrong answers.
If a question does not apply to you, <u>circle N/A.</u>
The seven places on the answer scale can interpreted as follows, but please
look at individual questions for specific wording.

</div>

1	2	3	4	5	6
7___					

extremely   quite   slightly   neither   slightly   quite   extremely

You indicated that you currently sleep less than 7 hours per night. The current recommendations for you is to sleep between 7-9 hours every night.

The following questions pertain to your beliefs about getting the recommended amount of sleep (7-9 hours) each night.

If I start sleeping 7-9 hours every night in the next 30 days, I will…

1.   . … feel rested   Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
2.   … have more energy.   Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
…
3.   … miss out on other important activities Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
4.   … have better focus   Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
5.   …think clearly   Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
…
6.   …have to study less   Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
…
7.   …have better health   Unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Likely
……
Getting 7-9 hours of sleep every night in the next 30 days would be…

8.   Unpleasant   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Pleasant
9.   Unsatisfying   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Satisfying

10.   Bad   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Good
11.   Harmful   1 : 2 : 3 : 4 : 5 : 6 : 7 :   Beneficial

12. For me feeling rested is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7
: Good
13. For me having more energy is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good
14. My missing out on other important activities is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7
     : Good
15. For me having better focus is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Good
16. For me thinking clearly is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7
     : Good
17. My studying less is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7
     : Good
18. For me being healthy is…   Bad : 1 : 2 : 3 : 4 : 5 : 6 : 7
     : Good

My _____ think(s) that I start sleeping 7-9 hours every night in the next 30 days.

     19. …parents…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
          …………………………………………………………………………………………
          ……………
     20. …friends…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
          …………………………………………………………………………………………
          ……………
     21. …extended family…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
          …………………………………………………………………………………………
          ……………
     22. …professors…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree
          N/A

For matters related to health, I want to do what my _____ think(s) I should do.

     23. …parents…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
          …………………………………………………………………………………………
          ……………
     24. …friends…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
          …………………………………………………………………………………………
          ……………
     25. …extended family…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree   N/A
          …………………………………………………………………………………………
          ……………
     26. …professors…
          Strongly Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Disagree
          N/A

………

_____ sleep 7-9 hours every night.

27. … traditional college students…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
    ……
28. …my parents…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
    ……
29. …kindergarten through 6th grade children…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
    ……
30. …working adults…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
……
31. …my friends…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
………

For matters related to health, I am similar to…

32. … traditional college students…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
……
……my parents…
Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
……
…
33. … kindergarten through 6th grade children …
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
    ……
34. …working adults…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
    ………………………………………………………………………………………………………
35. …my friends…
    Strongly Disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly Agree   N/A
……

Having _____ will *PREVENT* me from continuing to get 7-9 hours of sleep every night for the next 30 days.
36. … a lot of homework/studying…
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree
……
37. …a lot of social events…
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree
……
…
38. …a job…
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

……
…

Having _____ will *ENABLE* me to continue getting 7-9 hours of sleep every night for the next 30 days.

39. …fewer responsibilities …
    Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>
    ……
40. …a consistent daily schedule.
    Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>

41. I will have a lot of homework/studying in the next 30 days.

    Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>

42. **I will have a lot of social events in the next 30 days.**

    Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>

44. I will have a job in the next 30 days.
    Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>

45. I will have fewer responsibilities in the next 30 days.
    Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>

46. I will have a consistent daily schedule in the next 30 days.
Strongly <u>Disagree</u>   1   2   3   4   5   6   7   Strongly <u>Agree</u>

47. I am confident that I can sleep 7-9 hours every night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

48. If I really wanted to, I could sleep 7-9 hours every night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

49. Most people who are important to me want me to sleep 7-9 hours every night, for the next 30 days. .

        Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

50. Most people whose opinions I value would approve of my sleeping 7-9 hours every night for the next 30 days.
        Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

51. Most people like me sleep 7-9 hours every night.
        Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

52. People who are similar to me sleep 7-9 hours every night.
        Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

53. How much Control do you have over whether or not you can sleep 7-9 hours every night, for the next 30 days?
      No Control 1   2   3   4   5   6   7   Complete Control

54. Getting the 7-9 hours of sleep every night in the next 30 days is completely up to me.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

55. I intend to sleep 7-9 hours every night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

56. I will sleep 7-9 hours every night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

57. I am willing to sleep 7-9 hours every night in the next 30 days.

      Strongly Disagree   1   2   3   4   5   6   7   Strongly

58. I have the skills needed to 7-9 hours of sleep every night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

59. I am able to get 7-9 hours of sleep each night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

60. There are things in the environment that keep me from getting 7-9 hours of sleep every night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

61. I live in an environment where I can get 7-9 hours of sleep each night in the next 30 days.
    Strongly Disagree   1   2   3   4   5   6   7   Strongly Agree

All students will complete this portion of the survey.

62. "Do you take naps? Yes   No
63. Are you employed? Yes   No
        a. If yes, to the question above, how many hours/week do you work?
        b. Do you consider your shifts to be night shifts or day shifts? Night   Day   Both
64. INSTRUCTIONS: 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.
. During the past month, what time have you usually gone to bed at night?
BED TIME _____
65. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? NUMBER OF MINUTES _____
66. During the past month, what time have you usually gotten up in the morning?
GETTING UP TIME _____
For each of the remaining questions, check the one best response. Please answer all questions.
. During the past month, how often have you had trouble sleeping because you . . .
        67) Cannot get to sleep within 30 minutes
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
        68) Wake up in the middle of the night or early morning
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
        69) Have to get up to use the bathroom
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
        70) Cannot breathe comfortably
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
         71) Cough or snore
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
         72) Feel too cold
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
        73) Feel too hot
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
         74) Had bad dreams
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
        75) Have pain
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
        76) Other reason(s), please describe:

_____

_____
        77) How often during the past month have you had trouble sleeping because of this?
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week
78. During the past month, how would you rate your sleep quality overall?

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

79. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week

80. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week

81. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done? No problem at all _____ Only a very slight problem _____ Somewhat of a problem _____ A very big problem _____

82. Do you have a bed partner or room mate? No bed partner or room mate _____
Partner/room mate in other room _____ Partner in same room, but not same bed _____ Partner in same bed _____

If you have a roommate or bed partner, ask him/her how often in the past month you have had . .

     83) Loud snoring
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week

     84) Long pauses between breaths while asleep
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week

     85) Legs twitching or jerking while you sleep
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week

     86) Episodes of disorientation or confusion during
Circle one: Not during the past month---less than once a week---once or twice a week—three or more times a week

     87) Other restlessness while you sleep; please describe:

_____

_____

Demographics:
88. How old are you today? _____
89. What gender are you?   Male   Female   Other
90. What is your classification in school?
- Freshman
- Sophomore
- Junior
- Senior
- Graduate Student

91. What race to you most identify with?
- Caucasian
- African American
- Hispanic
- Asian
- Native American or American Indian
- Pacific Islander
- Other