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Sleep Hygiene Practices: A Cross Cultural Survey of Sleeping and Dreaming in College Students

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SLEEP HYGIENE PRACTICES: A CROSS CULTURAL SURVEY OF SLEEPING AND DREAMING IN COLLEGE STUDENTS

by

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There is consensus that a sizeable percentage of people in most developed countries do not obtain adequate amounts or quality of sleep. These disruptions in sleep, when chronic and severe, can lead to psychological, behavioral and health consequences. The focus on behavioral and contextual factors that impact sleep has been termed "sleep hygiene". An on-line anonymous survey collected sociodemographic information, as well as self-reports on sleep, sleep hygiene practices and dreaming across two cultural groups (English & Spanish speaking responders). A total of 204 participants (majority of them college and graduate students) answered the survey. Both cultural groups, English and Spanish speaking, reported similar results in terms of sleep quantity and quality as well as sleep hygiene practices. In general, respondents do not actively and consistently practice any of the sleep hygiene recommendations. These results area similar to previous research on sleep quality and sleep hygiene practices (Liu et al., 2013; Gellis & Lichstein, 2009) but the results also revealed surprisingly high levels of night awakenings, use of medications and disruption of sleep by environmental factors. Results on the frequency of dreams were similar to previous research (Schredl et al, 2014) but nightmares were more frequent within this population. Percentage of people who reported that dreams or nightmares affected their behavior and/or emotional status the following day were also similar to previous findings (Selterman et al, 2013).

Acknowledgments

Thank you

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Introduction

Overview

Sleep can be defined as the process commonly related with a biological necessity to rest and recover, associated with a relaxed posture and a decreased responsiveness to external stimuli. Moreover, dreams could be seen as internal stimuli, which can be defined as subjective experience occurring in the inner world of the person while sleeping.

Sleep and dreaming are important and widespread human experiences that can have an impact on quality of life. Sleep hygiene can be defined as the promotion of regular sleep, through the management of physiological, behavioral and cognitive processes and environmental contexts that are associated with sleep promotion.

There are several methodological and ethical challenges in conducting sleep research. Self-report using questionnaires have been the common approach in previous studies of sleep. Therefore, for this study a survey was used as a tool to evaluate sleep and dreaming as well as the contextual and physiological and cognitive factors affecting them, Furthermore, this survey evaluated the use of sleep hygiene recommendations in a cross-cultural population.

Sleep

What is Sleep?

Humans and animals engage almost every night in sleeping. Patterns of sleep and its characteristics vary across species and across individuals within a species. Sleep is a process that is considered a biological necessity to rest and recover. For purposes of the present study a definition of sleep must be presented in a more descriptive way. After observing changes in behaviors of humans several scientists have defined sleep as a period of reduced activity, which is associated with a relaxed posture (e.g., lying with eyes closed) and presenting a decreased responsiveness to external stimuli. An additional defining feature is that sleep is a state sleep is a state of reduced consciousness relatively easy to reverse (Division of Sleep Medicine at Harvard Medical School, 2007).

Why is Sleep Important?

The effects of sleep on health have been studied in the last decades. Liu et al., (2013) wrote, "although sleep is a necessity, about 60 million Americans are affected by chronic sleep disorders and sleep problems that can impair physical well-being and cognitive functioning" (p. 1). Individuals differ in the amount of sleep that they typically need but most experts agree that people need at least 6-8 hours of sleep on a daily basis in order to function effectively. Using this conservative criterion for the essential amount of sleep, Shankar, Syamala, Kalidindi, (2010) wrote, "Sleep loss, long-term sleep deprivation, and perceived insufficient rest/sleep are common in modern society, nearly one third of adults report sleeping <6 hours on average, leading some people to suggest that we live in a sleep-deprived society" (p. 1).

According to most experts, sleep problems are a relatively recent development in the course of human history. Prior to the invention and wide spread adoption of electricity and artificial light; there is evidence that chronic sleep deprivation was a relatively unusual problem for most humans. A probable explanation is that "factors responsible for this change may include increases in environmental light, introduction of electric light, longer work-days/commuting tie, shift and night work, expansion of manufacturing and service sectors to 24 hour-per-day operations, and the advent of television and internet" (Shankar et al., 2010, p. 1).

Sleep has been associated with behavioral changes and with physiological changes (e.g., brain wave activity patterns) (Division of Sleep Medicine at Harvard Medical School, 2007). There are connections between sleep and physical well-being, several health outcomes and even performance of daily tasks that require vigilance, judgment and good reaction times. There is not a simple causal mechanism, but sleep deprivation and disturbances may be a risk factor that is associated with the development of chronic disease although the connection may go both ways. Chronic diseases often produce sleep disturbances (Liu et al., 2013).

According with the DSM-5 (American Psychiatric Association, 2013) sleep problems are frequently found in mental disorders like PTSD, depression, anxiety and psychotic disorders in adults and in children.

Sleep is a biological and behavioral phenomenon that has been studied from many different perspectives. Today it is clear that sleep quantity and quality is related to the development of chronic diseases and even mental disorders. However, many people ignore their sleep habits and fail to take active steps to adopt sleep hygiene practices,

preferring instead to relay on non-prescribed or prescribed pharmacological products (Liu et al., 2013; Grander et al., 2011).

What is a Sleep Disorder?

Sleep disorders can be defined as changes in sleeping patterns or habits producing effects such as daytime sleepiness, problems of breathing or movement while sleeping, and other abnormal sleep behaviors. There are 18 sleep-wake disorders within the DSM-5 (American Psychiatric Association, 2013; Ohayon, 2002). The most common sleep disorders are insomnia, narcolepsy, restless leg syndrome, and sleep apnea. These disorders can be seen at any age and some of them. Intensity might be affected by different stimuli. (Mayo Clinic, 2015; Centers for Disease Control and Prevention, 2013).

It is easy to accept for any person that sleep is a necessity, however, a lot of people is experiencing problems related with sleeping habits. There are 18 sleep-wake disorders within the DSM-5 (American Psychiatric Association, 2013; Ohayon, 2002);

Insomnia

Insomnia is the most common sleep disorder, and according with the Centers for Disease Control and Prevention (CDC) (2013a), "is characterized by an inability to initiate or maintain sleep. It may also take the form of early morning awakening in which the individual awakens several hours early and is unable to resume sleeping" (Insomnia, para. 1). Hood, Rogojanski & Moss (2014) defined insomnia as "the subjective report of persistent impaired sleep quantity or quality, despite adequate opportunity for sleep that is associated with daytime impairment, such as fatigue, impaired memory, attention, or concentration" (p. 2). Ohayon (2007) commented that insomnia is the most commonly reported sleep problem and one of the most common psychiatric disorders among the

population. The third edition of the International Classification of Sleep Disorders (American Academy of Sleep Medicine, 2014) uses the term chronic insomnia disorder to denote the persistent and prolonged nature of the sleep difficulties associated with insomnia.

There are three models of insomnia: the behavioral, the cognitive and the arousal models. Spielman, Caruso, and Glovinsky (1987) proposed a theoretical model of insomnia based on three factors

> Predisposing factors, precipitating factors, and perpetuating factors. Predisposing factors precede the onset of sleep difficulties and increase individuals' vulnerability to insomnia; precipitating factors trigger the onset of insomnia and typically involve acute stressors; and perpetuating factors maintain insomnia after the initial sleep-disturbing factors have resolved (Schwartz & Carney, 2012, p 665).

The behavioral model of insomnia includes the interaction between two separate biological systems, which regulate wakefulness and sleep, "the homeostatic system, a process that arises during wakefulness and diminishes during sleep, and the circadian system, the body clock that determines the timing of sleep and wakefulness in the 24-hour day" (Schwartz & Carney, 2012, p. 665). Different behaviors can perpetuate factors disrupting homeostatic regulation, maintaining insomnia. For example, taking a nap during the day might affect the time perception of sleepiness and the latency to falling asleep at night. If a person cannot sleep and remains for a long time in bed without sleeping this may also affect the homeostatic regulation. A specific behavior that might affect the circadian system is changing the time for going to bed.

Moreover, in the cognitive model of insomnia people with insomnia cannot sleep because they experience increased worry and rumination about different situations, "as a result of this anxiety, their attention becomes focused on sleep-related threats, both internal (e.g., bodily sensations) and external (e.g., environmental noises)" (Schwartz & Carney, 2012, p. 666).

The third model is the arousal model of insomnia in which "based on the principles of classical conditioning, it is proposed that repeated associations between poor sleep and the bed result in conditioned arousal, whereby the bed and sleep environment become stimuli for heightened arousal" (Schwartz & Carney, 2012, p. 666).

Prevalence of Insomnia

Gellis and Lichstein (2009), described that the actual prevalence in the United "States is estimated at 9 % to 16 % for chronic insomnia and 27 % for occasional insomnia" (p. 1). Several studies have concluded with the assumption that "poor sleep is associated with increased fatigue, psychological distress, risk of suicide, decreased immune functioning, higher medical costs, increased disability, and greater limitations of activity" (Gellis & Lichstein, 2009, p. 1).

In a U.S. epidemiological study (n=10,094), Roth et al, (2011) found that prevalence of insomnia varied depending on the criteria used. Prevalence estimates were 22.1% for DSM-IV-TR, 14.7% for Research Diagnostic Criteria/International Classification of Sleep Disorders, Second Edition (RDC/ICSD-2), and 3.9% for International Classification of Diseases, Tenth Revision (ICD-10). (Schwartz & Carney, 2012, p. 665).

Treatments of Insomnia

With the high prevalence of sleep disorders, it is important to identify best evidence-based treatments. The effect of sleep disorders goes beyond the health field and involves social, cultural and economic factors disrupting well-being of people and therefore society in general.

The following interventions are recommended for the chronic treatment of insomnia (Morgenthaler et al., 2006; Bootzin & Epstein, 2011).

> Recommended behavioral therapies include sleep restriction therapy, stimulus control therapy, and relaxation. Sleep restriction therapy (Spielman, Saskin & Thorpy, 1987; Miller et al., 2014) involves developing an individualized sleep schedule limiting time in bed to the mean time spent asleep to prevent wakefulness and fragmented sleep.
>
> Based on operant and classical conditioning paradigms, stimulus control therapy eliminates sleep-incompatible behaviors in the bedroom to promote healthy conditioned associations between sleep and the bed/bedroom (Bootzin & Epstein, 2000).
>
> Relaxation interventions are intended to reduce the physiological and mental hyperarousal associated with chronic insomnia through the use of a range of strategies, including, but not limited to, progressive muscle relaxation, diaphragmatic breathing, and biofeedback (Bootzin & Rider, 1997). (Hood, Rogojanski & Moss, 2014, p. 2).

A different treatment available for sleep disorders is the use of medications. However, this approach presents some risk because of the side effects and addiction

potential, especially of long-term medication usage. There are different products such as nonprescription drugs (e.g., antihistamines, analgesics), naturopathic (e.g., valerian, melatonin), nutritional supplements (e.g., melatonin) and off-label medications (e.g., antidepressants, antipsychotics, antiepileptics). "Consensus-based recommendations in the American Academy of Sleep Medicine clinical guidelines (Schutte-Rodin et. al., 2008) regarding pharmacologic treatments for chronic insomnia indicate that medications should be accompanied by behavioral and cognitive therapy when possible" (Hood, Rogojanski & Moss, 2014, p. 5).

For the purposes of the present study, it is important to mention that there is a formal diagnostic category for inadequate sleep hygiene, which identifies insomnia due to Sleep Hygiene (The international Classification of Sleep Disorders, Second Edition [ICSD-II], American Academy of Sleep Medicine, 2005). This insomnia subcategory is defined by engaging in one or more behaviors related to the following five categories: (1) improper sleep scheduling, (2) the use of sleep-disrupting products, (3) engaging in activating or arousing activities close to bedtime, (4) the use of bed for activities other than sleep, and (5) maintaining an uncomfortable sleeping environment.

Sleep and Chronic Illnesses

Specific health diseases have been linked to sleep disruption, "a growing body of evidence strongly suggest that self-reported sleep duration are correlates of diabetes, cardiovascular disease, obesity, depression and anxiety" (Liu et al., 2013, p. 1). "Insufficient sleep has been linked to the development and management of a number of chronic diseases and conditions, including diabetes, cardiovascular disease, obesity, and

depression" (Centers for Disease Control and Prevention, 2013b, Sleep and Chronic Diseases, para. 1).

Liu et al. (2013) studied 375,653 US adults aged ≥ 18 years in the 2009 Behavioral Risk Factor Surveillance System were they assessed the relationship between insufficient sleep and chronic disease. The relationships were further examined using a multivariate logistic regression model after controlling for age, sex, race/ethnicity, education, and potential mediators (Frequent Mental Distress and obesity). The overall prevalence of insufficient sleep was quite high with 10.14 % of respondents reporting insufficient sleep in everyone of the prior 30 days, 17.0 % of the respondents claimed insufficient sleep for 14-29 days or the prior 30 day and 42.0 % reported insufficient sleep for 1-13 days. In contrast, only 30.6 % reported adequate sleep for each of the prior 30 days. The positive relationships between insufficient sleep and each of the six chronic diseases were significant ($p<0.0001$) after adjustment for covariates and were modestly attenuated but not fully explained by Frequent Mental Distress. The relationships between insufficient sleep and both diabetes and high blood pressure were also modestly attenuated but not fully explained by obesity. The main conclusion of Liu et al. is that the routine medical examinations should include the assessment of sleep quantity and quality encouraging optimal sleeping habits. These results are correlations between reports of sleep disturbances and reports of chronic illness and they should be interpreted cautiously because experimental research cannot ethically conducted that manipulates sleep as an independent variables and evaluates the long term impact on sleep quality of quantity on health outcomes. Nevertheless, the correlations between sleep measures and

health outcomes have led researchers to speculate on plausible mechanisms by which sleep quality might contribute to the development of health and behavioral problems.

Sleep and Type 2 Diabetes

Diabetes is a condition where blood glucose is too high and there is not sufficient production of the hormone called insulin or this hormone doesn't work appropriately to take glucose into the cells. "High blood glucose damages nerves and blood vessels, oftentimes leading to complications such as heart disease, stroke, blindness, kidney disease, nerve problems, gum infections, and amputation" (NIH Senior Health, 2014, Types of Diabetes, para. 1). It is increasing in prevalence and is listed among the 10 leading causes of death. The genetic cause of Type 1 diabetes has been identified. But a number of contextual and behavioral factors have been identified as potential mediators for the development and management of Type 2 diabetes, including sleep quality and quantity. For example, Different studies mentioned that optimizing sleep duration and quality may be important means of improving blood sugar control in persons with Type 2 Diabetes. (Ford et al., 2014; Knutson, Ryden, Mander, Van Cauter, 2006). Grandner et al. (2012), described the relation between sleep and the development of type 2 Diabetes as, "proposed mechanisms that have received the most attention include alterations in glucose tolerance, insulin resistance, and the metabolic hormones leptin and ghrelin" (p. 3). Thus it appears that sleep can have an effect in the control of blood glucose. This observation suggests that if a person improves the quality of sleep then they can also improve their management of Type 2 Diabetes. A key of this could be teaching people about how to take care of their sleep hygiene practices.

Sleep and Cardiovascular Disease

Many factors contribute to the development of cardiovascular diseases (CVD) and many of these factors are susceptible to be control by the person, thus reducing the risk for development of these diseases. For example, performing specific behaviors such as regular practice of exercise, eating a diet low in salt, and of course controlling sleep habits are hypothesized to lower risk of CVD. Different studies found that people with sleep apnea have an increased risk for hypertension, stroke, coronary heart disease and irregular heartbeats (cardiac arrhythmias) and hardening of the arteries (atherosclerosis). (Fang, Wheaton, Ayala, 2014; Kasabeh & Krishnaswamy, 2006).

Sleep and Obesity

Obesity is probably one of the most complex epidemics that humanity has faced; there are many factors involved in the development of this condition. Different epidemiological studies revealed an association between short sleep duration and excess body weight in all ages, but especially in children. (CDC, 2013b; Taheri, 2006). Thus, it can be said that sleeping well, especially for children, is an important component in efforts to control the obesity epidemic.

Ford et al., (2014) studied 13,742 participants aged ≥ 20 years from the National Health and Nutrition Examination Survey 2005-2010. Sleep duration was categorized as ≤ 6 (short sleepers), 7 – 9, and ≥ 10 hours (long sleepers). Compared to participants who reported sleeping 7-9 hours per night, short sleepers were more likely to be obese and have abdominal obesity.

Sleep, Depression and Anxiety

In the field of mental health, sleep has been related with depression. This relationship is also a complex one. Different studies have indicated that once sleep apnea is treated and when sufficient sleep is restored, then, depressive symptoms decrease. Therefore, it is important to assess carefully the amount and quality of sleep of persons with depression. Many cases within this population prefer to seek improvement due taking non-prescribed products or are taking prescribed medications to improve their sleep. (Ford et al., 2014; Chapman et al., 2010; Zimmerman, McGlinchey, Chelminski, 2006; Shwatz, Kohler, Karatinos, 2005).

Chapman et al., (2013) studied the association between anxiety and depressive disorder and frequent insufficient sleep. They obtained data from a telephone survey of a population-based sample of 113,936 adults in 20 states. Respondents were asked how often they did not get enough rest or sleep and if they have ever received a diagnosis of anxiety or depressive disorder. Frequent insufficient sleep was defined as insufficient rest or sleep during ≥ 14 of the past 30 days. They found that insufficient sleep was reported by 27.0 % of the total sample and was significantly more common ($p<.05$) among respondents who reported both anxiety and depressive disorders (48.6 %), depressive disorders only (39.0 %), or anxiety only (37.5 %) than among adults who reported neither disorder (23.1 %). The conclusion of the Chapman et al. study is that "frequent insufficient sleep is associated with depressive and anxiety disorders, and the odds of the sleep disorders are increased when both classes of psychiatric disorders are diagnosed" (p. 385).

How Much Sleep Do I Need?

The National Heart, Lung, and Blood Institute (2012) describes that sleep needs change as we age and that individual sleep needs vary. The recommended amounts of sleep hours per day are: Newborns (16-18 hours), Preschool –aged (11-12 hours), School-aged (at least 10 hours), teens (9-10 hours), Adults including the elderly (7-8 hours).

In summary, sleep has been defined and its importance for the well being of people has been stated. Description of the prevalence of sleep disorders and the relation with the development of chronic diseases was presented. Insomnia is the most frequent sleep disorder; theories of its origin and different approaches of treatment were described. Finally, specific findings of the relations between sleep and chronic diseases such as diabetes, cardiovascular disease, obesity, anxiety and depression were presented.

Dreams

In this section, I will define dreaming and describe its importance. Research done about the topic will be presented and a rationale for a behavioral approach will be stated.

What is Dreaming?

Dreams can be defined as "a series of thoughts, images and sensations occurring in a person's mind during sleep" (Oxford Dictionaries, 2015). Of course, only the person is exposed to his or her dreams, which are private perceptual stimulus events. Schredel et al., (2014) defined dreaming as, "A subjective experience occurring during sleep" (p. 141). Usually people talk about their dreams and some of those are "bad dreams" or Nightmares.

Nightmares are a related concept, based on the ICSD-3 (American Academy of Sleep Medicine, 2014): "Nightmares are dreams with strong negative emotions that result in awakening from the dreams. The plot can be recalled very vividly upon awakening" (Schredel et al., 2014, p. 142).

The content of dreams is influenced for the life experience of people, then, "Dream content is predominantly social; humans frequently dream about familiar people, friends, partners, and children" (Selterman et. al, 2013, p. 1).

Studying Dreaming

Because of the private and subjective nature of dreams, empirical and controlled study of dreams presents a methodological challenge. Three commonly used methodologies include: using retrospective measures (i.e., questionnaires, interviews), using dream diaries and by laboratory awakenings. "15 or more dream reports per participant are needed to measure interindividual differences reliably" (Schredel et al., 2014, p. 141).

A difficult task is to validate questionnaires attempting to measure dream content. For example, "the use of dream diaries seems to have a serious disadvantages; especially in low recallers. Dream recall frequency can increase dramatically because the participants' attention is directed toward their dreams" (Shredel et al., 2014, p.141).

Schredel et al. (2014), described that "although dreaming is a genuinely subjective experience occurring in the inner world of the person while sleeping there are quite a few aspects regarding dreaming that are worth being measured and investigated" (p. 141). These authors designed an online questionnaire "to elicit some form of dream history including dream recall, nightmares, lucid dreaming, attitude towards dreams, and

the effects of dreams on waking life" (p.141). With an on-line questionnaire titled "MADRE" they evaluated 2929 persons (1742 women, 1187 men). The mean age of the sample was 45.88 ± 14.38 years (range: 16 to 92 years). In their results, they found that "women tended to report more dreams, more intense dreams, more nightmares, more nightmare distress, more childhood nightmares, and more recurrent nightmares than men. No significant gender difference was found for lucid dreaming frequency and age of lucid dreaming onset, and women tend to report more negatively toned dreams" (p. 144).

Behavior Analysis of Dreaming

The discipline of behavior analysis has not focused much research on dreaming. However, Callaghan (1996) wrote, "Dreaming is a topic that remains largely ignored by radical behaviorist. How dreams come to exist as verbal operants might be understood using an analysis similar to Skinner's (1945) examination of private events" (p. 49).

First, it would be necessary to define what is a behavior, and Malott (2008) defined it as, "a muscle, glandular, or neuro-electrical activity" (p.5). Also, he described the "Dead man test" establishing that "If a dead man can do it, it isn't behavior. If a dead man can't do it, then it is behavior" (p. 5). In other words, when we are sleeping and/or dreaming, our body is involved in all kind of muscular, glandular and electrical activities that of course a dead man doesn't perform. However, as Dixon and Hayes (1999) wrote, "The behavior of dreaming has not received much attention from the behavioral community" (p. 613).

Callagham (1996) wrote,

> The importance of understanding dreams lies beyond an analysis of how they occur as verbal operants. That is not to say that sophisticated analysis

> of verbal events consistent with the principles of behavior are without merit. However, there exists more to the importance of a client talking about dreams in therapy that just understanding how they arise. (p. 49).

The study of dreams using a behavioral perspective represents a clinical tool for people receiving behavior therapy.

Callagham (1996) wrote,

> The Clinical utility of dream reports lies in their potential to allow therapists an opportunity to gain access to in-sessions behaviors as a means of facilitating behavior change. Dreams allow the therapist access to client history that can help modify ongoing treatment plans. Further, dreams can provide the therapist with the opportunity to directly access relevant client behaviors that can be reinforced or modified. Dreams, then, although not interpreted as unconscious material as purported by more psychodynamic therapist, can be clinically useful when conceptualized within a behavioral framework. (p. 51).

Recently, researchers have investigated the effects of dreams on the daily life of several people. Selterman et al., (2013) studied specific effects of dreams, and their results, provided evidence that "specific dream content predicts subsequent behavior with relationship partners" (p. 5). Sixty-one Stony Brook University undergraduates participated in their study, they were given a booklet containing blank pages for recording dreams in free-response format for 14 days, along with Likert-type scale items for 13 emotions experiences in each dream they reported. Participants also reported their daily activity, which included the following variables: items measuring love and

intimacy, items measuring general interaction with partners and measuring conflict. Participants completed dream reports immediately upon waking and daily activity reports in the evening at the end of each day. Selterman et al., found evidence that when people "recalled dreams of their significant others were associated with subsequent relational activity, even after controlling for the previous day's activity, trait attachment styles, and relationship quality. Further, there were not parallel findings in the opposite temporal direction (from behavior to subsequent dreams)" (p. 5). Selterman's conclusion should be taken skeptically until this research is replicated. For example, the current study evaluated dream content of participants and the specific findings will be described in later sections.

Challenges in Conducting Sleep and Dream Research

There are several methodological and ethical challenges in conducting sleep research. For example, relying on self-report as the primary source of data probably limits the fidelity of dream research but self-report can be combined with neurobiological measurements (i.e., brain waves) to add some level of objectivity to these measures. Furthermore, controlled night awakenings can add to the validity of self-report although night awakenings might produce discomfort for research participants. A behavioral approach would seek to find causal explanations for dreams but again self-report is the primary tool for assessment of dream content.

Dixon and Hayes (1999) wrote,

> The only problem with the dreaming organism is that the scientists must rely on subjective techniques to discover the content and meaning of that content. This may be a reason that this field has been relatively ignored by behavioral scientists. While other disciplines of psychology are

> comfortable with self-reports of dream meaning, behavior analysts tend to prefer more objective measures (p. 625).

One of the objectives of this study is to start a line of research for the development of a behavioral analysis of sleep and dream, seeking to improve these subjective measurements.

Even Skinner (1972) said that,

> Another major obstacle for the behavioral scientist is that dreaming has been historically considered a private event occurring within the skin of the organism. It follows that such an event can never be observed, and it is better left it to the physiologists of the future (as cited in Dixon & Hayes, 1999, p. 625).

Dixon and Hayes (1999) said that, "If one adopts a position that such events are merely subtle, and can be understood by the psychologist through an accumulation of observation and understanding of the history of dreaming individual, a behavioral analysis of dreaming may be developed" (p 625). The final goal of this study is precisely to start the development of a behavioral analysis of sleeping and dreaming, and this appears as an ethical duty, because as Dixon and Hayes continued saying that

> A science of human behavior must be able to account for all human behavior, not just those that are readily observable. So called private events and complex forms of human behavior such as a perceptual activity can not be dismissed to some other level of analysis or some other field of science (p. 626).

Why is it Important to Study Dreams?

As stated above, dreaming can be considered an action, in other words, behaviors. The behavior analysis field as described before has not embraced the study of dreaming as a behavior. However, the prevalence and subjective importance of dreams in clinical settings represents an opportunity to support behavioral research on dreams and their impact on waking behavior. In the current study, a survey will be used as a first step of what is intended to be a future line of research. The complexity of the topic (i.e., dreaming) and the difficulty to design an experimental control over it requires being skeptical about previous findings. With this survey, one goal is to assess if people are affected by their dreams the following day. The best option to study dreaming behavior is to study it in combination with the sleeping behavior, but as has been extensively explained dreaming is often understudied. In spite of advances in electrophysiology to monitor the neural and eye movement correlates of dreaming, the content of dreams cannot be independently and objectively measured and, as a result, empirical research on dreaming has lagged well behind research on insomnia and other more observable and quantifiable characteristics of sleep and sleep disorders. There are several authors making the case that dreaming can be construed as a private behavior that is worthy of study by psychology and by behavior analysis (Shredel et. al., 2014; Selterman et al., 2013; Dixon & Hayes, 1999; Callagham, 1996).

In that sense is probably a weakness to rely only in self-report. But self-report has proven its value in research, especially when more objective measures are not readily available and when efforts are taken to improve the validity and sensitivity of subjective measures. But requires the statement of clearly established goals. For example, in the

current study the goal was to describe the effect of dreams and sleep hygiene practices in daily life in a cross-cultural population.

What we know about dreaming is that it is a private perceptual stimuli or behavior presented in combination with the behavior of sleeping, and that several researcher have evaluated dreams through self-reports measures. An interesting approach has been to ask for these self-reports as soon as possible when the person awakes or even waking the person during the night. But the content of dreams might be affected by daily life experiences. For example, fights or arguments with your spouse, challenges at work, seeing disturbing imagery (as in PTSD) may all have an influence on the content of dreams. The challenges from one day may persist and carry over to the next day. It is necessary to be cautious about attributing a causal between dreams and any behaviors the day following a dream because the very same factors that might have influenced dream content may persist from day to day and have as much or more influence than the dreams. In other words, dreams might just be a correlate of challenging conditions (or physical and emotional needs—all those things that can influence the content of dreams) and it would be simpler to not infer that dreams had a special causal impact on behavior the day following a dream unless you can separate the effect of the dream content from the other ongoing events that influence both dream content as well as the behavior the following day. At the end, there is a need some empirical research, even at the descriptive level, on dreams and people's perception of the salience of dreams as an influence on waking behaviors; this was the objective of the current survey.

Sleep Hygiene

The CDC (2012) defined sleep hygiene as *"*The promotion of regular sleep*"*. The National Sleep Foundation recommends (CDC, 2012) the following recommendations of sleep hygiene tips, which can be used to improve sleep.

> (1) Go to bed at the same time each night and rise at the same time each morning. (2) Make sure your bedroom is a quiet, dark, and relaxing environment, which is neither too hot nor too cold. (3) Make sure your bed is comfortable and use it only for sleeping and not for other activities, such as reading, watching TV, or listening to music. Remove all TVs, computers, and other 'gadgets' from the bedroom. (4) Avoid large meals before bedtime. (CDC, 2012).

Research on Sleep Hygiene

Gellis and Lichtein (2009) developed an Internet-Based investigation where they assessed the frequency of multiple sleep hygiene practices in a sample of 220 people, where 128 were good sleepers and 92 were poor sleepers (mean age=41.6, SD=12.8, 61.8% women). Participants were categorized as good and bad sleepers using the Pittsburgh Sleep Quality Index, which was used to measure, sleep quality (<5 = good sleep, > 7 poor sleep).

It is important to recall as was stated in earlier sections that the most prevalent sleep disorder is insomnia. Gellis and Lichstein, (2009) wrote, "Poor sleep is associated with increased fatigued, psychological distress, risk of suicide" (p.1). In their study these authors found that

> Although sleep hygiene practices were generally good, poor sleepers showed increased cognitive activity in the bed, even after controlling for global indices of depression and anxiety, poor sleepers also reported statistically significant increases in excessive noise in the bedroom, uncomfortable nighttime temperature, and activities that were exciting, emotional, or demanded high concentration near bedtime (Gellis and Lichstein, 2009, p. 1).

Environmental factors are concluded to contribute to poor sleep. Moreover, Gellis & Lichstein (2009) described limitations of the study, calling the attention that "it is possible that individuals volunteering for Internet-based studies show worse sleep as compared to the population, particularly among males" (p. 7) and suggested that in order to improve research in this area "future studies will no doubt utilizing the internet to assess community attributes, future research should continue to assess the validity of using the Internet sample to accurately assess sleep characteristics in the population" (p. 7). A final point that can be obtained from this study is the fact that "these self-report data cannot address the possibility that poor sleepers differ from good sleepers because they are more vulnerable to the effects of Sleep Hygiene and not necessarily because of the increased frequency of behaviors" (p. 7). Examples provided by these authors consisted in a person who is a poor sleeper not just for drinking coffee but maybe is more susceptible to the effect of coffee, or a person with insomnia may practice good sleep hygiene behaviors because of the knowledge that practicing those specific behaviors may limit disturbed sleep.

Sleep hygiene can be used to improve the quality of sleep, and there are different recommendations from different institutions and experts, in the following section, will be presented the sleep hygiene recommendations that will be used in the current study.

Recommendations for Sleep Hygiene Habits

The Center for Clinical Interventions (CCI), (2008) lists 15 sleep hygiene tips, which are practically the same but in a more detailed presentation than the CDC (2012) sleep hygiene recommendations. Gellis and Lichstein (2009) studied a list of 19 sleep hygiene recommendations based on ICSD-II criteria for inadequate sleep hygiene and list a variety of activities that are characterized of poor Sleep Hygiene (American Academy of Sleep Medicine, 2005).

All of these sleep hygiene recommendations should be considered as popular advices for improving sleep but there is a need to admit that the efficacy of these advices requires evaluation in adequately controlled scientific research. Nevertheless, Gellis and Lichstein (2009) evaluated some of these recommendations.

The Sleep Hygiene recommendations are listed next, and these were used in the design of the survey for the current study:

"Get Regular. – Go to bed and get up more or less at the same time every day, even on weekends and days off" (CCI, 2008). People tend to sleep more during the weekends or days off, the common way of thinking is that if a person sleep more during those days he or she recuperate the hours that didn't sleep during the week. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Sleep when sleepy. – Only try to sleep when you actually feel tired or sleepy, rather than spending too much time awake in bed" (CCI, 2008). As was described above,

insomnia is the most common sleep disorder; people tend to remain lying on their beds waiting until they get sleep. But this is not the best advice according with the sleep hygiene recommendations, as can be seen in the following one. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Get up & try again. – If you haven't been able to get to sleep after about 20 minutes or more, get up and do something calming or boring until you feel sleepy, then return to bed and try again" (CCI, 2008). The different institutions listed before recommends the same tip, which includes getting out of bed if a person cannot sleep and trying to find a boring activity until they feel sleepy. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Avoid Caffeine & nicotine. – For at least 4-6 hours before going to bed" (CCI, 2008). This might appear as something logic, but a lot of people tend to drink coffee or smoke, arguing that this helps them to sleep. As was described before this is physiologically incorrect. These substances activate the central nervous system. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Avoid Alcohol. – For at least 4-6 hours before going to bed" (CCI, 2008). Several of these recommendations appear as good pieces of advice and even logical ones. The purpose of this section is to present all the sleep hygiene recommendations and provide a critique of them. Alcohol is well known as a depressor of the Central nervous system, however, in this list is presented as a substance that should be avoided in order to sleep. Probably, this can be related with the consumption of the substance in a particular environment, it is not the same to consume alcohol in a party than in your house when you're alone. As was stated before, this recommendation need to be evaluated with a

more scientifically approach. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Bed is for sleeping. – Try not to use your bed for anything other than sleeping and sex" (CCI, 2008). It is clear that the intention of this recommendation is to psychologically relate the bedroom only with the activity of sleep. However, having sex can be considered as an arousal activity. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"No naps. – If you can't make it through the day without a nap, make sure it is for less than an hour and before 3 pm" (CCI, 2008). In the different studies described before, this is one of the common recommendations; it is well known that for several people, the time you use to take a nap is time taken from the total amount at night, producing insomnia frequently. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Sleep rituals. – 15 minutes before bed each night, you can develop your own rituals of things to remind your body that it is time to sleep" (CCI, 2008). The usual justification for this recommendation is to prepare psychologically the body and the mind to sleep. Even when this sound logic, almost everybody does the same activities before going to bed every night without knowing that those activities must be done, in the exact same way every day. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Bath time. – Having a hot bath (shower) 1-2 hours before bedtime" (CCI, 2008). The justification for this recommendation is that helps the body to improve the blood

circulation. Relaxing muscles and then allowing the body to rest. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"No clock-watching. – If you can't sleep do not watch the clock. Frequently checking the clock during the night can wake you up" (CCI, 2008). The rationale for this recommendation is that if you continue observing the clock when you can't sleep this will increase the anxiety for not sleeping, activating you. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Use a sleep diary. – Make sure you have the right facts about your sleep, rather than making assumptions" (CCI, 2008). This is a popular recommendation that is prescribed for those people with diagnose of any sleep disorder, but it is not a common practice in the general population. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Exercise. – Try not to do strenuous exercise in the 4 hours before bedtime" (CCI, 2008). This is again recommended in order to avoid an arousal in the body physiology. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Eat right. – It can be useful to have a light snack, but a heavy meal soon before bed can also interrupt sleep" (CCI, 2008). As the previous recommendation, this is suggested in order to avoid an increment in the activation of the metabolic process within the body. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"The right space. – Bed and bedroom are quiet and comfortable for sleeping; control the light, noise and temperature" (CCI, 2008). This is probably one of the most studied factors disrupting sleep. As was described before in different studies, noise and

temperature are frequent contributors to insomnia. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

"Keep daytime routine the same. –Even if you have a bad night sleep and are tired it is important that you try to keep your daytime activities the same as you had planned. Don't avoid activities because you feel tired" (CCI, 2008). Probably one of the most difficult recommendations for many people, as was described in some of the studies listed before many of the participants felt fatigued, and also accepted that this affected their daily activities, emotions, thought and social interactions. (CDC, 2012; Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005).

Survey of Sleep Hygiene and Dreaming

In the previous sections, I described research on sleep and dreaming as well as research on sleep hygiene. As stated before, there are several limitations in these areas of research, starting with the exclusive reliance on self-report measures and the difficulty in accurately measuring the behaviors of sleep and dreaming. However, because of the prevalence of sleep disorders and their potential impact on people's health, there is an ethical need to continue studying sleep and dreaming from a behavioral perspective and using the best available research methods that are appropriate for these phenomena. This is also important for behavioral medicine and health psychology because of the potential linkage between sleep and dreaming and health and waking behaviors

Replicating and Expanding Previous Research

For purposes of this study, a survey was designed with the goal of assessing self-reported sleep quality, dreams and the extent to which people engage in various sleep

hygiene practices. It is important to replicate and extend prior research on sleep and dreaming such as the study by Gellis and Lichstein (2009) where they studied the sleep hygiene practices of good and poor sleepers using Internet-based investigation. Replicating this type of study expands research about the impact of external factors on sleep and evaluates the impact of sleep hygiene in the general population not only in people with a sleep disorder.

The study conducted by Selterman et al., (2013) identified "for the first time a unique and important role of dreams in affecting relationship behaviors". The survey designed for the present study, had a goal to answer a simpler question: if dreams affect people thoughts, emotion or behaviors during the day following the dream? Extending this type of research might lead to the development of a line of research in the behavior analysis field dedicated to study sleeping and dreaming.

Liu et al, (2014) used a random-digital-dialed telephone survey in the United States collecting data on health-related behaviors that are linked to chronic disease. And they found a positive relationship between insufficient sleep and each of six chronic diseases. A similar study conducted by Chapman et al., (2013) used a telephone survey to evaluate the association of anxiety or depressive disorder and frequent insufficient sleep. With the survey designed in the current study it was intended to evaluate the presence of the same chronic diseases within the studied cross-cultural population, expanding research on this specific topic.

Finally, Shredel et al., (2014) designed a questionnaire (MADRE) to elicit some form of dream history including dream recall, nightmares, lucid dreaming, attitude toward dreams and the effects of dreams on waking life. The survey designed for the

current study included similar questions evaluating different characteristics of dreams, attempting to expand the research of dream characteristics in a cross-cultural population.

In summary, the current study consisted in an on-line anonymous survey with two versions (English and Spanish languages), with the goal being to: a) obtain data about the current knowledge and use of sleep hygiene recommendations (CDC, 2012; CCI, 2008, Gellis & Lichstein, 2009; American Academy of Sleep Medicine, 2005); and, b) to obtain information about the patterns such as hours of sleep, refresh or fatigue after sleeping and common environmental factors that have disrupted sleep and the relation with chronic illness. Thus, the goal of this survey is to use an on-line survey to study the patterns of sleep and dream thus replicating and extending previous research on sleep and sleep hygiene practices (Liu et al., 2013; Chapman et al., 2013; Grander et al., 2012; Selterman, 2013; Shankar et al., 2010; Gellis & Lichstein, 2009;).

A second objective of this study was to obtain self-report data about the presence and content of dreams and nightmares of the respondents and on the perceived impact of dreams and nightmares on subsequent behavior of respondents, thus replicating and extending previous research on this topic (Selterman et. al., 2013; Shredel et al., 2014).

Method

Subject Recruitment

Subjects were recruited by announcements in academic classes at Western Michigan University (see Appendix B for a copy of the announcement script). Participants were also recruited via announcements on social network web sites (e.g. Facebook ® groups for WMU Psychology Department Graduate Students, WMU International Student Groups and WMU Mexican Graduate Students). The only inclusionary criterion was that participants have access to a computer and the Internet so that she or he could answer an online survey about their sleeping and dreaming experience.

There wasn't any direct communication between the investigators and the participants. Participants were directed to an online anonymous survey that was posted on the Survey Monkey ® platform. The survey was completed anonymously; no personal data was required from the participants. (i.e. e-mail, phone) and all data were encrypted. The survey platform prevented multiple submissions from the same IP address (in an effort to prevent a person from completing more than one survey. No IP addresses were stored. Participants were not compensated for completing the survey.

Informed Consent Process

This study was approved by the HSIRB (Appendix A) of Western Michigan University. A consent document for anonymous data collection was included at the beginning of the on-line survey (see Appendix C); the document had two versions, the English and Spanish languages versions, both of which can be found in the Appendix C.

Methods of Data Collection

Each participant had access to the online survey using the survey monkey ® link provided in class announcements and different web pages. In this platform people were able to complete the survey in an average time of 3-5 minutes according with the general analysis of results provided by the platform system. The survey had two versions one written in English and one in Spanish.

This instrument, included questions related with demographic data (11 questions), sleep hygiene tips practice (15 questions), characteristics of sleep and dreaming (12 questions). Some questions were rated using a Likert scale from 1 (strongly disagree) to 5 (strongly agree) and others required short answers. The questions asked the participant to recall their sleep habits during the past two weeks; the intention was to identify any possible sleep disorder present.

The survey can be answered only once for each participant. The study reached the mark of 100 surveys per version within the first two weeks on-line and was closed one month later because there were no more people answering it. The initial number desired was 50 surveys per version but you said earlier that you had no goal in terms of number of survey completers.

Results

Sociodemographic Characteristics

After the survey had been available for two weeks on-line, 204 completed surveys were submitted. Of these, *n* = 101 (49.51 %) were from the English language version and *n* = 103 (50.49 %) of the Spanish language version were submitted. All the questions had the option to be skipped according to the participant preferences meaning there was no mandatory rule of answering each questions. This explains why the total responses on each specific survey item do not always total 204. The following tables will depict both the number of respondents and the number of participants who skipped each question.

Table 1

Total number of surveys

Survey	*N*	English *(n)*	Spanish *(n)*
Total	*204*	49.51% (101)	50.49% (103)

Table 2 shows the sociodemographic characteristics of survey completers related to gender. From the total (N = 204), more females (63.64%) answered the survey than males (36.36%).

As seen in Table 2, the difference between male and female respondents was greater in the English language survey than in the Spanish language survey.

Table 2

Sociodemographic characteristics – Gender

Gender	*N = 198*	English *(n = 99)*	Spanish *(n = 99)*
Male	36.36% (72)	24.24% (24)	48.48% (48)
Female	63.64% (126)	75.76% (75)	51.52% (51)
Total	100% (198) *Skipped 6*	100% (99) *Skipped 2*	100% (99) *Skipped 4*

Table 3 depicts the breakdown of respondents by age category separately for the English and Spanish surveys. As can be seen in Table 3, the English version respondents were skewed toward the younger end of the age distribution when compared to Spanish respondents. 65% of the English respondents were within the 18-24-age category, where as only 5.1% of the Spanish respondents were. This difference in age distribution likely resulted from recruiting in university classes where a large percentage of students spoke English as their primary language and were in the traditional university age range of 18-24. Spanish participants were only recruited from on-line sources.

Table 3

Sociodemographic characteristics – Group of age

Group of age	*N = 197*	English *(n = 99)*	Spanish *(n = 98)*
18 - 24	35.53% (70)	65.66% (65)	5.10% (5)
25 - 34	41.62% (82)	31.31% (31)	52.04% (51)
35 - 44	16.75% (33)	3.03% (3)	30.61% (30)
45 - 54	2.54% (5)	0.00% (0)	5.10% (5)
55 - 64	2.54% (5)	0.00% (0)	5.10% (5)
65 - 74	1.02% (2)	0.00% (0)	2.04% (2)
Total	100% (197) *Skipped 7*	100% (99) *Skipped 2*	100% (98) Skipped 5

Table 4 depicts the educational background of the respondents and is congruent with the age distribution patterns that were documented in Table 3. In general, the English respondents younger and had completed less formal education (e.g., 20% had completed only high school when compared to 1% of the Spanish version respondents who had only completed high school).

Table 4

Sociodemographic characteristics – Level of education

Level of education	*N = 198*	English *(n = 98)*	Spanish *(n = 100)*
High school	10.10% (20)	19.39% (19)	1.00% (1)
1 year of college	1.51% (3)	2.04% (2)	1.00% (1)
2 years of college	4.55% (9)	9.18% (9)	0.00% (0)
3 years of college	17.68% (35)	29.59% (29)	6.00% (6)
Graduated from college	15.15% (30)	5.10% (5)	25.00% (25)
Some graduate school	18.69% (37)	21.43% (21)	16.00% (16)
Completed graduate school	32.32% (64)	13.27% (13)	51.00% (51)
Total	100% (198) *Skipped 6*	100% (98) *Skipped 3*	100% (100) *Skipped 3*

Racial characteristics were reflected in these results given that there were two language versions of the survey. A total of 81 White (41.75%), 96 Hispanics (49.48%), 9 Black or African-American (4.64%), 6 Asian (3.10%), and 2 American Indian-Alaskan Native individuals (1.03%) answered the survey. More detailed comparisons for each survey version can be observed in Table 5.

Table 5

Sociodemographic characteristics – Race

Race	*N = 194*	English *(n = 93)*	Spanish *(n =101)*
White	41.75% (81)	77.42% (72)	8.91% (9)
Black or African-American	4.64% (9)	9.68% (9)	0.00% (0)
American Indian-Alaskan Native	1.03% (2)	1.08% (1)	0.99% (1)
Asian	3.10% (6)	6.45% (6)	0.00% (0)
Hispanic	49.48% (96)	5.38% (5)	90.10% (91)
Total	100% (194) *Skipped 10*	100% (93*)* *Skipped 8*	100% (101) *Skipped 2*

Table 6

Sociodemographic characteristics – Sexual preference

Sexual preference	*N =190*	English *(n = 93)*	Spanish *(n =97)*
Heterosexual	88.42% (168)	93.55% (87)	83.51% (81)
Homosexual	6.84% (13)	1.08% (1)	12.37% (12)
Bisexual	4.74% (9)	5.37% (5)	4.12% (4)
Total	100% (190) *Skipped 14*	100% (93) *Skipped 8*	100% (97) *Skipped 6*

At this point, all the demographic information that was collected on both the English and Spanish survey versions have been presented. Figures showing the population total depiction with regard to specific items will be presented next.

Figure 1 represents the three largest groups in regards to occupation. 68 individuals identified as students (34%), 30 were health care and technical practitioners (15%), and 17 were health care support workers (9%). Other occupations that made up 42% of the participants are listed in Table 11, which can be observed in more detail in the Appendix D. A total of 5 individuals skipped this question.

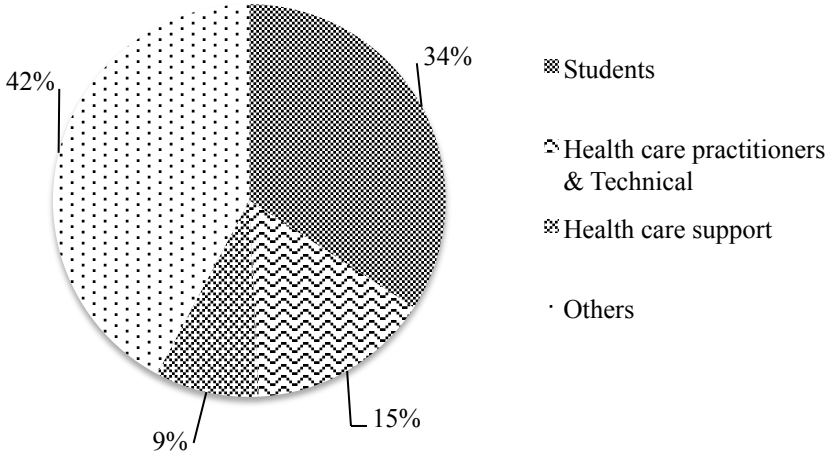

Figure 1. Occupation

With regard to relationship status, there are two distinct groups. 87 people (43%) documented being married or living with a significant other and 106 (53%) reported being single. Divorced or separated respondents made up 3% (6) and there was one widow (1%). Figure 2 shows this distribution. Additional details and comparisons can be found in Table 12, located in the Appendix D.

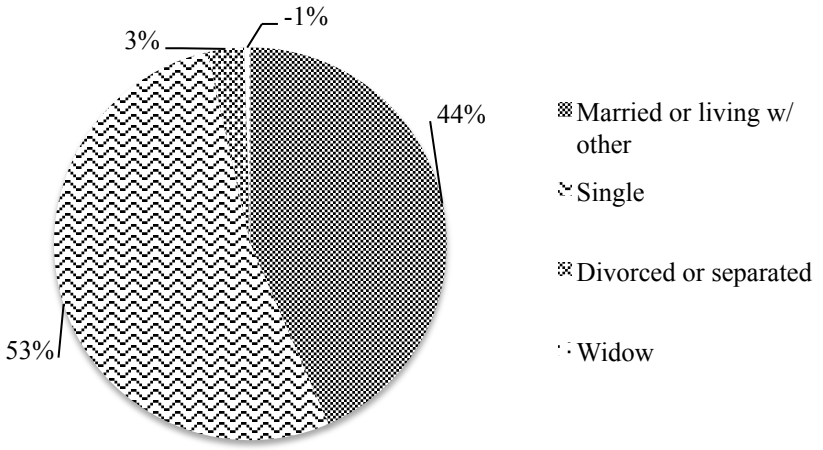

Figure 2. Relationship status

People answered an open-ended question in relation to religious practices. The largest group consisted of individuals that identified as Catholic (35.07%), followed by atheist (24.11%), Christian (19.89%), agnostic (e.g., belief in God not church; 6.81%), other (9.94%) and Muslim (4.18%). Figure 3 demonstrates the proportions of these groups. Further details can be found in Table 13 of Appendix D.

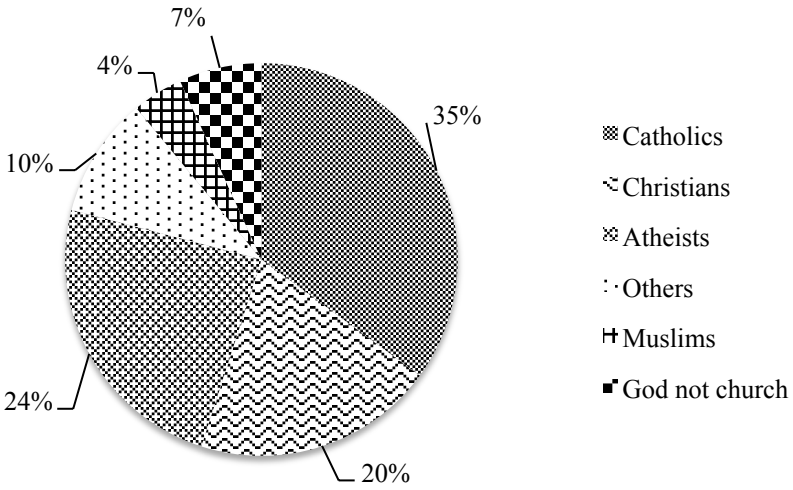

Figure 3. Religion

An open-ended question related to sexual preferences was also analyzed. The largest group identified as heterosexual (88.42%), followed by homosexual (4.74%) and bisexual (4.74%). More detailed comparisons can be observed in Table 6.

People were asked about their country of origin and their current country of residency. Additional details can be found in Tables 14 and 15 in Appendix D. Due to the on-line nature of this survey, it was possible to have participants from different countries respond. However, two nationalities emerged as dominate responders, those who are from and reside in the United States and those from and residing in Mexico. Other nationalities represented by respondents included Bulgaria, Namibia, Afghanistan,

Burma, Canada, Kazakhstan, Saudi Arabia, The Dominican Republic, Egypt, Malaysia, Panama, Brazil, and Holland.

Details about the country of origin and residency can be observed in Figures 4 and 5. It is important to remember that many participants were international students residing outside their home countries.

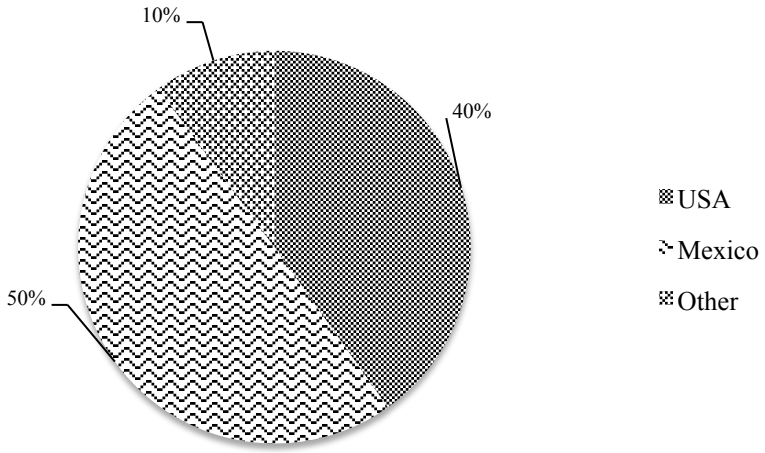

Figure 4. Country of origin

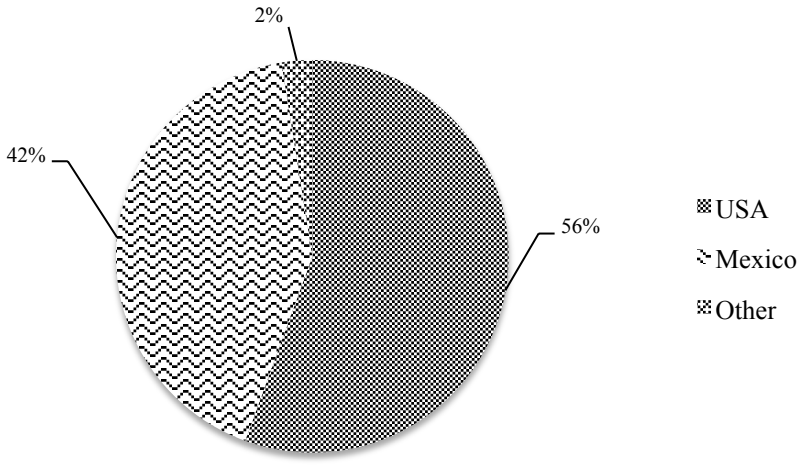

Figure 5. Country of residency

The focus of the survey was to evaluate sleeping and dreaming characteristics in a cross-cultural population; therefore it was necessary to present the demographic characteristics in a lot of detail. However, the most important point from all this information is that the respondents to the English version survey were younger and had fewer educational accomplishments than Spanish respondents. Again, this is likely as result of the recruiting strategies used. This variable is important because it can be assumed that since the Spanish sample is older they maintain different demands (e.g., possibly as a result of having kids or a professional job) than the English version (e.g., college and graduate students).

Chronic Illness

Before describing the sleep characteristics, the results related to chronic illness, one of the most important factors that hamper the quality of sleep will be presented. A specific question about the presence of chronic illness (i.e., is a long-lasting condition that can be controlled but not cured) was asked to the participants, and a total of 187 participants responded. 17 individuals (8.33%) skipped this question.

42 participants (22.46%) reported having a confirmed chronic illness such as anxiety, depression, cardiovascular disease, obesity or any other. 12 individuals (6.42%) reported that they were uncertain if they had a chronic illness and 133 people (71.12%) answered that they do not have a chronic illness (Figure 6).

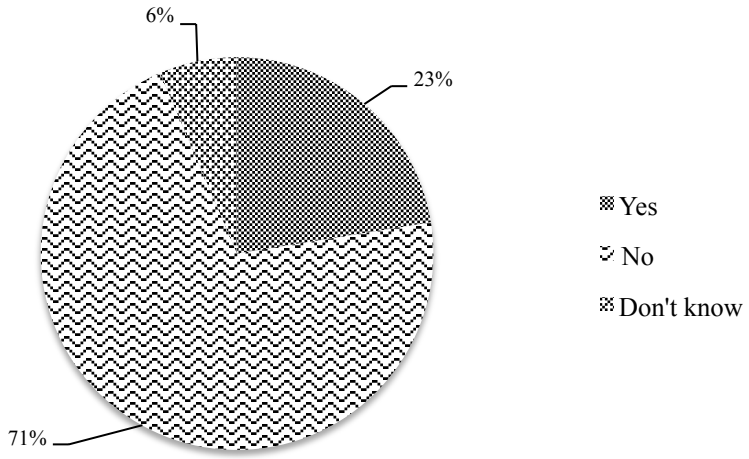

Figure 6. Chronic illness

With regard to specific chronic illnesses, approximately 7% reported chronic anxiety, 6% reported chronic depression and 5% reported chronic obesity. Very few reported chronic health problems such as diabetes, cardiovascular disease and cancer, possibly because the respondents tended to be younger than the age range at which many chronic diseases develop. More details can be observed in Table 16, located in the Appendix D.

Sleeping Characteristics

This section presents the survey results related to sleeping characteristics, dream frequency and content, and the reported effect of dreams on the participants' daily lives.

Sleep Hygiene Definition

As an open-ended question, respondents were asked to define "sleep hygiene." Responses were scored based on the degree to which they corresponded to well-accepted definitions of sleep hygiene. Sleep hygiene is defined as the "promotion of regular sleep" (CDC, 2012, p. 1), or the "variety of different practices that are necessary to have normal,

quality nighttime sleep and full daytime alertness" (National Sleep Foundation, 2014, p. 1).

Open ended answers were scored as a "correct" definition if it included an action and/or expressions related to sleep such as, behavior, habits, strategies, regularity, rituals, practices, quality, routine, preparation, factors, schedule, perform, conditions or helps. Answers were scored as incorrect if they failed to include any action words or if they simply referred to the quality of sleep without mentioning contextual factors and behaviors that could influence sleep. The following answers provide examples to responses that were scored as incorrect: "I don't know", "sleep well", "healthy living", "sleep effectively", "relax", "clean sleep", "deepest level of REM", "anything that interferes with your sleep" and "sleeping correctly."

From the total population (N = 204) of this study, 19 participants (9%) did not answer and 54 people (27%) were not able to appropriately define sleep hygiene. 131 participants (64%) provided an adequate definition of sleep hygiene. Figure 7 shows the percentage distribution of these groups.

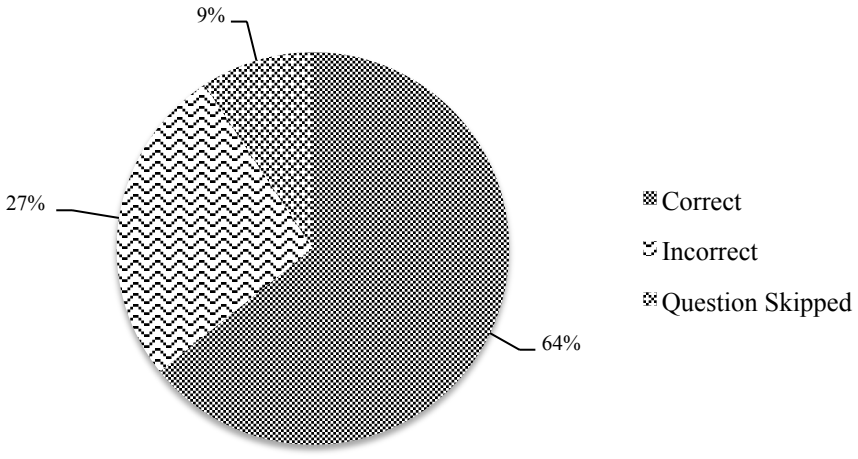

Figure 7. Sleep hygiene definition

It was possible to find differences among the participants who answered in English versus in Spanish. Recruitment strategies resulted in very different samples (the Spanish participants are much older and more involved in professional activities) any effort to attribute differences to the English-Spanish differences is confounded by the different age ranges. However, the English group had 17.28% better definitions than the Spanish group, even though the English speakers skipped this question almost the double (12 versus. 7) as often as the Spanish participants. A possible explanation of these results is that some students answering in English were recruited from a Health Psychology class and had studied sleep hygiene. Additional details on these data can be found in Table 17, located in Appendix D.

Bedtime and Awakening Time

For this population, the most common bedtime hour was 11-12 p.m. (39.20%), followed by those who usually go to bed at 12-1 a.m. (33.16%) and those who go to bed later than 1 a.m. (31 people; 15.58%). An interesting result is that the English participants tended to go to sleep later than the Spanish participants as can be observed in Table 7.

Table 7

Sleep characteristics – Time to go to sleep

Time to go to sleep	*N = 199*	English *(n = 99)*	Spanish *(n = 100)*
< 11 pm	12.06% (24)	8.08% (8)	16.00% (16)
11 -12 pm	39.20% (78)	31.31% (31)	47.00% (47)
12 -1 am	33.16% (66)	40.40% (40)	26.00% (26)
>1 am	15.58% (31)	20.20% (20)	11.00% (11)
Total	100% (199) *Skipped 5*	100% (99) *Skipped 2*	100% (100) *Skipped 3*

With regard to wake up times (Table 8), the most common time was 6-7 a.m. (28.28%), followed by those who wake up after 8 a.m. (27.27%). Those who get up between 7-8 a.m. accounted for 22.73% of the total.

Table 8

Sleep characteristics – Time to wake up

Time to wake up	*N = 198*	English *(n = 98)*	Spanish *(n = 100)*
4 - 5 am	6.57% (13)	3.06% (3)	10.00% (10)
5 – 6 am	15.15% (30)	5.10% (5)	25.00% (25)
6 – 7 am	28.28% (56)	20.41% (20)	36.00% (36)
7 – 8 am	22.73% (45)	28.57% (28)	17.00% (17)
> 8 am	27.27% (54)	42.86% (42)	12.00% (12)
Total	100% (198) *Skipped 6*	100 % (98) *Skipped 3*	100% (100) *Skipped 3*

The average of hours of sleep per night for this population was seven per night.

Factors Affecting Sleep

Likely the most common factors that affect the participants sleeping habits are environmental. The participants were asked to identify each factor that had a deleterious effect on sleep. Figure 8 shows the most common factors that affected this population included: 1) temperature (32.58%), 2) noise (21.91%), and 3) the presence of a partner (16.29%). Other factors such as light and a pet, or a combination of factors had similar percentages. A detailed description of these factors can be seen in Table 18, located in Appendix D.

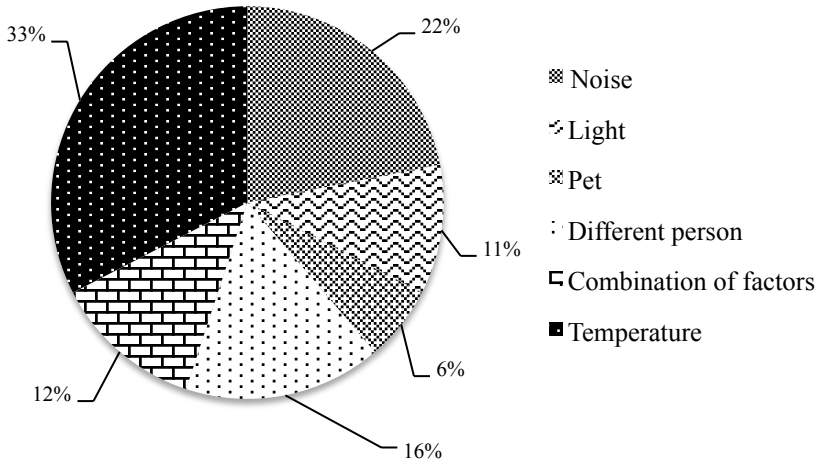

Figure 8. Environmental factors impacting sleep

Nocturnal Awakening

As described above, there are different environmental factors that can impact one's sleeping behaviors and therefore impact their quality of sleep One of those impacts is the frequency with which one wakes up during the night. A frequency of more than one wake-up per night and more than two nights per week was found in 61% of participants (Figure 9). More comparisons can be found in Table 19, located in Appendix D. It is likely that several participants had nighttime awakenings at various levels, but these were not accurately captured by the way the question was asked (e.g., > 1 time > 2 days/week). These results can be compared with a different survey developed by Ohayon (2009), who studied,

> A representative sample consisting of 8,937 non-institutionalized individuals aged 18 or over living in Texas, New York and California, where people was interviewed on sleeping habits, health, sleep and mental disorders. A total of 35.5% of the sample reported awakening at least 3

nights per week. When the duration was set at 1 month, the prevalence decreased to 34.2%. The addition of daytime impairment dropped the prevalence to 19.5%. More than half of them had Difficulty Resuming Sleep (DRS) once awakened. DRS was associated with greater daytime impairment, greater consultations for sleep disturbances and greater likelihood of receiving a sleep medication. (Ohayon, 2009, p. 1).

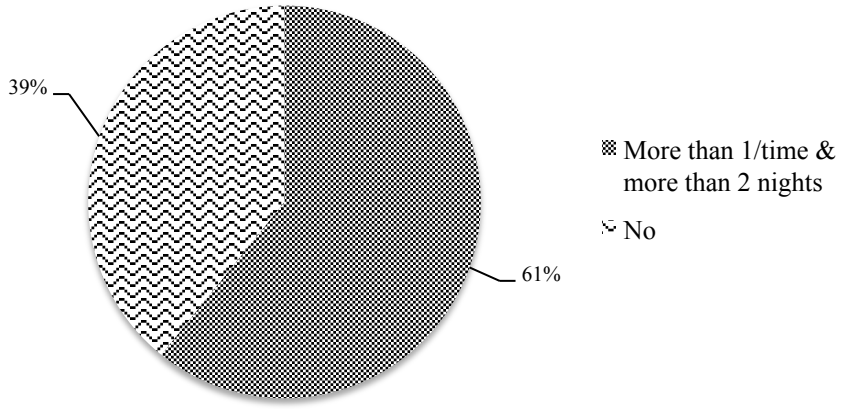

Figure 9. Wake up at night

Physical Status Upon Awakening

It was described previously that this population has an average of 7 hours per night, however, when asked how they feel upon waking up only 33.63% felt rested. The majority, 62.37%, described waking up and still feeling fatigued (Figure 10). This result can be compared with the 19.5% daytime impairment, which was found in the study of Ohayon (2009).

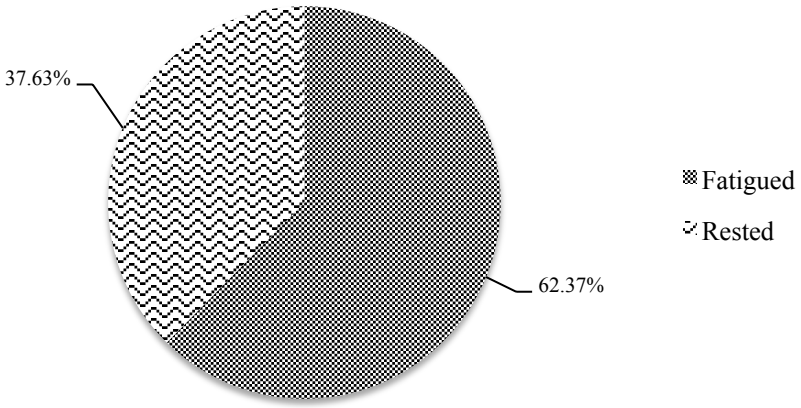

Figure 10. How did you feel when you wake up?

Sleep Medications

Slightly over 8% of the survey respondents reported consuming one or more sleep enhancing pharmaceuticals in the past two weeks. Products included different brands of flu nighttime relief, melatonin, "over the counter sleep aid", "generic sleep aid", "essential oils" and various types of antipsychotics and antidepressants (Figure 11).

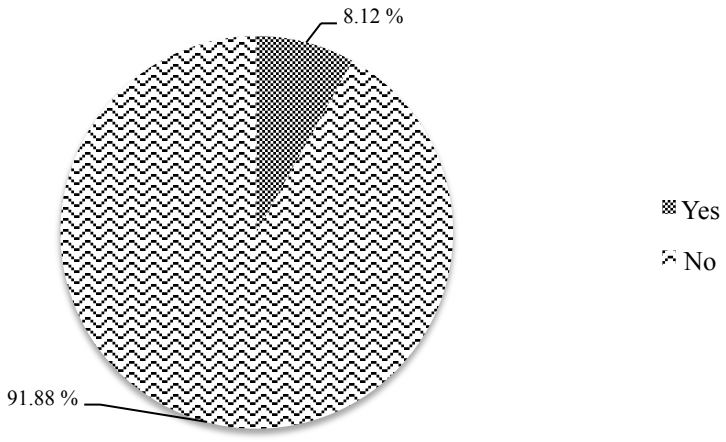

Figure 11. Sleep enhancing medication and remedies

Dreams and Nightmares

The first question about dreaming consisted of assessing of the frequency of dreams. It was found in this population that in the past two weeks, 23% had dreamt 3-4 times per week, whereas 41% recalled dreaming 1-2 times per week. Only 13% denied having dreams for the two past weeks (Figure 12). Similar results were obtained for both language groups, and only 4 participants skipped this question. Further details are observable in Table 22, located in Appendix D.

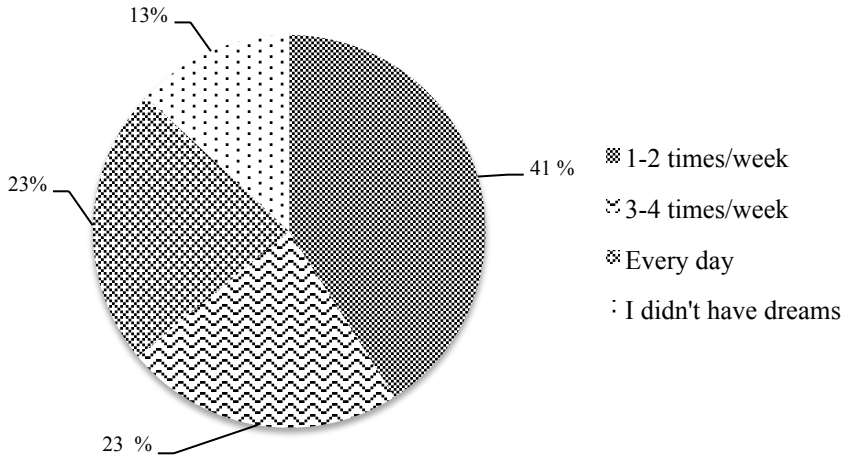

Figure 12. Frequency of dreams

Nightmares

Nightmares are defined based on the ICSD-3 (American Academy of Sleep Medicine, 2014) as "dreams with strong negative emotions that result in awakening from the dreams. The plot can be recalled very vividly upon awakening" (Schredel et al., 2014, p. 142). For the purposes of the present survey, a definition was not provided to the participants with the intention to observe natural answers. The majority of respondents reported having no nightmares over the past two-week period, as is depicted in Figure 13.

Nevertheless, approximately one third of the respondents reported 1-2 nightmares per week and smaller percentages reported nightmare frequencies of 3 or more per week.

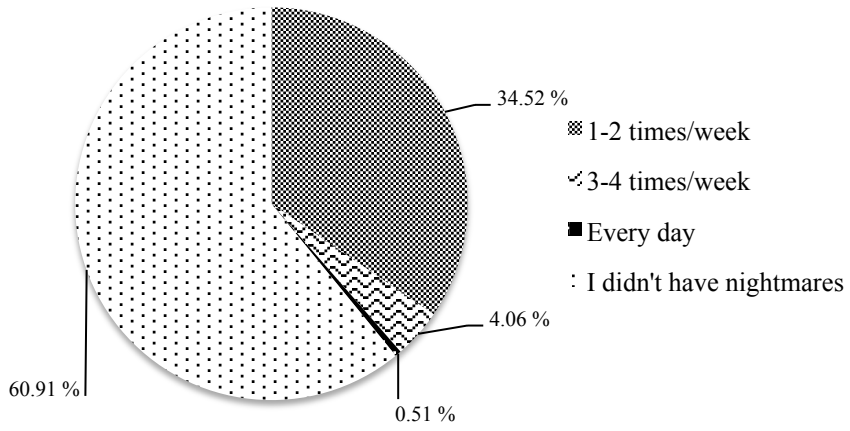

Figure 13. Frequency of nightmares

Dreams and/or Nightmares Affecting the Next Day

In this study, participants were asked if their dreams and nightmares affected their next day functioning. The specific question was:

> During the past two weeks, do you think that your dreams and/or nightmares affected your behavior (actions, emotions, thoughts) the next day? If yes, was it because of a dream, a nightmare or both and how often (1, 2 or more times).

It was found that 21.54% of the participants answered 'yes' (Figure 14). The English group was around 14% more affected by their dreams and nightmares the next day than the Spanish participants. A total of nine participants did not answer this question. For people who answered 'yes', they were slightly more affected by a dream than by a nightmare. This part of the question was open-ended and some of the answers did not specify the details necessary to further analyze this finding. The frequency of the

affectation range was between 1-3 times during the two-week period. Additional details can be found in Table 24, located in Appendix D.

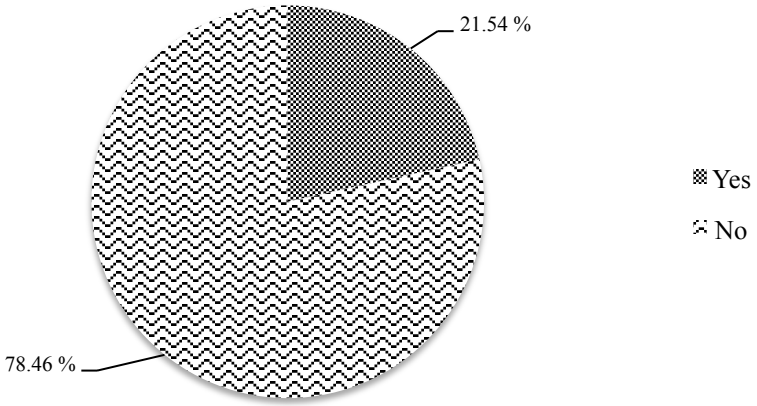

Figure 14. Dreams and nightmares affected next day

Dream Content

Questions regarding the content and themes of dreams were included in the survey. As depicted in Figure 15, slightly over 1/3 of the respondents reported that they dreamed about "real people, things and events." A similar percentage reported that they dreamt about both, "real and not real people, things and events." 18.92% of the population selected the N/A option and 19% skipped this question. The Spanish language version group dreamt more frequently about not real people, things and events than English speakers. Table 25, located in Appendix D can provide more details about the answers for this question.

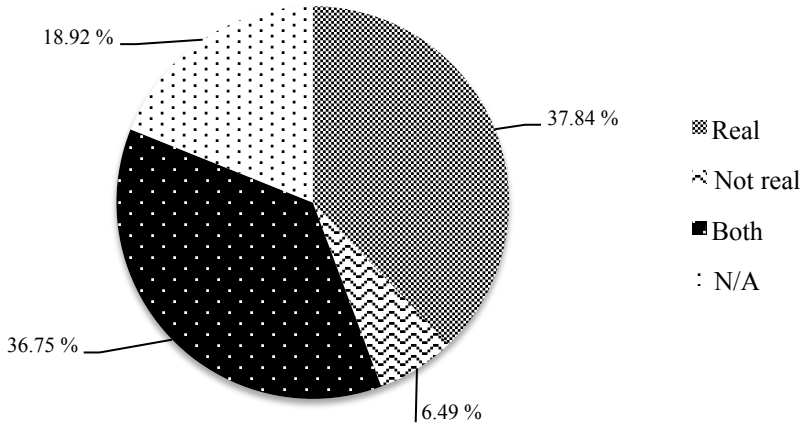

Figure 15. Dreams and nightmares content (real, not real, both and N/A)

Emotional Content of Dreams

Using a Likert rating scale (1=strongly disagree and 5 = strongly agree), respondents reported that dreams contained "happy content" (average Likert rating of 3.98 on a 5 point scale), followed by sexual content (3.53 average Likert rating) and frightening content (3.14 average Likert rating). As can be seen, averages among the evaluated content were very similar.

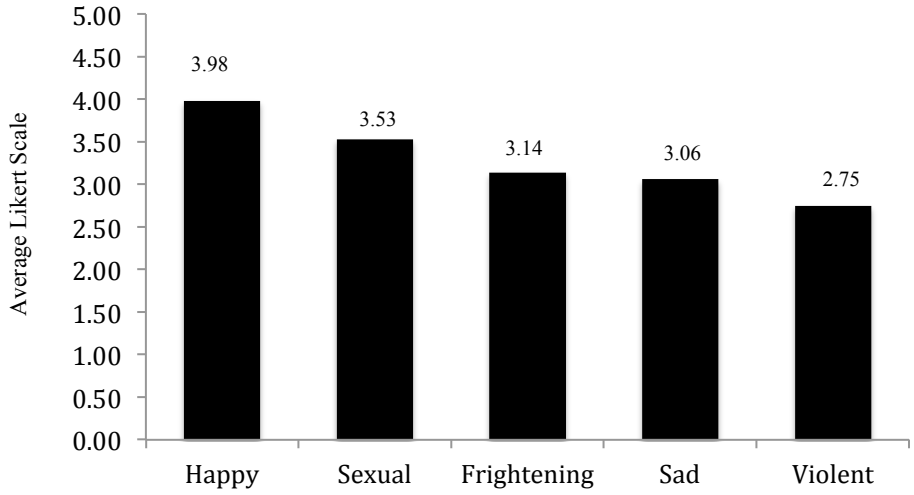

Figure 16. Dreams and nightmares content (happy, sexual, frightening, sad and violent)

Sleep Hygiene

For the purposes of this survey, 15 sleep hygiene recommendations were evaluated within the population using a Likert scale with the following criteria: Strongly disagree (1), disagree (2), neither disagree nor agree (3), agree (4), strongly agree (5).

The lead statement in this section was for participants to "evaluate the following statements, recalling as much as possible your sleep habits during the past two weeks." 15 sentences were then presented with a brief description each (Appendix C).

Table 9 shows the averages per group, total average and standard deviations. As can be seen, both the averages and standard deviations were almost equal. Due to this, no further analysis of this data was conducted. 12 participants did not respond to this question.

Table 9

Sleep characteristics – Sleep hygiene recommendations average of points.

Recommendation	*N = 192*	English *(n = 98)*	Spanish *(n = 94)*
Right bedroom	3.78	3.72	3.83
Do not strenuous exercise	3.42	3.65	3.19
Sleep when sleepy	3.38	3.16	3.59
Days are always regular	3.27	2.97	3.57
Keep daytime routine	3.23	3.15	3.30
My bed is for sleeping	3.22	3.30	3.13
I have sleep rituals	3.15	3.32	2.98
No heavy meal	3.14	3.07	3.20
Do not "clock watch"	3.11	3.28	2.93
Avoid alcohol	2.97	2.81	3.12
Avoid caffeine & nicotine	2.93	2.84	3.02
I never take naps	2.93	2.81	3.04
Get up and try again	2.58	2.60	2.56
Bath	2.40	2.61	2.18
Sleep diary	1.64	1.51	1.77
Total	100% (192) *Skipped 12* *Average 3.01* *SD 0.5*	100% (98) *Skipped 3* *Average 2.99* *SD 0.5*	100% (94) *Skipped 9* *Average 3.03* *SD 0.5*

The highest score was given for having the correct bedroom environment (3.98 points) and the lowest score was given for sleep diary use (1.64 points). The overall averages are similarly low and three points corresponded to the "neither disagree nor agree" option. This means that this population is not actively following any type of sleep hygiene recommendations (Figure 17).

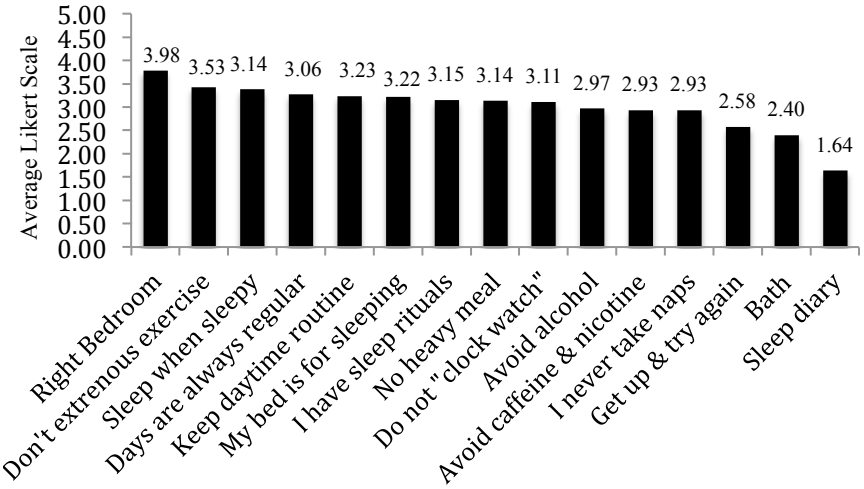

Figure 17. Sleep hygiene recommendations, average of points

Statistical Analysis

Sleep Hygiene

Presented in the previous sections were the different results obtained from the survey. The statistical analysis will now be discussed.

One of the main goals with this survey was to assess the sleep hygiene practice within the studied population. As it was described previously, it was determined that this population is not currently engaging in the practice of sleep hygiene recommendations. However, there are some participants who have higher scores in this area than others. For

statistical purposes, the participants with the top 20% scores and the bottom 20% scores were separated from the total population. The group with the higher scores had an average of 3.78 points versus an average of 2.23 points for the lowest scoring group. Using a one-way ANOVA, a statistical difference between both groups was found ($p<0.0001$). However, there was no statistical difference when the hours of sleep where compared ($p<0.1804$).

Moreover, the sleep hygiene results from both groups were compared with other variables using a Chi-square test. The use of sleep medication or other products, gender, fatigue, next day dream affected level, waking up during the night and chronic illness were all analyzed. None of these variables had statistical significance over the sleep hygiene recommendation scores (details can be observed in Appendix D, Figure 18).

Sleep Medication and Other Products

As sleep medication can be a critical factor affecting sleep characteristics, a statistical analysis of this variable was developed which compare participants who used medications or another sleep-aid with those who did not use anything. In this one-way ANOVA it was not possible to find a statistical significance between the sleep hygiene recommendation scores or for the hours of sleep. In order to find the probability to present other variables, a Chi-squat test was performed. The only variable that presented a higher probability of being affected by the use of medication was the presence of any chronic illness ($p<0.0001$; details can be observed in Appendix D, Figure 19).

Chronic Illness

Chronic illness is statistically significant when it is related to the use of medications or other sleep-aid products. Using a one-way ANOVA to directly analyze

chronic illness determined the average hours of sleep for people with chronic illness were 7.52 hours. For those without chronic illness the average was 7.19 hours ($p<0.0996$). Additionally, the scores on sleep hygiene from people with a chronic illness (i.e., average of 3.05 points) versus those without a chronic illness (i.e., average of 2.97 points) were found not to be statistically significant ($p<0.4252$).

After using a Chi-square test it was found that the only two variables affecting the probability of presenting a chronic illness were medication ($p<0.0328$) and waking up at night ($p<0.0271$). Additional details can be observed in Appendix D, Figure 20.

Wake Up at Night

At this point it was been found that variables such as medication and chronic illness appear to be statistically significant. It also appears that the frequency with which one wakes up at night is also important. However, this last variable did not affect the scores of sleep hygiene practice ($p<0.8636$), or the hours of sleep ($p<0.6998$). Nevertheless, after using a chi-square test it was found that the presence of fatigue the next day and waking up at night are not independent ($p<0.0122$).

Next Day Fatigue

The last result statistically analyzed was the presence of fatigue after waking up the next day. Using a one-way ANOVA, it was found that the hours of sleep affected the presence of fatigue the next day ($p<0.0088$) and the sleep hygiene scores ($p<0.0159$). A chi-square test found that gender, specifically being female, was related with the presence of fatigue the next day ($p<0.0008$) and that the presence of fatigue and waking up during the night were related ($p<0.0457$)

Discussion

A total of 204 online surveys (101 in English and 103 in Spanish) were answered. However, not all the participants answered the survey completely, leaving some questions unanswered, which were incorporated in to the statistical analysis. There was not a clear pattern of skipped answers, however it may be postulated that some participants hesitated to answer questions on emotionally charged topics such as religion (6.37 %), sexual preference (6.86%), and racial identity (4.90%). These questions were included with the intention to have a complete comprehensive view of the population demographics and to find a possible link between demographics and sleep behaviors. In conclusion, no clear differences were found in this cross-cultural population. As discussed in the results section, due to these findings a sophisticated statistical analysis was not necessary to conduct. It does not seem that the skipped questions have affected the final results of the survey.

People were asked to identify their occupation and great diversity was discovered. Students consisted of 34.17% of the population, and health care and technical practitioners making up the next largest group at 15.07%. The highest percentage of participants had completed graduate school (32.32%) or had some graduate school study accomplished (18.69%). This can be explained by the recruitment procedures, as

participants were recruited using social media students groups from WMU and from class announcements.

There were two version of the survey (English and Spanish) and people from various countries were able to respond. The most frequent participants were from the United States (40.20%) and Mexico (49.75%), although other nationalities made us 10.05% of the responses. 55.56% of the participants are currently residing in the USA, 41.92% reside in Mexico and 2.52% are residing in other countries such as Canada, Saudi Arabia, Brazil, Holland. International students participated in this study, but their results were not different to the rest of the population.

Following the analysis of skipped questions, when the people were asked to define sleep hygiene 9.31% did not provide an answer, 26.47% offered an incorrect definition, and 64.21% provide a correct definition. It is necessary to recognize a methodological weakness in this study related to this result. There was not a procedure of inter-observer agreement and only one person scored the answers for this specific question. It is possible that other observers may have found the incorrect definitions acceptable, therefore affecting these results.

In the end, it seems that for most people, sleeping is a passive activity where one does not need to do anything else than lie in their beds. On the contrary, sleeping is a behavior that requires a daily routine, and the establishment of the correct environment and all the related conditions to it.

It is possible to compare training of physical exercise with the proper training of sleep behaviors. This is why the field of behavior analysis, and specifically the field of behavioral medicine, has a large amount of work to do. The first step should be to teach

people about the importance of understanding sleep as a behavior, not as a passive action. It seems important here to recall two definitions from Malott (2008) who described a behavior as a "muscle, glandular, or electrical activity" and the dead man test rule, "if a dead man can do it, it isn't behavior. If a dead man can't do it, then it is behavior" (p. 5). In other words, when we are sleeping, our body is involved in all kind of muscular, glandular and electrical activities that of course a deceased individual does not have. Sleeping is a behavior that can be observed, measured and trained, and for that reason can be controlled in order to improve one's quality of health.

In this study's population, 42 people (20%) endorsed being diagnosed with chronic illness (e.g., diabetes, cardiovascular, obesity, depression, anxiety). While it is important that every individual learn how to improve the quality of sleep, it is imperative for those with chronic illness. An important segment of participants with chronic illness referred to being affected by their dreams and nightmares the following day. Therefore, it should be a goal in later studies to address this specific relation in a more direct manner, develop a sophisticated statistical analysis, and manipulate various variables (e.g. sleep hygiene practices). These measures should be done with the objective to improve the quality of sleep and to facilitate study of the effect on dream characteristics.

An interesting result is that 8.12% of the total population endorsed taking a medication to sleep such as benzodiazepines, antipsychotics, cold/flu drugs or generic sleep-aid products. These participants demonstrate the need to learn about the benefits of following the sleep hygiene recommendations more so than other participants. It is common that people with chronic illnesses take several medications. Often these medications are prescribed to help them cope with their chronic illnesses and its

symptoms; as well it is not uncommon for them to be given medications to improve their sleep as well. Learning how to take care of sleep habits is knowledge that all individuals with chronic illness should do. This 8.12% could be considered a disturbing result because of the sociodemographic characteristics of this population (i.e., age, occupation).

As can be seen, people with any chronic illness are a specific population that could benefit from using the sleep hygiene recommendations. Now we turn to the rest of the participants, those who denied any chronic illness.

In this survey, we found that people are sleeping approximately 6-8 hours per night, and that 15.58% are going to bed later than 1 a.m. It is likely that many students are being kept awake late in to the night due to the stress of their educational pursuits. This would be considered an environmental factor that is affecting their sleep characteristics. Participants were asked to answer the survey thinking in the past two weeks and 62.37% shared that when they wake up they still feel fatigued. This percentage can be compared with the 19.5% found by Ohayon (2009). The problem here is that the currently studied population consists of a majority of students and this fatigue might be hampering their academic performance, not to mention their overall health.

A more dramatic number corresponds to the 60.80% of participants who wake more than one time per night and more than two nights per week. This percentage can be compared with the 35.5% of people who reported awakening at least three nights per week in the study of Ohayon (2009). The current study doubled the number of the other study's findings; again with the most disturbing part being that the majority of the respondents were students. Following the sleep hygiene recommendations could reduce these numbers. For example, when asked about the environmental factors impacting

sleep, the intention was to try to find anything that could be controlled by the person and it was found that people are affected more frequently by the temperature (32.58%), another individual (16.29%), noise (21.91%), light (10.67%), and a pet (6.18%). For the English respondents the option for all or a combination of previous factors was added, which found that 25% were affected by a combination of factors. The results on environmental factors in the current study are similar of what was found in the study of Gellis & Lichstein (2009), "poor sleepers also reported statistically significant increases in excessive noise in the bedroom, uncomfortable nighttime temperature, and activities that were exciting, emotional, or demanded high concentration near bedtime" (p. 1).

People usually think that sleep quality is not controllable so when this survey was designed a decision to look at the behavior of dreaming was made. If Malott's behavior and dead man test definitions are recalled, then it can be agreed upon that dreaming is a behavior. As a behavior, dreaming can be the subject of study and may be able to be trained in individuals. For purposes of this survey, no training attempts were made. In the population surveyed it was found that 23% had dreams every day and 34.52% had nightmares at least 1-2 times per week. These results can be compared with the results found by Shredel et al. (2014). In their online sample (N = 2929) they found a dream recall frequency "several times a week" of 28.85%, "almost every morning" 10.69%. About nightmares, Shredel et al. (2014) found a frequency of "almost every morning" of 3.52% and "about once a week" as 5.22% (p. 143). As can be observed, the current survey found similar frequency for dreams but a higher frequency for nightmares. Of course, there is an enormous difference in the size of samples. Nevertheless, in the

sample studied by Shredel et al., the age average was 45.88 ± 14.38, and in the current survey the participants were younger (e.g. majority of college and graduate students).

At this point, it cannot be doubted that dreaming is a common and frequent behavior. Regarding the impact of this behavior on the daily lives of people, 21.54% answered that those dreams and/or nightmares affected their thoughts, emotions and even social interactions in a positive or negative way. This survey also attempted to identify the content of those dreams, which found 37.84% of the participants dreamt about real people, and 36.75% dream about both real and not real people, things and events.

Finally, individuals asked to rank order their dream content and it was found that the first place was for happy content, the second was sexual content, followed by frightening content, then sad and violent content. It is interesting to find that people are dreaming a lot and that their dreams are important for them, also it is encourage to find that may people endorsed happy dreams. More research is needed with more advanced methodology, including the manipulation of behaviors related to sleep hygiene recommendations. With this, the patterns and characteristics of dreams can be studied and their impact on daily lives could be assessed.

In this population, one third had an incorrect definition of sleep hygiene, however, it was also assessed what sleep hygiene recommendations they were engaging in without awareness. Using a Likert scale, 15 sleep hygiene recommendations were assessed according to individuals' use of them in their daily lives. A maximum of 5 points were granted for strong agreement and a minimum of 1 point for strong disagreement.

It was found that people neither disagree nor agree to have the right bedroom environment (3.78 pts.), which means they can improve the environmental factors

discussed earlier. Simple recommendations would be to find the correct mattress and pillows for their body complexion, and to control the temperature, light, and noise factors. If there is a factor that can be improved is the environmental factor, these results expand the findings of Gellis & Lichstein (2009) as previously discussed.

For this population, there were some obvious and commons behaviors related with the daily routine and the preparation for going to bed. People did not engage in extraneous exercise before going to bed (3.42 pts.), they went to bed when sleepy (3.38 pts.), their days are always regular (3.27 pts.), they kept daytime routine (3.23) and used their bed for sleeping and having sex (3.22 pts.). People usually have a sleep ritual (3.15 pts.) and do not have heavy meals prior to bedtime (3.14 pts.). Nevertheless, all these areas can be improved upon, as the participants appeared ambivalent about how they are able to control the quality of their sleep.

People must not engage in extraneous exercise because this might increment the state of alertness. It is good to go to sleep when people are sleepy but sometimes even when they want to go to sleep people have work to do or as in the current population study. A better organization of one's daily schedule could improve this factor, which leads to the next sleep hygiene recommendation, to keep daytime routine. This implies to wake up and go to bed every day at the same time even on weekends or days off. It is common to use bedrooms besides sleeping and having sex for many different activities such as reading, exercising, eating, watching television, and playing videogames. All these activities are not recommended to be done within the bedroom, because they increase one's state of alertness, and the bed becomes associated with being awake. Talking about activities, it is a good recommendation to prepare the body and the mind

for sleep and therefore having a sleep ritual is a good idea. This involves common activities such as brushing one's teeth, removing makeup, putting on pajamas, and more. It is important that these behaviors occur in the same pattern every single night.

What about when people cannot sleep? Several people tend to watch the clock, which is likely to increase the anxiety for not sleeping. In the studied population, it was found that people neither disagree nor agree with this point (3.11 pts.). But when asked about what they do when they cannot sleep, specifically if they got up and do something else until they felt sleepy, most endorsed staying in bed even if they could not sleep (2.58 pts.). The sleep hygiene recommendation is that if a person cannot sleep in 20 minutes, that they get up and engage in an uneventful until feeling sleepy. A particular recommendation is to take a bath or warm shower prior to bed, but this is something that the studied population usually never does (2.40 pts.).

Previously, it was discussed that this population did not agree nor disagree with having heavy meals before going to bed. There are specific meals that can affect sleep such as caffeine and nicotine and avoiding these is part of the sleep hygiene recommendations. However, within this population they frequently do not follow this advice (2.93 pts.) and they engage in these behaviors, and drinking alcohol (2.97 pts.) prior to bed. It can be assumed that the demographics, such as age and occupation, of this population may provide some answers to this finding.

The less frequent sleep hygiene recommendation that this population avoids is to have a sleep diary (1.64 pts.). This is understandable as rarely do individuals keep a sleep diary unless they have severe sleep problems. As 37.63% of this population documented being fatigued upon waking, regardless of the number of hours of sleep,

therefore they may benefit from following this recommendation. Again, more research is this area is needed.

A statistical analysis of this result was done. The first step was the analysis of the sleep hygiene recommendations versus other variables. In order to do this analysis, two groups of participants were integrated using the 20% highest and the 20% lowest scores. The group with the higher scoring had an average of 3.78 points versus an average of 2.23 points of the lowest scoring group. Using a one-way ANOVA, a statistical difference between both groups ($p<0.0001$) was found. No other variables had a statistical influence over the sleep hygiene recommendation practice. Once again it can be assumed that if this population is trained to follow the sleep hygiene recommendations their scores would increase. Nevertheless, it is interesting to know that no other factors influences these results.

Since sleep medication is a very important factor affecting sleep characteristics, a statistical analysis was also conducted here to compare those who used any medication or sleep-aid product against those participants who did not use anything. The only variable that presented a higher probability of being affected by the use of medication was the presence of any chronic illnesses ($p<0.0001$). It is important to note that the most frequent chronic illness described within this population was anxiety. However, the answer provided by the participant may be their perception and not a formal diagnosis from a healthcare professional. Participants did endorse that their academic activities were stressful for them.

As described before, chronic illness was statistically significant when related to the use of medications or other sleep-aid products. Analyzing directly the variable of

chronic illnesses, and using a one-way ANOVA, it was found that the average hours of sleep for people with chronic illness were 7.52 hours and for those without chronic illness was 7.19 hours ($p<0.0996$). The difference is a matter of minutes, even when the results were statistically significant it is important to stress the need to have a good quality of sleep. In conclusion, the population is sleeping the same amount of hours recommended by different experts and still experiencing fatigue the next day.

An explanation of the fatigue feeling after waking up was apparently related to awakening during the night. After using a chi-square test it was found that the presence of fatigue the next day and waking up at night are not independent ($p<0.0122$). Using a one-way ANOVA, it was found that the hours of sleep affected the presence of fatigue the next day ($p<0.0088$) and also the sleep hygiene scores ($p<0.0159$). Finally with a chi-square test it was found that gender, specifically being a female, was related to the presence of fatigue the next day ($p<0.0008$), and also that the presence of fatigue and waking up during the night were related ($p<0.0457$).

It can be stated that the quality of sleep was affected by the presence of a chronic illness, more frequent anxiety as the participants described it. It is likely that there are two factors that can be manipulated due to following the sleep hygiene recommendations; those factors are decreasing the awakenings at night, and therefore, decreasing the experience of fatigue the next day.

Conclusion

In conclusion, it can be stated that in this cross-cultural sample it was not possible to find any significant visible differences among the English and the Spanish language group participants. Both demonstrated similar responses, even in the dream characteristics. Hence, it was not required to run a sophisticated statistical analysis to attempt to find non-existent differences between the groups.

Another finding of this study was that the cross-cultural population was unfamiliar with the concept of sleep hygiene and therefore, are not practicing any of the recommendations. Alarming results about the frequency of night awakenings, the use of medications and the disruption of sleep by environmental factors were found. The findings related with dreaming were similar to previous research, but nightmares were more frequent in this population. The percentage of people who endorsed being affected by their dreams and/or nightmares the next day was also similar to previously documented findings. After the statistical analysis for this study, it can be stated that the quality of sleep was affected by the presence of a chronic illness, and in particular anxiety. If participants were to follow sleep hygiene recommendations that could increase the goal of improving their quality of sleep two outcomes would likely occur. The first

would be a decrease in the number of awakenings at night, and the second would be a decrease the experience of fatigue the next day.

It can be concluded that a future line of behavioral analytical research for sleeping and dreaming should include the assessment and manipulation of all possible external factors that may contribute to the characteristics of sleep and dreams. It would be necessary to have accurate records and a sleep diary to work from. The experimental aspect of a future study could be developed by gradually introducing the practice of the sleep hygiene recommendations. The methodological difficulties and limitations (e.g., self-report) of the current study have been previously mentioned so it would be helpful for future work to employ additional strategies. Future studies may wish to make use of new technology such as electronic devices (e.g., mobile phone applications) to monitor sleep and record dream content.

Appendices

A. HSIRB Approval

Date: October 29, 2014

To: Wayne Fuqua, Principal Investigator
Ivan Noe Martinez Salazar, Student Investigator for thesis

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 14-10-39

This letter will serve as confirmation that your research project titled "Sleep Hygiene Survey" has been **approved** under the **exempt** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study***)." Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: October 28, 2015

B. Script

"Sleep Hygiene Survey"

We would like to invite you to participate in an on line anonymous survey entitled ***"Sleep Hygiene Survey"***

designed to analyze the sleep characteristics in different populations.

You can access the English language version of the survey in the link
https://www.surveymonkey.com/s/FN35YVR

Or the Spanish language version of the survey in the link
https://es.surveymonkey.com/s/GKFCWNQ

If you have any questions, you may contact

Ivan Noe Martinez-Salazar
ivannoe.martinezsalazar@wmich.edu
(***269-910-4514)***

"Encuesta de Higiene del Sueño"

Nos gustaría invitarlo a participar en una encuesta anónima en línea titulada "Encuesta de higiene del sueño" diseñada para analizar las características de sueño en diferentes poblaciones.

Puede acceder la versión en idioma ingles de la encuesta en el siguiente enlace
https://www.surveymonkey.com/s/FN35YVR

o la versión en idioma español de la encuesta en el enlace
https://es.surveymonkey.com/s/GKFCWNQ

Si tiene alguna pregunta, puede contactar a

Ivan Noe Martinez-Salazar
ivannoe.martinezsalazar@wmich.edu
(***269-910-4514)***

C. English & Spanish Language Versions of the Survey

Sleep hygiene survey

1. General information and Consent

The objective is to identify the characteristics of sleep in diferent populations around the world, including dreaming.
Also, our goal is to assess the current knowledge and use of sleep hygiene recommendations.
NO data required can identify you. For example, we do not require your name or e-mail, also, your IP address is not recorded. All data are encrypted.
If you have any questions, you may contact Ivan Noe Martinez-Salazar ivannoe.martinezsalazar@wmich.edu
Thank you for participating in our survey.

SLEEP HYGIENE SURVEY CONSENT (ENGLISH VERSION)

You are invited to participate in a research project entitled "Sleep Hygiene Survey" designed to analyze the sleep characteristics in different populations. The study is being conducted by Wayne Fuqua, Ph.D. BCBA-D and Ivan Noe Martinez-Salazar from Western Michigan University, Department of Psychology. This research is being conducted as part of the thesis requirements for Ivan Noe Martinez-Salazar.

This survey is comprised of 38 multiple choice and short answer questions and will take approximately 3 -5 minutes to complete. Your replies will be completely anonymous; so DO NOT put your name anywhere on the survey (for example in the open-answer boxes). You may choose not to answer a question and simply leave it blank. If you choose not to participate in this survey, you may exit from it just by closing the browser.

Completing the survey indicates your consent for the use of the answers you supply. If you have any questions, you may contact Wayne Fuqua, Ph.D. BCBA-D at 269-387-4474, Ivan Noe Martinez-Salazar at 269-910-4514, the Human Subjects Institutional Review Board (269-387-8293) or the vice president for research (269-387-8298).

This study was approved by the Western Michigan University Human Subjects Institutional review Board (HSIRB) on 10/29/2014. Please DO NOT participate in this study after 10/28/2015. Participating in this survey online indicates your consent for use of the answers you supply.

Page 1

Sleep hygiene survey

2. Demographic information and Sleep characteris...

What is your gender?

- Female
- Male

What is your age?

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 to 74
- 75 or older

Which of the following best describes your current relationship status?

- Married
- Widowed
- Divorced
- Separated
- In a domestic partnership or civil union
- Single, but cohabiting with a significant other
- Single, never married

What is your religion or spiritual belief?

What is your sexual preference?

What is the highest level of education you have completed?

Sleep hygiene survey

Are you White, Black or African-American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific islander, or hispanic?

- White
- Black or African-American
- American Indian or Alaskan Native
- Asian
- Native Hawaiian or other Pacific Islander
- Hispanic

Sleep hygiene survey

Which of the following best describes your current occupation?

- ○ Sales and Related Occupations
- ○ Transportation and Materials Moving Occupations
- ○ Life, Physical, and Social Science Occupations
- ○ Protective Service Occupations
- ○ Farming, Fishing, and Forestry Occupations
- ○ Construction and Extraction Occupations
- ○ Management Occupations
- ○ Building and Grounds Cleaning and Maintenance Occupations
- ○ Architecture and Engineering Occupations
- ○ Education, Training, and Library Occupations
- ○ Food Preparation and Serving Related Occupations
- ○ Installation, Maintenance, and Repair Occupations
- ○ Community and Social Service Occupations
- ○ Healthcare Practitioners and Technical Occupations
- ○ Business and Financial Operations Occupations
- ○ Home
- ○ Office and Administrative Support Occupations
- ○ Healthcare Support Occupations
- ○ Production Occupations
- ○ Personal Care and Service Occupations
- ○ Legal Occupations
- ○ Arts, Design, Entertainment, Sports, and Media Occupations
- ○ Computer and Mathematical Occupations
- ○ student

In which country were you born?

In what country do you currently reside?

- ○ United States
- ○ Other (please specify)

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Sleep hygiene survey

Do you have any chronic illness or mental disorder?

Other (please specify)

Please tell us in your own words, what does "sleep hygiene" mean?

During the past two weeks, at what time did you usually go to sleep at night?

During the past two weeks, at what time did you usually wake up?

During the past two weeks, what environmental factor impacted your sleeping?

Other (please specify)

During the past two weeks, did you wake up during the night?

During the past two weeks, how did you feel when you woke up?

During the past two weeks, did you take any medication or another product to sleep?

If yes, what medication or product did you take and in what quantity or dose?

During the past two weeks, approximately how often did you have dreams?

During the past two weeks, approximately how often did you have nightmares?

During the past two weeks, do you think that your dreams and/or nightmares affected your behavior (actions, emotions, thoughts) the next day?

If yes, was it because of a dream, a nightmare or both and how often (1, 2 or more times)?

Sleep hygiene survey

During the past two weeks, I had dreams/nightmares about...

Rank the order of the common content of your dreams/nightmares. I usually have dreams/nightmares about...

	Sexual content	N/A
	Violent content	N/A
	Frightening content	N/A
	Happy content	N/A
	Sad content	N/A

Sleep hygiene survey

3. Sleep hygiene questions

Evaluate the following statements, recalling as much as possible your sleep habits during the past two weeks

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
My days are always regular *Go to bed and get up more or less at the same time every day, even on weekends and days off.*	○	○	○	○	○
I always sleep when sleepy *Only try to sleep when you actually feel tired or sleepy, rather than spending too much time awake in bed.*	○	○	○	○	○
I get up & try again if I cannot sleep *If you haven't been able to get to sleep after about 20 minutes or more, get up and do something calming or boring until you feel sleepy, then return to bed and try again.*	○	○	○	○	○
I always avoid caffeine & nicotine *For at least 4-6 hours before going to bed.*	○	○	○	○	○
I always avoid alcohol *For at least 4-6 hours before going to bed.*	○	○	○	○	○
My bed is for sleeping *Try not to use your bed for anything other than sleeping and sex.*	○	○	○	○	○
I never take naps *If you can't make it through the day without a nap, make sure it is for less than an hour and before 3 pm.*	○	○	○	○	○
I have developed my own sleep rituals *15 minutes before bed each night, you can develop your own rituals of things to remind your body that it is time to sleep.*	○	○	○	○	○

Sleep hygiene survey

I always take a bath or shower before bed time *Having a hot bath (shower) 1-2 hours before bedtime.*	○	○	○	○	○
I do not engage in "clock-watching" *If you can't sleep do not watch the clock. Frequently checking the clock during the night can wake you up.*	○	○	○	○	○
I use a sleep diary *Make sure you have the right facts about your sleep, rather than making assumptions.*	○	○	○	○	○
I do not do strenuous exercise before bedtime *Try not to do strenuous exercise in the 4 hours before bedtime.*	○	○	○	○	○
I never eat a heavy meal before bedtime *It can be useful to have a light snack, but a heavy meal soon before bed can also interrupt sleep.*	○	○	○	○	○
I have the right bedroom *Bed and bedroom are quiet and comfortable for sleeping; control the light, noise and temperature.*	○	○	○	○	○
I always keep daytime routine the same *Even if you have a bad night sleep and are tired it is important that you try to keep your daytime activities the same as you had planned. Don't avoid activities because you feel tired.*	○	○	○	○	○

Encuesta de Higiene del sueño

Nuestro objetivo es evaluar el conocimiento actual y uso de las recomendaciones de higiene del sueño. Ningún dato solicitado en esta encuesta puede identificarlo. Por ejemplo, no requerimos su nombre o correo electrónico, tampoco se registra la direccion IP de su computadora o dispositivo. Toda la información es encriptada.

Gracias por participar en nuestra encuesta.

Si tiene alguna pregunta puede contactar a Ivan Noe Martinez-Salazar al correo electrónico ivannoe.martinezsalazar@wmich.edu

CONSENTIMIENTO ENCUESTA HIGIENE DEL SUEÑO (VERSION EN ESPAÑOL)

Usted ha sido invitado a participar en el proyecto de investigación titulado "Encuesta de Higiene del Sueño" diseñada para analizar las características del sueño en diferentes poblaciones. Este estudio esta siendo conducido por Wayne Fuqua, Ph.D. BCBA-D e Iván Noé Martínez Salazar pertenecientes a Western Michigan University, Departamento de Psicología. Esta investigación esta siendo conducida como parte de los requisitos de tesis de Iván Noé Martínez Salazar.

Esta encuesta contiene 38 preguntas de opción múltiple y de respuesta breve, tomará aproximadamente 3-5 minutos en completarla. Sus respuestas serán completamente anónimas, por lo que NO debe escribir su nombre en ninguna parte (por ejemplo, en las opciones de respuesta abierta). Usted puede elegir no contestar alguna pregunta o simplemente dejarla en blanco.

Si elige no participar en este encuesta, puede usted salir de ella simplemente cerrando su navegador. Al completar la encuesta usted indica su consentimiento para el uso de las respuestas que escriba. Si tiene alguna pregunta, usted puede contactar a Wayne Fuqua, Ph.D. BCBA-D al 269-387-4474, Iván Noé Martínez Salazar al 269-910-4514, al Consejo Institucional de Revisión de investigación en Sujetos humanos (Human Subjects Institutional Review Board) (269-387-8293) o al Vicepresidente de Investigación (269-387-8298).

Este consentimiento ha sido aprobado para su uso por un año por el Consejo Institucional de Revisión de investigación en Sujetos humanos (Human Subjects Institutional Review Board) el 29/10/2014. Por favor, no participe en este estudio después del 29/10/2015.

Al participar en esta encuesta en línea, usted indica que da su consentimiento para el uso de las respuestas que usted escriba.

Encuesta de Higiene del sueño

Información demográfica y características del...

Indique su sexo

- ○ Femenino
- ○ Masculino

¿Qué edad tiene?

¿Cuál es su estado civil actual?

- ○ Casado/a
- ○ Viudo/a
- ○ Divorciado/a
- ○ Separado/a
- ○ Soltero/a

¿Cuál es su nivel máximo de educación?

Raza

- ○ Blanco
- ○ Negro o Afro-americano
- ○ Indo Americano or Nativo de Alaska
- ○ Asiatico
- ○ Nativo de Hawai u otra isla del Pacífico
- ○ Hispano

¿Cúal es su religión o creencia espiritual?

¿Cuál es su preferencia sexual?

Encuesta de Higiene del sueño

¿Cual de las siguientes describe mejor su ocupación actualmente?

- ○ Construcción y extracción
- ○ Artes, diseño, entretenimiento, deportes y medios
- ○ Granja, pesca y ocupaciones forestales
- ○ Negocios y operaciones financieras
- ○ Oficina y apoyo administrativo
- ○ Gerencia
- ○ Hogar
- ○ Profesionales y técnicos de la salud
- ○ Ocupaciones legales
- ○ Cuidado personal
- ○ Servicios de protección
- ○ Arquitectura e ingeniería
- ○ Instalación, mantenimiento y reparación
- ○ Limpieza y manteniemiento de edificios y terrenos
- ○ Apoyo de la salud
- ○ Ventas y ocupaciones relacionadas
- ○ Vida, actividad física y ciencias sociales
- ○ Preparación de alimentos y servicios relacionados
- ○ Computación y matemáticas
- ○ Transporte y movimiento de materiales
- ○ Comunidad y servicio social
- ○ Educación, entrenamiento y biblioteca
- ○ Producción

País de nacimiento

País de residencia actual

Padece de alguna enfermédad física y/o mental

Otra (por favor, especifique)

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Encuesta de Higiene del sueño

Por favor, describa en sus propias palabras, ¿Qué significa Higiene del sueño?

Durante las últimas dos semanas, ¿a que hora usualmente se fue a dormir?

Durante las últimas dos semanas, ¿a que hora se desperto usualmente?

Durante las últimas dos semanas, ¿que factores ambientales impactaron su sueño?

Otras (por favor, especifique)

Durante las últimas dos semanas, ¿se despertó durante la noche?

Durante las últimas dos semanas, ¿cómo se sintió cuando se despertó?

Durante las últimas dos semanas, ¿Tomó algún medicamento o producto para dormir?

Si tómo algo, ¿qué medicamento o producto? y ¿en que cantidad o dosis?

Durante las pasadas dos semanas, aproximadamente, ¿Qué tan frecuente tuvo sueños?

Durante las pasadas dos semanas, aproximadamente, ¿Qué tan frecuente tuvo pesadillas?

Durante las últimas dos semanas, ¿Usted piensa que sus sueños y/o pesadillas afectaron el día posterior?

Si lo afectaron, ¿fue por un sueño, una pesadilla, ambos? y ¿qué tan frecuente (1, 2 o más veces)?

Durante las pasadas dos semanas, Yo tuve sueños/ pesadillas acerca de...

Encuesta de Higiene del sueño

Durante las últimas dos semanas, clasifique el orden del contenido común de sus sueños/pesadillas y/o seleccione la opción N/A (No Aplica) según corresponda. Yo usualmente tengo sueños/pesadillas acerca de...

	Contenido Sexual	N/A
	Contenido Violento	N/A
	Contenido amenazante	N/A
	Contenido feliz	N/A
	Contenido triste	N/A

Encuesta de Higiene del sueño

Preguntas sobre Higiene del sueño

Evalúe los siguientes enunciados recordando tanto como sea posible, sus hábitos de sueño durante las últimas dos semanas.

	Fuertemente en desacuerdo	Desacuerdo	Ni en desacuerdo, ni de acuerdo	Acuerdo	Fuertemente de acuerdo
Mis días son siempre regulares *Ir a la cama y levantarse más o menos a la misma hora todos los días, incluso en fines de semana y en días libres.*	○	○	○	○	○
Siempre duermo cuando tengo sueño *Tratar de dormir solo cuando en realidad se sienta cansado o con sueño, en lugar de pasar mucho tiempo en la cama.*	○	○	○	○	○
Yo me levanto & vuelvo a intentar si no puedo dormir *Si usted no ha sido capaz de dormir después de 20 minutos o más, se levanta y hace algo relajante o aburrido hasta que se sienta con sueño, entonces regresa a la cama y vuelve a intentar.*	○	○	○	○	○
Siempre evito cafeína & nicotina *Por lo menos 4-6 horas antes de irse a dormir.*	○	○	○	○	○
Siempre evito el alcohol *Por lo menos 4 – 6 horas antes de irse a dormir.*	○	○	○	○	○
Mi cama es para dormir *Trata de no usar su cama para nada mas que dormir y tener relaciones sexuales.*	○	○	○	○	○
Nunca tomo siestas Si no puede lograr su día sin una siesta, se asegura de que sea menor a una hora y antes de las 3 pm.	○	○	○	○	○
He desarrollado mis propios rituales para dormir	○	○	○	○	○

Encuesta de Higiene del sueño

15 minutos antes de irse a dormir cada noche, usted puede desarrollar sus propios rituales de hacer actividades para recordarle a su cuerpo que es hora de dormir.					
Siempre tomo una baño de tina o una ducha antes de ir a dormir *Tomar una ducha o baño de tina caliente, 1-2 horas antes de irse a dormir.*	○	○	○	○	○
No acostumbro observar el reloj Si usted no puede dormir, no observe el reloj. Checar frecuentemente el reloj puede despertarlo aún más.	○	○	○	○	○
Utilizo un diario de sueño *Se asegura de que tiene los datos correctos acerca de sus hábitos de sueño, en lugar de hacer supuestos.*	○	○	○	○	○
No realizo ejercicio extenuante antes de dormir Trata de no hace ejercicio en exceso en las 4 horas antes de irse a dormir.	○	○	○	○	○
Nunca como demasiado antes de dormir Puede ser útil comer un alimento ligero, pero una comida pesada cerca de la hora de acostarse puede interrumpir su sueño.	○	○	○	○	○
Tengo una habitación adecuada para dormir La cama y su habitación son tranquilas y confortables; tiene control sobre la luz, el ruido, la temperatura.	○	○	○	○	○
Siempre mantengo mi rutina diaria sin cambios Incluso si ha tenido una mala noche de sueño y se siente cansado, es importante que intente mantener sus actividades diarias sin cambios tal y	○	○	○	○	○

como lo tiene planeado.

D. Tables and figures

Table 10. Affected by dreams & Nightmares next day plus other factors

Questions & options		Total (*n = 42)* (21.54 %) *	English *(n = 28)*	Spanish *(n = 14)*
Chronic Illness	Yes	26.19 % (11)	25.00 % (7)	28.57 % (4)
	No	73.80 % (31)	75.00 % (21)	71.43 % (10)
Environmental factors	Temperature	26.19 % (11)	17.86 % (5)	42.86 % (6)
	Noise	26.19 % (11)	25.00 % (7)	28.57 % (4)
	Light	9.52 % (4)	7. 14 % (2)	14.29 % (2)
	Pet	9.52 % (4)	14.29 % (4)	0.00 % (0)
	Different Person	9.52 % (4)	10.71 % (3)	7.14 % (1)
	"Stress"	11.90 % (5)	14.29 % (4)	7.14 % (1)
	Combination of factors	7.14 % (3)	10.71 % (3)	0.00 % (0)
Rank of content 1st place only	Sexual	23.81 % (10)	17.86 % (5)	35.71 % (5)
	Violent	16.67 % (7)	10.71 % (3)	28.57 % (4)
	Frightening	14.29 % (6)	21.42 % (6)	0.00 % (0)
	Happy	33.33 % (14)	35.71 % (10)	28.57 % (4)
	Sad	11.90 % (5)	14.29 % (4)	7.14 % (1)
Feeling when waking up	Fatigued	73.80 % (31)	82.14 % (23)	57.14 % (8)
	Rested	26.19 % (11)	17.86 % (5)	42.86 % (6)

***** *Note.* From the total population (N = 204), 9 people skipped the question about affectation by dreams & nightmares the next day, then, the total number of people affected was 42 (21.54%) out of 195.

Table 11

Sociodemographic characteristics – Occupation

Occupation	***N = 199***	**English *(n = 99)***	**Spanish *(n = 100)***
Management	2.01 % (4)	1.01 % (1)	3.00 % (3)
Business and financial operations	1.51 % (3)	1.01 % (1)	2.00 % (2)
Life, physical and social science	3.02 % (6)	3.03 % (3)	3.00 % (3)
Architecture & engineering	0.50 % (1)	0.00 % (0)	1.00 % (1)
Computer and Mathematical	1.51 % (3)	0.00 % (0)	3.00 % (3)
Community and social service	2.51 % (5)	3.03 % (3)	2.00 % (2)
Education, training and library	6.03 % (12)	12.12 % (12)	0.00 % (0)
Legal	0.50 % (1)	0.00 % (0)	1.00 % (1)
Arts, design, entertainment, sports, and media	5.53 % (11)	2.02 % (2)	9.00 % (9)
Health care practitioners & Technical	15.07 % (30)	3.03 % (3)	27.00 % (27)
Health care support	8.54 % (17)	6.06 % (6)	11.00 % (11)
Protective service	0.50 % (1)	0.00 % (0)	1.00 % (1)
Food preparation and service related	2.51 % (5)	4.04 % (4)	1.00 % (1)

Continuation Table 11

Sales and related	6.03 % (12)	5.05 % (5)	7.00 % (7)
Office and administrative support	4.02 % (8)	4.04 % (4)	4.00 % (4)
Production	1.51 % (3)	2.02 % (2)	1.00 % (1)
Farming, fishing and forestry	0.50 % (1)	0.00 % (0)	1.00 % (1)
Installation maintenance & repair	0.50 % (1)	0.00 % (0)	1.00 % (1)
Construction and extraction	0.50 % (1)	0.00 % (0)	1.00 % (1)
Home	3.01 % (6)	3.03 % (3)	3.00 % (3)
Students	34.17 % (68)	50.51 % (50)	18.00 % (18)
Total	100 % (199) *Skipped 5*	100 % (99) *Skipped 2*	100 % (100) *Skipped 3*

Table 12

Sociodemographic characteristics – Relationship status

Relationship Status	***N = 200***	**English** ***(n = 99)***	**Spanish** ***(n = 101)***
Married or living w/significant other	43.5 % (87)	42.42% (42)	44.55 % (45)
Single	53 % (106)	57.58 % (57)	48.51 % (49)
Divorced or separated	3 % (6)	0.00 % (0)	5.94 % (6)
Widowed	0.5 % (1)	0.00 % (0)	0.99 % (1)
Total	(200) *Skipped 4*	100 % (99) *Skipped 2*	100 % (101) *Skipped 2*

Table 13

Sociodemographic characteristics – Religion

Religion	***N = 191***	**English** ***(n = 95)***	**Spanish** ***(n = 96)***
Catholic	35.07 % (67)	16.84 % (16)	53.12 % (51)
Christian	19.89 % (38)	33.68 % (32)	6.25 % (6)
Muslim	4.18 % (8)	8.42 % (8)	0.00 % (0)
Atheist	6.81 % (13)	10.53 % (10)	3.13 % (3)
Jewish	1.57 % (3)	2.11 % (2)	1.04 % (1)
Native American	0.52 % (1)	1.05 % (1)	0.00 % (1)
None	17.30 % (33)	12.63 % (12)	21.88 % (21)
Good not the church	6.81 % (13)	6.32 % (6)	7.30 % (7)
Agnostic	3.14 % (6)	5.26 % (5)	1.04 % (1)
Buddhist	2.62 % (5)	3.16 % (3)	2.08 % (2)
Free thinker	1.05 % (2)	0.00 % (0)	2.08 % (2)
Polytheist	0.52 % (1)	0.00 % (0)	1.04 % (1)
Humanist	0.52 % (1)	0.00 % (0)	1.04 % (1)
Total	100 % (191) *Skipped 13*	100 % (95) *Skipped 6*	100 % *(96)* *Skipped 7*

Table 14

Sociodemographic characteristics – Country of Origin

Country of origin	***N = 199***	**English** ***(n = 99)***	**Spanish** ***(n = 100)***
USA	40.20 % (80)	80.81 % (80)	0.00 % (0)
Mexico	49.75 % (99)	0.00 % (0)	99.00 % (99)
Other [Bulgaria, Namibia, Afghanistan, Burma, Canada (3), Kazakhstan, Saudi Arabia (6), Dominican Republic (2), Egypt, Malaysia, Panama]	10.05 % (20)	19.19 % (19)	1.00 % (1)
Total	100 % (199) *Skipped (5)*	100 % (99) *Skipped 2*	100 % (100) *Skipped 3*

Table 15

Sociodemographic characteristics – Country of Residency

Country of Residency	***N = 198***	**English** ***(n = 99)***	**Spanish** ***(n = 99)***
USA	55.56 % (110)	96.97 % (96)	14.14 % (14)
Mexico	41.92 % (83)	0.00 % (0)	83.84 % (83)
Other [Canada, Saudi Arabia (2), Brazil, Holland]	2.52 % (5)	3.03 % (3)	2.02 % (2)
Total	100 % (198) *Skipped 6*	100 % (99) *Skipped 2*	100 % (99) *Skipped 4*

Table 16

Chronic illness

Chronic illness	*N = 187*	English *(n = 92)*	Spanish *(n = 95)*
Diabetes	2.67 % (5)	0.00 % (0)	5.26 % (5)
Cardiovascular	1.07 % (2)	0.00 % (0)	2.10 % (2)
Obesity	5.35 % (10)	6.52 % (6)	4.21 % (4)
Depression	6.42 % (12)	10.87 % (10)	2.11 % (2)
Anxiety	6.95 % (13)	6.52 % (6)	7.37 % (7)
I don't know	6.42 % (12)	5.43 % (5)	7.37 % (7)
None	71.12 % (133)	70.65 % (65)	71.58 % (68)
Total	100 % (187) *Skipped 17*	100 % (92) *Skipped 9*	100 % (95) *Skipped 8*

Table 17

Sleep characteristics – Sleep hygiene definition

Sleep Hygiene Definition	*N = 185*	English *(n = 89)*	Spanish *(n = 96)*
Good definition or close one.	70.81 % (131)	79.78 % (71)	62.50 % (60)
Incorrect definition	29.19 % (54)	20.22 % (18)	37.5 % (36)
Total	100 % (185) *Skipped 19*	100 % (89) *Skipped 12*	100 % (96) *Skipped 7*

Table 18

Sleep characteristics – Environmental factors impacting sleep

Environmental factor	*N = 178*	English *(n = 88)*	Spanish *(n = 90)*
Temperature	32.58 % (58)	30.68 % (27)	34.44 % (31)
Light	10.67 % (19)	6.82 % (6)	14.44 % (13)
Noise	21.91 % (39)	19.32 % (17)	24.44 % (22)
Pet	6.18 % (11)	4.55 % (4)	7.78 % (7)
Different person	16.29 % (29)	13.64 % (12)	18.89 % (17)
All the above or a combination of those	12.36 % (22)	25.00 % (22)	* Not asked
Total	100 % (178) *Skipped 26*	100 % (88) *Skipped 13*	100 % (90) *Skipped 13*

Table 19

Sleep characteristics – Wake up at night

Wake up at night	*N = 199*	English *(n = 99)*	Spanish *(n = 100)*
No	39.20 % (78)	30.30 % (30)	48.00 % (48)
More than 1 time per night & more than 2 nights	60.80 % (121)	69.70 % (69)	52.00 % (52)
Total	100 % (199) *Skipped 5*	100 % (99) *Skipped 2*	100 % (100) *Skipped 3*

Table 20

Sleep characteristics – How did you feel when you wake up?

Feeling	*N = 194*	English *(n = 98)*	Spanish *(n = 96)*
Fatigued	37.63 % (73)	33.67 % (33)	41.67 % (40)
Rested	62.37 % (121)	66.33 % (65)	58.33 % (56)
Total	100 % (194) *Skipped 10*	100 % (98) *Skipped 3*	100 % (96) *Skipped 7*

Table 21

Sleep characteristics – Medication

Medication	*N = 197*	English *(n = 98)*	Spanish *(n = 99)*
No	91.88 % (181)	90.82 % (89)	92.93 % (92)
Yes	8.12 % (16)	9.18 % (9)	7.07 % (7)
Total	100 % (197) *Skipped 7*	100 % (98) *Skipped 3*	100 % (99) *Skipped 4*

Table 22

Sleep characteristics – Frequency of Dreams

Frequency	*N = 200*	English *(n = 99)*	Spanish *(n = 101)*
1 – 2 times/week	41 % (82)	42.42 % (42)	39.60 % (40)
3 – 4 times/week	23 % (46)	23.23 % (23)	27.77 % (23)
Every day	23 % (46)	23.23 % (23)	27.77 % (23)
I didn't have dreams	13 % (26)	11.11 % (11)	14.85 % (15)
Total	100 % (200) *Skipped 4*	100 % (99) *Skipped 2*	100 % (101) *Skipped 2*

Table 23

Sleep characteristics – Frequency of nightmares

Frequency of nightmares	*N = 197*	English *(n = 98)*	Spanish *(n = 99)*
1 – 2 times/week	34.52 % (68)	37.76 % (37)	31.31 % (31)
3 – 4 times/week	4.06 % (8)	7.14 % (7)	1.01 % (1)
Every day	0.51 % (1)	1.02 % (1)	0.00 % (0)
I didn't have Nightmares	60.91 % (120)	54.08 % (53)	67.68 % (67)
Total	100 % (197) *Skipped 7*	100 % (98) *Skipped 3*	100 % (99) *Skipped 4*

Table 24

Sleep characteristics – Dreams & Nightmares affected next day

Answer	*N = 195*	English *(n = 98)*	Spanish *(n = 97)*
Yes	21.54 % (42)	28.57 % (28)	14.43 % (14)
No	78.46 % (153)	71.43 % (70)	85.57 % (83)
Total	100 % (195) *Skipped 9*	100 % (98) *Skipped 3*	100 % (97) *Skipped 6*

Table 25

Sleep characteristics – Dreams & Nightmares content

Content	*N = 185*	English *(n = 99)*	Spanish *(n = 86)*
Real people, things and events	37.84 % (70)	38.38 % (38)	37.21 % (32)
Not real people, things and events	6.49 % (12)	2.02 % (2)	11.63 % (10)
Both, real & not real people, things and events	36.75 % (68)	39.39 % (39)	33.72 % (29)
N/A	18.92 % (35)	20.20 % (20)	17.44 % (15)
Total	100 % (185) *Skipped 19*	100 % (99) *Skipped 2*	100 % (86) *Skipped 17*

Table 26

Sleep characteristics – Rank order of content (Average of points)

Content	*N = 192*	English *(n = 96)*	Spanish *(n = 96)*
Happy content (1st)	3.98 pts.	3.94 pts.	4.01 pts.
Sexual content (2nd)	3.53 pts.	3.30 pts.	3.76 pts.
Frightening content (3rd)	3.14 pts.	2.91 pts.	3.36 pts.
Sad content (4th)	3.06 pts.	2.96 pts.	3.16 pts.
Violent content (5th)	2.75 pts.	2.65 pts.	2.84 pts.
Total	100 % (192) *Skipped 12*	100 % (96) *Skipped 5*	100 % (96) *Skipped 7*

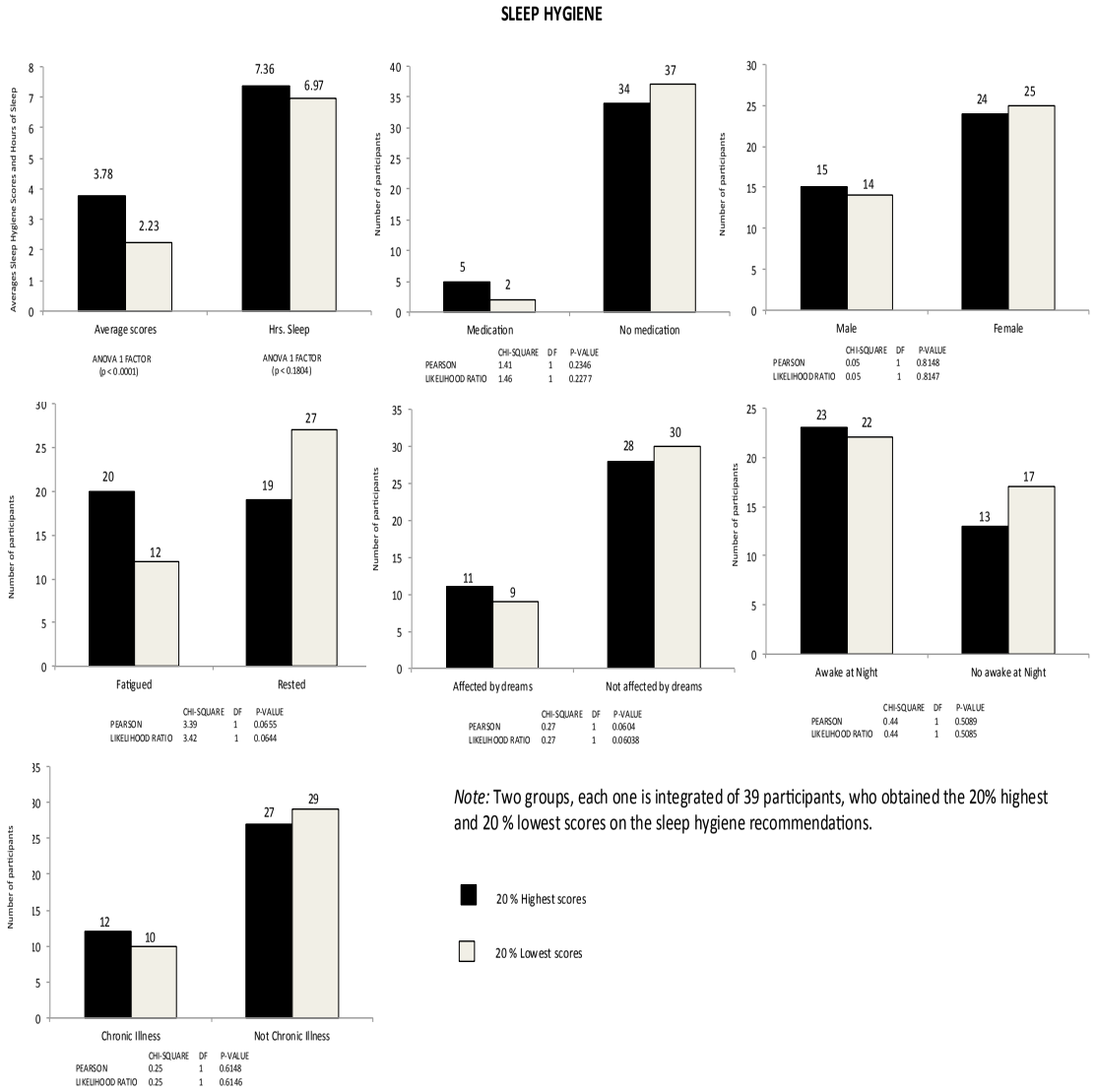

Figure 18. Sleep Hygiene Statistical Analysis

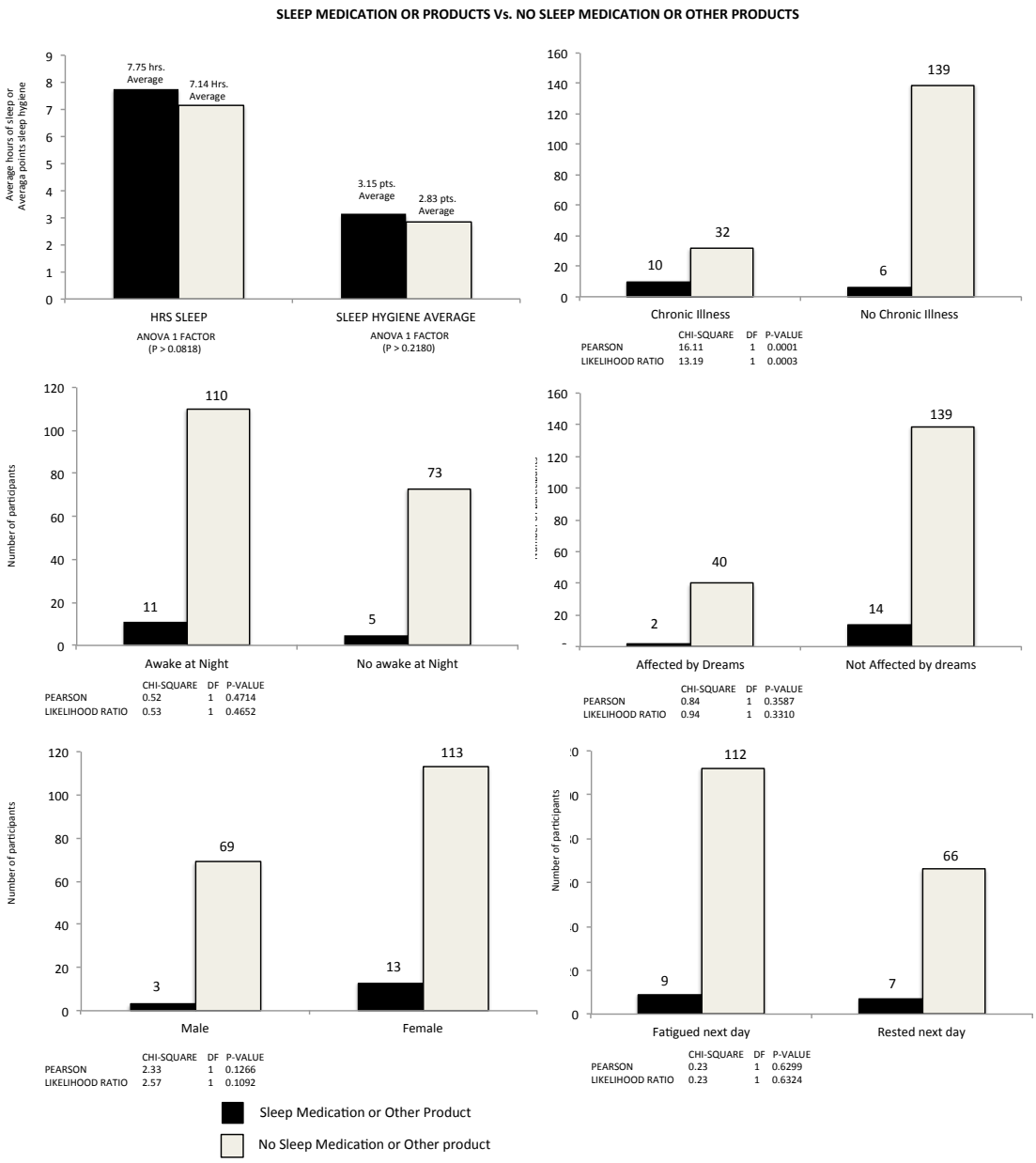

Figure 19. Sleep Medication or Other Products Statistical Analysis

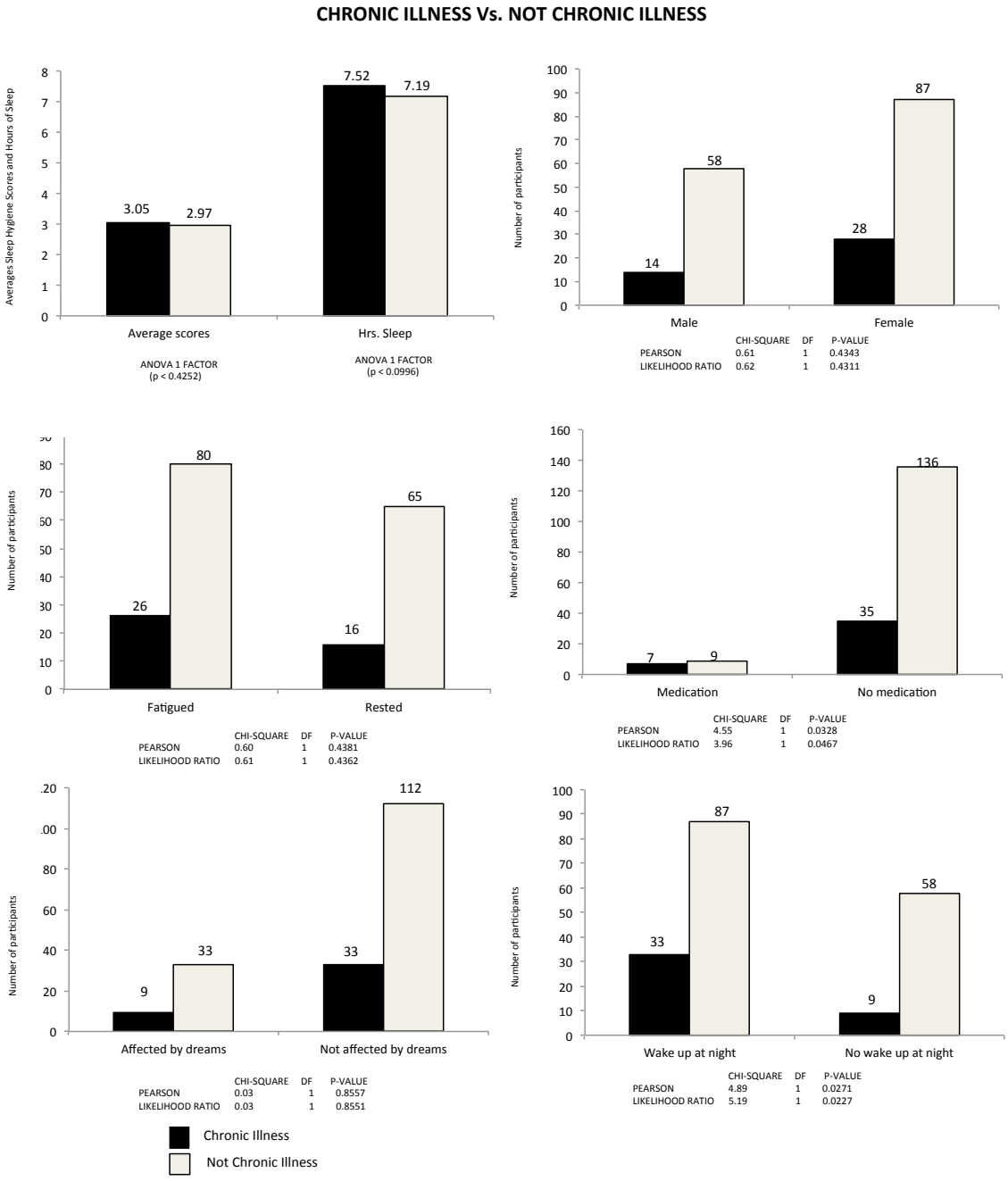

Figure 20. Chronic Illness Statistical Analysis

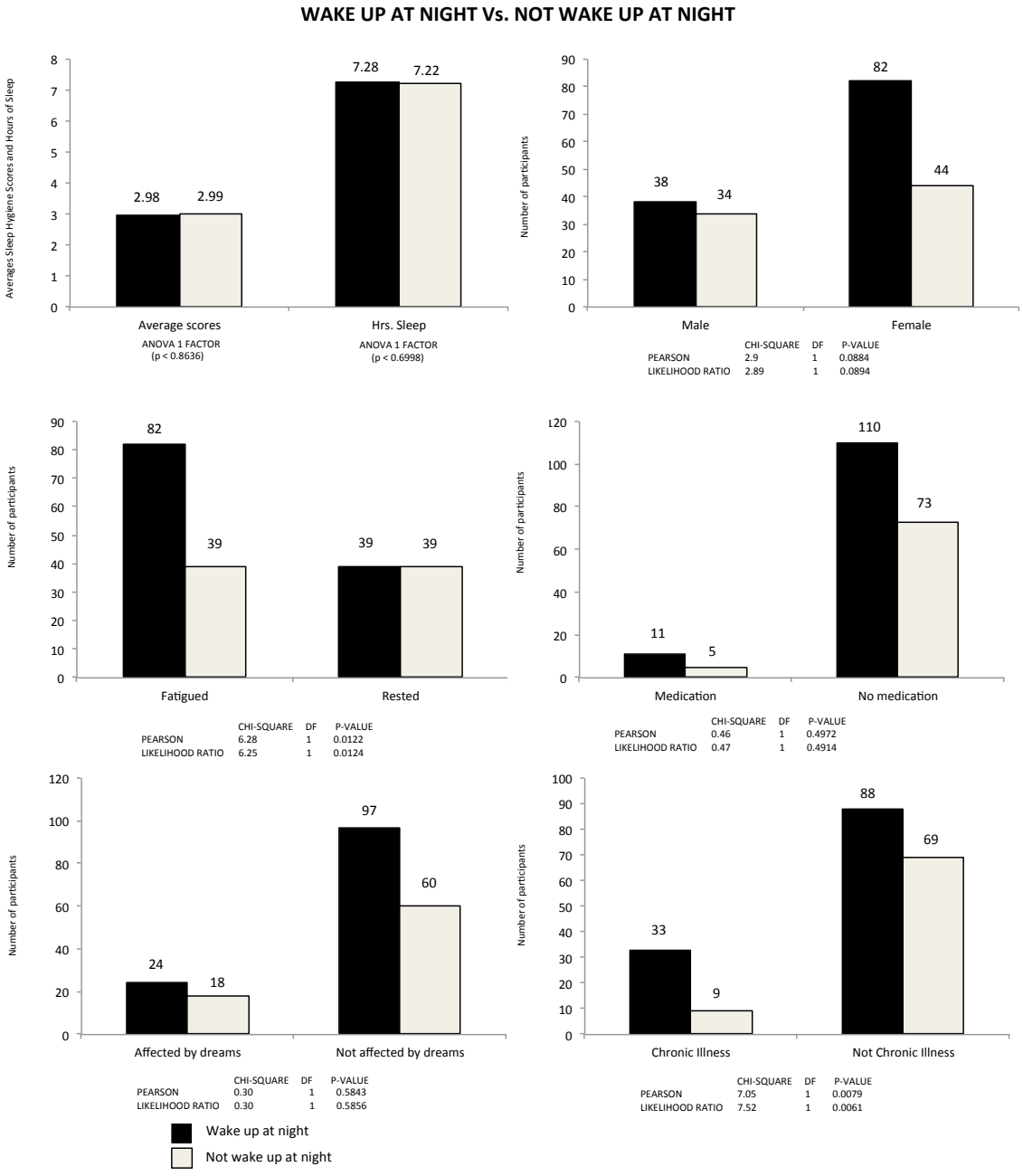

Figure 21. Wake Up at Night Statistical Analysis

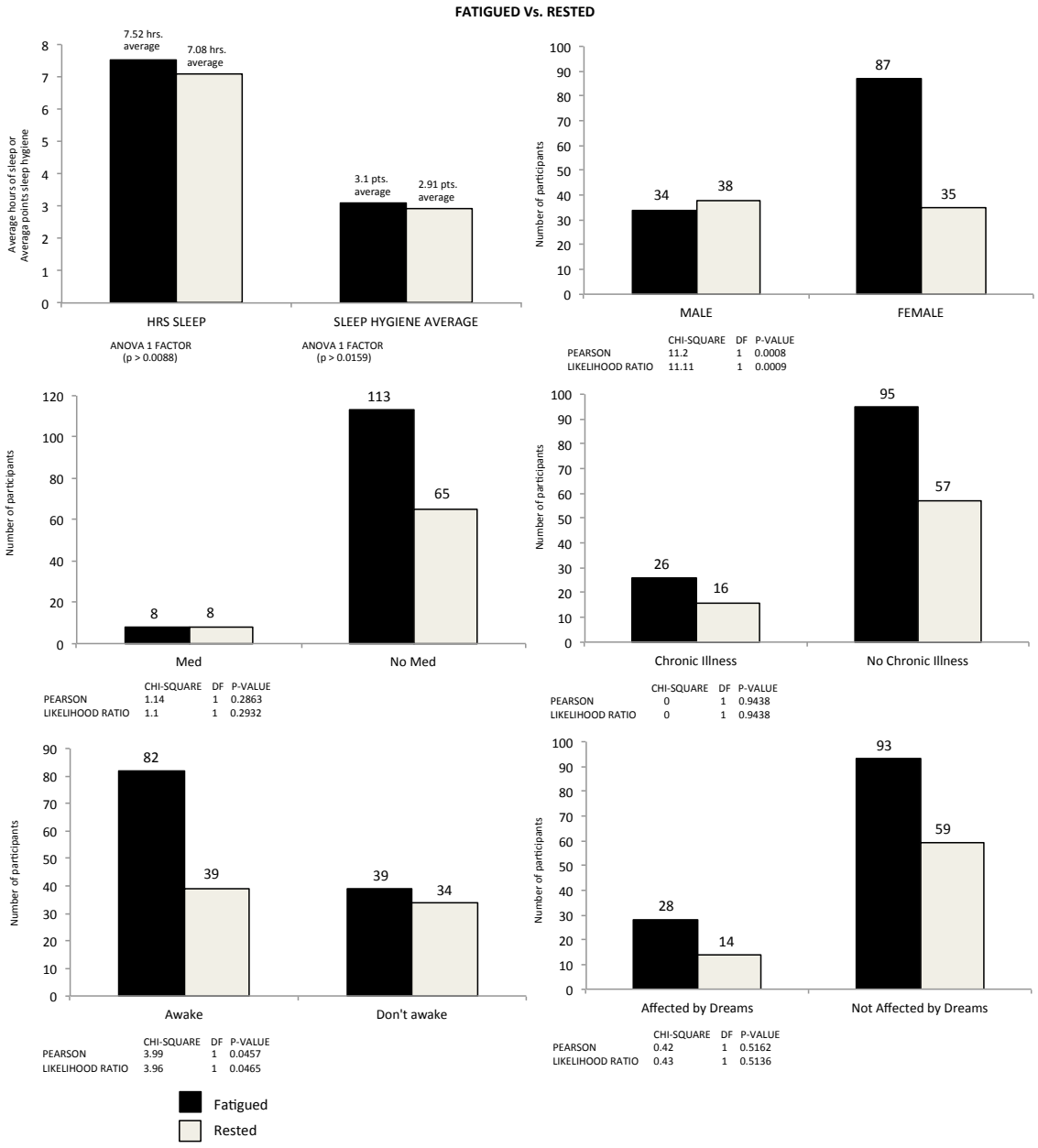

Figure 22. Fatigued Statistical Analysis

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