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Subjective Sleep Quality of Isolated Sleep Paralysis: Fear Parameters and Psychosocial Correlates

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Walden University
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Abstract

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MS, Walden University, 2006

BA, City College, CUNY, 1979

Dissertation Submitted in Partial Fulfillment

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Abstract

The bidirectional link between insufficient sleep and the distress related to a parasomnia known as isolated sleep paralysis (ISP) might lead to chronic health effects. The impact of fear-ridden hallucinations related to this REM sleep disorder can be both distressful and embarrassing for individuals often resulting in a reticence to seek help. This quantitative study was guided by a biopsychosocial approach with an integrated theoretical framework. One aim of the study was to determine if fear parameters of ISP (low and high) differ when considering psychosocial factors and sleep quality, based on the Dysfunctional Beliefs and Attitudes About Sleep Scale, the Social Phobia Inventory, the Locus of Control (LOC) subscales, and the Pittsburg Sleep Quality Inventory. Predictive associations between psychosocial factors and subjective sleep quality (SSQ) were also investigated. Retrospective online data from a sample of 159 participants ages 18 and over were analyzed via MANOVA, multiple regression, and independent samples t-tests. Findings from the MANOVA were significant and showed that participants who experience ISP with more fear scored higher on two measures, external other LOC and social phobia. The MANOVA regarding differences in SSQ in relation to psychosocial variables were not significant, and independent sample t-tests did not differentiate fear parameters for DBAS and SSQ (poor sleep was found for both parameters). Providers of therapeutic treatments should take factors of social phobia and external other LOC into account with regards to poor sleep quality for those distressed by ISP. Sleep quality assessments might benefit those who are afraid to disclose about ISP sleep distress, as long term poor sleep can place some at risk for negative health outcomes.

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Dedication

To my dear children, my wonderful gifts of Light, Kaisim, Sunczerae, Yoshua, and Mishael, you are all such a tremendous blessing to me, please know that the energy of this effort belongs to you and it is infused with all my love! And to all my grandchildren, never forget that you can accomplish whatever you set your mind to do. I am very grateful to all my family members in the higher realms my mom and dad, my soulmate Sel, and more recently my loving sister, who never failed to remind me to "get it done". To my dear siblings and spiritual sister, many thanks for rooting from the sidelines, and don't forget it's never ever too late. Last but not least a great big Meow of love to my loving feline family, especially my 18- year old papoose!

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And many thanks to my loving parents who instilled in me from a very early age the spirit of achievement. Much gratitude to all my wonderful adult children for their love, support, and their understanding of the time and effort it takes to bring a vision of heart to fruition.

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Chapter 1: Introduction to the Study

Introduction

Poor sleep quality is a substantive primary care issue with repercussions for adverse health (Epstein & Mardon, 2007); insufficient sleep in the United States increased from 1985 to 2012 from 38.6 to 70.1 million (Ford, Cunningham, & Croft, 2015). Untreated chronic sleep loss can place some at greater risk for the development of chronic diseases such as obesity, high blood pressure, heart disease, and diabetes (Center of Disease Control and Prevention, 2011; Liu et al., 2013). According to experts, improvements in professional training in sleep related medicine for physicians are needed. As such, sleep medicine as an important component of medical school education continues to remain underrepresented worldwide (Ioachimescu et al., 2014; Mindell et al., 2011). For example, out of a four-year medical student's curriculum less than two hours are required for education on sleep disorders (Division of Sleep Medicine-Harvard Medical School, 2017).

One specific sleep disorder warranting more attention in the domain of sleep medicine is sleep paralysis (SP), due to the increased potential for sleep deprivation and subsequent poor health (Lauderdale, Knutson, Yan Liu, & Rathouz, 2008). Sleep paralysis disorders (SPD) or sleep paralysis, in general, involves sleep interruption from the intrusion of dream state immobility or paralysis (also referred to as muscle atonia), which is often accompanied by fearful hallucinations, either during awakening (i.e., hypnopompic) or before falling asleep (i.e., hypnogogically; Cheyne, Newby-Clarke, & Rueffer, 1999). The isolated form of sleep paralysis (ISP), which is experienced in isolation from other disorders (Sharpless & Doghramji, 2015), can also be experienced without the distress

associated with fear (Cheyne, 2001; Denis & Poerio, 2016). Notably, experiencing paralysis or muscle atonia while awake, in the absence of hallucinations can progress to the point of meeting diagnostic criteria (American Association of Sleep Medicine [AASM], 2014). Accordingly, it would be reasonable to examine the subjective sleep quality for a population with ISP.

There is an additional concern that the fearful hallucinations associated with sleep paralysis might have a psychological impact upon individuals, causing some to become reticent about discussing this sleep disorder with health care professionals (Cheyne & Pennycook, 2013; Yeung, Xu, & Chang, 2005). Notably, Stores (1998, 2007) found that sleep paralysis was associated with psychosis and other psychiatric disorders such as schizophrenia. Consequently, reluctance to disclose their condition has led some individuals to use the Internet to gain health information or access SPD forums for support (Weisgerber, 2004). Oftentimes, though, online professional sleep paralysis support organizations have assured individuals of the harmlessness of this sleep disorder (e.g., American Sleep Apnea Association, 2018; American Academy of Sleep Medicine [AASM], 2014, 2018); the health risks of possible sleep insufficiency also need to be addressed (Liu et al., 2013).

Some clinicians and researchers have considered the parasomnia of sleep paralysis to be harmless as it occurs (Avidan & Kaplish, 2010; Solomonova et al., 2008). However, the impact upon sleep quality from the possible negative effects of associated fear has not been given much consideration, potentially minimizing the importance of referrals for sleep studies or treatment (Chokroverty, 2008; Galbiati, Rinaldi, Giora, Ferini-Strambi, &

Marelli, 2015). Thus, one purpose of this study was to examine the impact of fear associated with ISP and the possibility of adverse impact on sleep quality, which can ultimately result in long-term health effects such as obesity, high blood pressure, heart disease, stroke, and diabetes (Chokroverty, 2008; Epstein & Mardon, 2007; Liu et al., 2013). Although SP is no longer considered a symptom necessary for narcolepsy diagnosis (American Psychiatric Association [APA], 2013), the potential of any sleep disorder to affect sleep quality should not be undermined (Chokroverty, 2008).

Underestimating the potential urgency of sleep paralysis may be even more concerning given that similarities to seizure disorder have been found (Galimberti, Ossola, Colnaghi, & Arbasino, 2009) and associations made with sudden unexpected nocturnal death syndrome (SUNDS; Adler, 2011). In this regard, it may be necessary to exercise a more comprehensive assessment of this sleep disorder for those who experience it, before researchers and health care professionals associate harmlessness with ISP (Hsieh, Lai, Liu, Lan, & Hsu, 2010; McCarty & Chesson, 2009; AASM, 2014, 2018). As such, the primary purpose of this research was to examine the impact of fear associated with ISP based on subjective measures of sleep quality especially as it relates to the possibility of significant sleep disruption. Second, this study which is the first to my knowledge, included an examination of the potential differentiation of fear by psychosocial factors (i.e., LOC, social phobia, and DBAS), with close associations with aspects of ISP (Arikawa, Templer, Brown, Cannon & Thomas-Dodson, 1999; Solomonova et al., 2008). I also sought to identify any moderating effects of such factors on self-reported sleep quality (good or poor sleep).

The implications for positive social change garnered from the study might serve to encourage individuals who suffer from ISP to proactively discuss any sleep disturbance concerns with their health care providers. In addition, internet medical support groups should reference health risks associated with long term sleep loss while assuring harmfulness of sleep paralysis (American Academy of Sleep Medicine, 2016; QualityHealth, 2016). In this respect, it would be beneficial to encourage health care professionals and Internet medical support groups to have a more holistic approach concerning sleep paralysis and possible negative impact on sleep quality and subsequent health (AASM, 2018). The results from this research study are intended to highlight the need for sleep assessments to be included in routine medical examinations, which may encourage better patient-physician dialogue on the topic of ISP. Ioachimescu et al. (2014) asserted the need to improve curriculum to address sleep impairments in U.S. medical schools. Moreover, the information gained might inform therapeutic interventions to help mitigate any adverse effects upon sleep quality associated with ISP.

The chapter begins with the background to the study. This review is followed by the problem statement, the statement of purpose, the research questions and hypotheses, the theoretical foundation, the nature of the study, and definitions of key terms. Also included are a discussion of the assumptions, scope and delimitations, limitations, and significance of the study. The last section includes a summary of key points.

Background of the Study

There has been a paucity of research with regards to examining fear associated with ISP in relation to subjective sleep quality and even less in conjunction with the several

psychosocial variables as represented with the preset study. Past research closely related to the topic has been conducted with insomnia (Harvey, Stinson, Whitaker, Moskovitz, & Virk, 2008; Woosley, Lichstein, Taylor, Riedel, & Bush, 2012), insomnia with dysfunctional beliefs (Okajima, Nakajima, Ochi, & Inoue, 2014), as well as insomnia with nightmare disorders (Semiz, Basoqlu, Ebrinc, & Cetin, 2008). More specific to the present research, Hsieh et al. (2010) highlighted the importance of applying a subjective measure for sleep quality research specific to ISP compared to the use of objective measures such as polysomnographs (PSG). Such an approach is necessary for a more effective detection of aspects of sleep quality when considering the nuances of this specific population. Hsieh et al.'s (2010) study involved the investigation of the relationship between individuals with sleep apnea with and without ISP; the results indicated distinctions on subjective measures of sleep quality but not on the objective measures.

At the inception of the present study, supporting research literature to measure subjective sleep quality in association with ISP was scant. Yet, more recently other researchers (one of whom is referenced in this study as a personal communication), have conducted research to measure the subjective sleep quality of those who experienced sleep paralysis with and without lucid dreaming (Denis, 2018; Denis & Poerio, 2016; Denis, French, Schneider & Gregory, 2017). In similar research studies, associations were found between other parasomnias such as nightmare frequency and sleep paralysis (Munezawa et al., 2011). Nightmare frequency has been significantly associated with subjective sleep quality (Lancee, Spoormaker, & Van Den Bout, 2010) as well as with ISP occurrence (Liskova, Janeckova, Kluzova-Kracmarova, Mlada, & Buskova, 2016). In addition, other

researchers found that participants diagnosed with frequent nightmares showed worse sleep quality compared to normal controls based on subjective measures while no distinctions were found with objective measures (Paul, Schredl, & Alpers, 2015).

On the other hand, other past research essential for the present study regarding ISP and subjective sleep quality, involved more physiological approaches via the use of a sleep interruption technique found to elicit sleep paralysis (SP) episodes (Takeuchi, Murphy, & Fukuda, 1992). As such, a bidirectional association of the effects of SP on the dynamics of sleep was known to trigger more episodes. This undergirds the importance of assessing the subjective sleep quality for individuals who experience the more distressful type of ISP based on parameters of fear.

With the present study I used a retrospective measure of sleep quality to examine the subjective nuances of individual ISP sleep experiences, which might not be identified otherwise. For example, the results from a self-report case study involving fear associated ISP substantiated the general assumption that disrupted sleep implied subsequent poor sleep quality, (McCarty & Chesson, 2009). On the contrary, other researchers found that decreased sleep from insomnia based on results of a PSG was not indicative of nonrestorative sleep (Ohayon & Roth, 2001). One explanation for the latter study results might be due to the association of insomnia with sleep-state perception (Mendelson, 1987), where symptoms are exaggerated even though sleep is considered relatively normal according to objective measures. Other researchers employed both retrospective and objective measures jointly (Mendelson, 1987) as a balanced approach, while Morin and Espie (2003) have prioritized the use of subjective measures for insomnia to determine

sleep quality. Unfortunately, an insufficient amount of research has been conducted to reference fear related ISP that might distinguish the subjective measures of sleep quality.

Subjectively measuring sleep quality also presents the opportunity to consider psychological variables such as DBAS pertinent to the present research, which is immeasurable by PSG. For example, having DBAS via supernatural beliefs concerning ISP was associated with increased post-episode distress (Cheyne & Pennycook, 2013). As such, a cognitive model to address the dysfunctional perceptions involving sleep paralysis might be applied to the present study as in studies regarding associations between subjective illness beliefs and sleep paralysis (Yeung et al. 2010) as well as maladaptive beliefs and insomnia (Bluestein, Rutledge, & Healey, 2010).

Other researchers have found a correlation between the psychosocial factor of social anxiety (Solomonova et al., 2008) and ISP. This substantiates the inclusion of social phobia in the study, associated with the fear of being closely scrutinized, which is a characteristic of the intruder aspect of ISP (Sharpless et al., 2015). Likewise, external locus of control (LOC) has been associated with unpredictability and the feeling of powerlessness (Arikawa, Templer, Brown, Cannon, & Thomas-Dodson, 1999; Rotter, 1990), characteristic of the incubus aspect of ISP (Cheyne, 2001). In this regard, the psychological effect of unpredictability of ISP events as seen with LOC might have an impact on sleep quality. In conjunction with the unpredictability of a fearfully experienced event occurring, there may be a concern about pre-sleep cognitions or dysfunctional beliefs possibly affecting assessment of sleep quality (Carney et al., 2010).

With quality of sleep directly related to sleep continuity (Akerstedt, Hume, Minors, & Waterhouse, 1994) and sleep fragmentation (Pittsburg Sleep Quality Index; Bussye, Reynolds, Monk, Berman, & Kupfer, 1989) the possible effects of frequent disrupted sleep involved with ISP are relevant for the present study. In addition, perceived sleep quality of ISP might be more specific to sleep disruption associated with the aspect of fear relative to the unpredictability of occurrence rather than the frequency of episodes (Cheyne & Pennycook, 2013). Sleep paralysis has been found to also be related to anxiety (Otto et al., 2006; Ohayon & Shapiro, 2000) which warrants the consideration of subjective sleep quality based on levels of fear associated with ISP as well as the high anxiety sensitivity from fearful expectancy (Ramsawh, Raffa, White & Barlow, 2008; Sharpless et al., 2010).

While sleep-loss has become more prevalent in the general population, the connection with negative health consequences is often overlooked (National Institute of Neurological Disorders and Stroke, 2014), possibly attributing to a prevalence of apathy towards behaviors that might contribute to sleep deficiency. In this regard, some individuals might be unaware of the potential harm of long-term impaired or insufficient sleep and viewing such as less than problematic (Avidan, Vaughn, & Silber, 2013), thus highlighting the importance of assessing sleep quality subjectively.

Similarly, concerns of indifference related to impaired or disrupted sleep was referenced with past literature indicating insufficiency of sleep disorder-related curriculum in medical schools (Miller, 2008). Ironically, ISP has also been commonly experienced amongst medical students as indicated in past research (Penn, Kripke, & Scharff, 1981; Ohaeri, Odejide, Ikuesan, & Adeyemi, 1989).

An additional concern regarding individuals with ISP, involves proneness to an attitude of disregard from the embarrassment associated with it, lessening any motivation to discuss this disorder with others (Cheyne & Pennycook, 2013). With more focused research as per the present study, sleep loss and other factors related to ISP might be investigated via perceptions of sleep quality and possible associated psychological variables (i.e., social phobia, LOC, and DBAS). These psychosocial factors in relation to subjective sleep quality, as implied within a biopsychosocial model (Kales & Kales, 1987), are explained based on the dream continuity hypothesis and cognitive appraisal.

Problem Statement

ISP is a diagnosable REM sleep disorder which involves sleep interruption from symptoms of paralysis while being conscious accompanied with or without fearful hallucinations (AASM, 2014; Sharpless & Doghramji, 2015). Ultimately, long-term sleep disruption might result in an increased risk for chronic diseases such as high blood pressure, heart disease, and diabetes (Liu et al., 2013; National Sleep Foundation, 2011). The associated reported distress of ISP is shown to have a significant impact even if episodes are less frequent (Cheyne & Pennycook, 2013). According to Cheyne, et al. (1999), sleep paralysis was experienced with fear in 98% of a study involving a World Wide Web sample; on the other hand, it is important to note that it is also experienced more pleasantly as with lucid dreaming (Denis & Poerio, 2016). As inferred by Cheyne (2001), the three factors characteristic of ISP (i.e., incubus, intruder, and unusual bodily sensations) are reflective of perceptions of fear referenced in the present study. As such the subjective reports to measure sleep quality are relative to an individual's internal input and

hallucinatory perceptions (Denis, 2018), that are difficult to discuss (Cheyne & Pennycook, 2013). The most recent research study conducted involves sleep paralysis with reference to sleep quality and lucid dreaming (Denis & Poerio, 2016) and more recently an investigation of specific variables of subjective sleep quality associated with sleep paralysis (Denis, French, Schneider & Gregory, 2017).

The parasomnia known as sleep paralysis is common among student and general populations (Sharpless & Barber, 2011), but is less referenced within the sleep disorder literature (APA, 2013). SP prevalence rates vary cross-culturally and geographically, however, 7.6% of the general population based on an aggregate of studies, experience it at least once in a lifetime (Sharpless et al, 2011). More specifically, for example, a domestic account among 254 households in Pennsylvania were reported at 17% (Hufford, 2005). Other research reports among college students were rated at 28.3% for at least a single episode of ISP (Sharpless et al, 2011) with 75% of episodes involving hallucinations (Cheyne et al., 1999). The fearful hallucinations often experienced with ISP are associated with fear of disclosure (Cheyne & Pennycook, 2013) or of being misdiagnosed with psychosis or substance abuse (Cheyne et al., 1999; Gangdev, 2004; Sharpless et al., 2015) possibly leading to the development of a hidden population of sorts. As such, individuals become less apt to volunteer information about this disorder, thus, more transparency regarding ISP is warranted. Consequently, some have sought health information and advice via the Internet and advised of the harmlessness of ISP (QualityHealth, 2016; Sleephealth.org, 2017). However, health information supplied via the Internet might not address possible negative health effects (e.g., obesity, high blood pressure, heart disease,

stroke, and diabetes; Chokroverty, 2008) associated with poor sleep quality when assessing harm.

Sleep paralysis is the inability to move or speak while being fully conscious bypassing the non-REM slow wave stage of sleep and entering directly into REM sleep (Sharpless & Doghramji, 2015). This REM sleep disorder is an ominous experience often accompanied by visual, auditory, and tactile hallucinations hypnogogically or hypnopompically (Cheyne, 2001) and had also been considered a primary symptom of narcolepsy (AASM, 2014). However, in the more recent Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V; APA, 2013) sleep paralysis has been removed as part of the narcoleptic tetrad, because some individuals have experienced narcolepsy exclusively.

In isolation from narcolepsy and other sleep disorders, the subtypes of ISP such as fearful isolated sleep paralysis and the recurrent fearful type of ISP (RISP), involve at least two episodes occurring within the past six months (Sharpless et al., 2010). Some researchers found the severity of fear experienced from ISP episodes to be 75.64% at moderate levels and 15.38% with clinically significant distress (Sharpless & Grom, 2016). Notably, although RISP has been diagnostically coded (G47.53; Ham & Camp, 2015), a consensus has not been met concerning an appropriate diagnostic criterion for ISP due to a lack of empirical evidence to more clearly distinguish disorder from unusual experience (Sharpless et al., 2015). This might be a result of sleep paralysis formerly being more credibly recognized as a part of the tetrad of narcolepsy (APA, 2013); however, in isolation from narcolepsy SP might be perceived as less threatening. On the other hand, it is

important to note that patients experiencing a more blissful type of sleep paralyis without distress could be considered for diagnosis (American Academy of Sleep Medicine, 2014).

Other research on ISP has been conducted to understand certain psychological associations as well as specific aspects that characterize it (Adler, 2011). Yet, recently there been more focus on subjective sleep quality and SP (Denis, 2018; Denis & Poerio, 2016; Denis, French, Schneider & Gregory, 2017), as disrupted sleep has been considered a notable trigger for episodes (Takeuchi, Murphy, & Fukuda, 1992). Due to the importance of having good quality of sleep for better health, one should not discount the possible effects that isolated sleep paralysis might have upon sleep quality, especially with the aspect of fear associated with ISP (FISP; Sharpless, et al., 2010). The distress associated with having an episode of ISP might significantly impact quality of sleep, even if episodes are less frequent (Cheyne & Pennycook, 2013). As referenced earlier, the frequency of ISP events does not necessarily imply higher distress and fear (Cheyne et al., 2013), as less distressful hallucinations were found to be more prevalent with those who were more receptive and experienced with ISP commonly seen with lucid dreamers (Cheyne, 2005).

With the unpredictability of ISP and its intrusive nature especially when accompanied by fear, the variable of external other LOC has been included in the present research study as well as past ISP research (Arikawa et al., 1999). Additionally, researchers have associated social phobia and dysfunctional social imagery (Solomonova et al., 2007; Wild & Clark, 2011) with high rates of ISP in Japan (Simard & Nielsen, 2005) with the fear of offending others (Clarvit, Schneier, & Liebowitz, 1996; Fukada, Miyasita, Inugami, & Ishihara, 1987). In this regard, variables such as social phobia and subscales of LOC

along with DBAS should be considered to determine the relationship between levels of fear associated with ISP and the concomitant subjective sleep quality.

Purpose of the Study

A primary aim of this quantitative research study was to examine the subjective sleep quality (dependent variable) of a population with ISP. Examining whether levels of fear (higher fear and lower fear) in association with ISP (the quasi-independent variable) are correlated with certain psychosocial factors, which share similar aspects of ISP, might help to establish whether any moderating effects of such factors (i.e., the dependent variables of DBAS, LOC, and social phobia) exist in appraisal of ISP sleep quality. I specifically included the psychosocial variables in this study to offer a more comprehensive view of ISP in relation to fear and subjective sleep quality.

Individuals experiencing ISP are generally reticent about voluntarily disclosing this condition in casual encounters (Cheyne & Pennycook, 2013), leading some to feel more comfortable consulting the Internet to inquire about ISP and to gain support from online sleep paralysis communities and health forums (Weisgerber, 2014). Consequently, many who experience ISP distressfully have developed a vested interest in ISP research in the hope of finding answers regarding this disorder, as indicated by their responses to online surveys (J. A. Cheyne, personal communication, February 9, 2013) such as The Sleep Paralysis Project (D. Denis, personal communication, October 21, 2015; December 22, 2016).

Some individuals who suffer from ISP have also sought advice from Internet health care professional sites that assure them of the harmlessness of ISP (AASM, 2018;

QualityHealth, 2016). However, individuals who may experience long-term disrupted sleep from ISP might not be aware of the harmful repercussions (e.g., obesity, high blood pressure, heart disease, and diabetes (Center of Disease Control and Prevention, 2011) resulting in their viewing it as less necessary to consult a health care provider concerning this disorder. Measuring the subjective sleep quality of individuals with ISP is essential to increasing awareness regarding the danger of long-term impaired sleep quality potentially associated with ISP).

Nature of the Study

The nature of the study was quantitative and nonexperimental with a cross-sectional survey design. The relationships amongst individuals with ISP involve variables of subjective sleep quality, DBAS, the three subscales of LOC (external other [EO], external social [ES], and internal [INT]) and social phobia. Arikawa, Templer, Brown, Cannon, and Thomas-Dodson (1999) and Simard and Nielsen (2005) also investigated the variables of LOC-EO and social phobia in association with ISP, respectively, as these variables share similarities characteristic of isolated sleep paralysis (incubus and intruder). I investigated distinctions amongst dependent variables as measured against two categories of the quasi independent variable of ISP fear (i.e., higher fear [HFISP] and lower fear [LFISP]). I initially included a no fear category associated with a more blissful type of ISP and unusual bodily sensations (UBS; Cheyne, 2001) during the recruitment phase of the study but later excluded it from data analysis due to a low response rate. Quantitative research was conducive for this quasi experimental study design to compare more than one variable

simultaneously (Creswell, 2014), as an experimental research approach was not feasible due to the nature of ISP.

The correlational aspect of the study involved exploration of the relationships among predictive ISP fear categories specific to dependent variables of subjective sleep quality, DBAS, LOC, and social phobia, related characteristically with ISP or as a potential effect of it. Sources of data collection and recruitment include the administration of surveys to the Walden Participant Pool and selected online sleep paralysis communities with links to SurveyMonkey. Data analysis involves measuring sleep quality (with higher scores indicating poor sleep) with the predictor or quasi independent variables (i.e., LFISP and HFISP) based on scores from the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) and using linear regression to show differences among groups due to an ordinal level measure index. I used a separate multivariate analysis of variance (MANOVA) to identify whether the dependent variables (i.e., LOC based on the three subscales, social phobia, and DBAS) taken as a set can differentiate fear categories of ISP. An additional MANOVA was used to identify whether the individual subscales of LOC (i.e., EO, ES, and INT) measuring uncontrollability and uncertainty of life events as referenced in the Brown Locus of Control scale (BLOC; Brown, 1990), indicate any differentiation between fear categories.

An independent samples t-test was used to assess relationships between social phobia (e.g., being observed by others and fear of embarrassment) and the predictor variables of LFISP and HFISP based on the Social Phobia Inventory (SPIN; Connor et al., 2000). Maladaptive beliefs about sleep (dependent variable) as determined by the

Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS scale; Morin, Vallieres, & Ivers, 2007), was analyzed using the independent samples t-test to establish distinctions in relationships between fear categories of ISP. Finally, multiple regression was used to determine whether the relationships between subjective sleep quality and levels of the quasi independent variables are moderated by variables of DBAS, social phobia, and LOC.

Research Questions and Hypotheses

I developed the research questions and hypotheses based on my review of the literature. One primary focus of the research questions and hypotheses regard the quantification of subjective sleep quality associated with the fear factor of a REM sleep disorder, specifically ISP. Due to a gap in the existing literature on the specifics of fear associated with ISP and subjective sleep quality, I reviewed other closely related research on sleep disruption and sleep disorders (e.g., insomnia and sleep apnea) in relation to perceived sleep quality. Furthermore, I examined the aspect of fear associated with ISP and the possible impact on sleep quality in association with the psychosocial variables of the LOC subscales, social phobia, and DBAS.

RQ1: Is there a significant predictive relationship between the fear category a participant belongs to (i.e., LFISP and HFISP) and the measures of the LOC subscales (external other [EO], external social [ES], and internal [INT]), DBAS, and social phobia?

$H_0$1: There is no significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belong to and the measures of the LOC subscales (EO, ES, and INT), DBAS, and social phobia (DVs).

H_a1: There is a significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belong to and the measures of the LOC subscales (EO, ES, and INT), DBAS, and social phobia (DVs).

RQ2: Are there differences in measures of LOC (EO, ES, and INT), DBAS, and social phobia that significantly predict subjective sleep quality scores?

$H_0 2$: There are no significant difference in the measures of the LOC (EO, ES, and INT), DBAS, and social phobia that significantly predict subjective sleep quality scores.

$H_a 2$: There are significant differences in the measures of LOC (EO, ES, and INT), DBAS and social phobia that significantly predict subjective sleep quality scores.

RQ3: Are there significant differences in the dependent variable measures of the LOC subscales of EO, ES, and INT for the participants in the HFISP compared to LFISP categories?

$H_0 3$: There are no significant differences between the LOC scores based on the three subscales (EO, ES, and INT) for the HFISP category compared to the LFISP category.

$H_a 3$: There are significant differences in the LOC subscales of EO, ES, and INT (DVs) for the HFISP category compared to the LFISP category.

RQ4: Are there significant differences between the reported subjective sleep quality scores (dependent variable) of individuals who experience ISP as quasi independent variables of high fear-associated ISP (HFISP) and low fear-associated ISP (LFISP)?

$H_0 4$: There are no significant differences between the subjective sleep quality scores of participants with HFISP and LFISP.

H_a4: There are significant differences between scores of individuals with HFISP regarding reported quality of sleep (dependent variable) compared to those with LFISP.

RQ5: Are there significant differences in social phobia scores between participants with LFISP and HFISP?

$H_0 5$: There are no significant differences in social phobia scores between participants with HFISP and LFISP.

$H_a 5$: There are significant differences in social phobia scores between participants with HFISP and LFISP.

RQ6: Are there significant differences between DBAS scores for participants with LFISP and HFISP?

$H_0 6$: There are no significant differences between DBAS scores for participants with LFISP and HFISP.

$H_a 6$: There are significant differences between DBAS scores for participants with HFISP and LFISP.

Theoretical Foundation

According to Buysse et al. (1989), the complex nature of sleep quality warrants that assessments should not be limited solely to objective measures which are incapable of measuring certain subjective aspects of sleep. For example, previous findings showed that chronic insomnia might not predict poor sleep quality via an objective measure, such as PSG data; contrarily, those having subjectively normal sleep have shown objectively disturbed sleep (Harvey et al., 2008). In addition, reports of worse sleep quality may not necessarily be substantiated by polysomnographic measures; as some sleep quality

perceptions may be more adaptive (Buysse et al., 1991). Other sleep disorder researchers have also found inconsistencies between subjective and objective measures involving sleep efficiency and insomnia (Bianchi, Williams, McKinney, & Ellenbogen, 2013). Moreover, subjective sleep quality has been found to be more consistently predictive of health than having an efficient amount of sleep (Pilcher, Ginter, & Sadowsky, 1997). This signifies the importance of applying subjective measures such as the PSQI (Buysse et al., 1989) to quantitatively examine the sleep quality associated with ISP, given that sleep may be impacted by fearful hallucinations as reflected in the present study. The subjective appraisal of sleep quality might also be influenced by factors such as DBAS as it relates to ISP, as detailed in chapter two.

The focus on retrospective data to measure quality of sleep might be explained in part by the cognitive appraisal theory (Beck, 1970; Lazarus & Folkman, 1984). This highlights the importance of examining the perceptions and interpretations attached to one's sleep experience possibly attributing to the distress felt, compared to the event itself (Cheyne & Pennycook, 2013; Harvey et al., 2008). As such, cognitive appraisal (Lazarus & Folkman, 1984) is essential in the examination of the subjective sleep quality of those with ISP, which involves the consideration of key aspects of appraisal associated with stressfulness of events, uncontrollability, threats to self-esteem, unpredictability, and frequency of events (Lazarus & Folkman, 1984). Furthermore, variables such as social phobia (Sharpless, McCarthy, Chambless, Milrod- Khalsa, & Barber, 2010), and maladaptive beliefs about sleep (Carney et al., 2010) might have a cognitive impact on the appraisal of sleep quality as it relates to ISP. Finally, I included the dream continuity

hypothesis (Domhoff, 2011) to examine the connection between the three-factor model of ISP experienced universally by many individuals and the possible connection to the psychosocial factors. Chapter 2 will contain a more in-depth explanation of these theories.

Definitions

Cognitive appraisal: The personal assessment of the stressfulness of an event as a primary aspect and secondarily gauging uncontrollability, threats to self-esteem, and unpredictability (Lazarus & Folkman, 1984).

Dream continuity hypothesis: The proposal that waking life events translate into the dream state (Hall & Nordby, 1972; Shredl, 2008, 2009; Shredl & Whitmann, 2005).

Dysfunctional beliefs and attitude about sleep (DBAS): The engagement of emotion laden ruminating thoughts, which are often irrational and intrusive, prior to the onset of sleep (Morin et al., 2007) as based on the DBAS Scale. The subscales relate to misconceptions and misattributions of the consequences of sleep, faulty beliefs about sleep expectation, and sleep promotion behavior as well as decreased perception of control (Morin et al., 2007).

Hypnagogic (Maury,1865) and hypnopompic (Myers, 1903) hallucinations: The visual, tactile, auditory or other sensation experienced during sleep paralysis when falling asleep or upon awakening, respectively.

Isolated sleep paralysis (ISP): A parasomnia that involves the sensation of not being able to move one's extremities or speak upon awakening or falling asleep and is often accompanied by fear (AASM, 2018). ISP is generally unassociated with other sleep, medical, or psychiatric related disorders (Sharpless & Doghramji, 2015). ISP is also

considered a parasomnia, a distinct category of sleep disorders involving abnormal behaviors or experiences interfering with rapid eye movement sleep (REM) or non-REM sleep (Avidan & Kaplish, 2010). As such, ISP is considered a REM arousal disorder (American Academy of Sleep Medicine, 2014) involving immobility of extremities accompanied by fear 98% (World Wide Web study: Cheyne et al.,1999), as well as distressful hallucinations (Sharpless et al., 2010) occurring either during the dream stage before falling asleep (hypnogogic) or upon awakening (hypnopompic).

Locus of control: Constructs based on the Brown (1990) LOC subscales (internal, external other, and external social). Internal LOC references the feeling of being in control of one's destiny (Brown, 1990). External other LOC involves a perception of life as ruled by fate, chance, or God; external social LOC references individuals attributing life experiences to the actions of others and the social environment (Brown, 1990).

Normal sleep architecture: A sleep pattern that begins with nonrapid eye movement (N-REM) and includes transitioning from drowsiness (Stage 1) on to deep sleep (Stage 3) also known as slow wave or delta, where muscles become relaxed (Colten & Altevogt, 2006). Dreaming is more prone to occur at Stage 3 (Colten & Altevogt, 2006). Subsequently, the stages reverse before entry to the REM stages of sleep where paralysis occurs due to suppression of brain impulses that control muscle movement (Colten & Altevogt, 2006). During this stage the vividness of dreams are more pronounced. Both REM and N-REM stages are repeated about five times throughout the night (Colten & Altevogt, 2006).

Parasomnias: A distinct category of sleep disorders involving abnormal behaviors or experiences interfering with the normal cycle of N-REM and REM sleep (Avidan & Kaplish, 2010), as seen with sleep paralysis and REM arousal disorder.

Retrospective measures of sleep: A subtype of subjective measures which involve an overall estimate of sleep experience (Babkoff, Weller, & Lavidor, 1996) assessed by specific measurements such as those included in the PSQI (Buysse et al., 1989).

Muscle atonia: A physiological brain mechanism, which occurs during REM sleep, that is in place to prevent the acting out of dreams (APA, 2013).

Sleep paralysis (SP) or sleep paralysis disorder (SPD): An intrusion of REM sleep during the transition between sleep (i.e., upon awakening or falling asleep), which bypasses N-REM sleep or restorative sleep and encompasses an enhanced sense of awareness of external stimuli (APA, 2013). In the past, SPD had been considered a primary symptom of narcolepsy while the isolated form of sleep paralysis (ISP) has been conceptualized as occurred in isolation to narcolepsy or any other sleep disorder (AASM, 2014).

Social phobia (i.e., social anxiety disorder): An unreasonable or excessive fear of social situations experienced with worry or anxiety and expectation of social repercussion (APA, 2013). I used the Social Phobia Inventory (Connor et al., 2000) in the present study to address fear, inclusive of avoidance and physiological discomfort.

Subjective sleep quality: The meaning attached to sleep as perceived by individuals, which generally involves components of sleep continuity, perceived calmness of sleep, sleep efficiency, sleep quality, and ease of falling asleep (Akerstedt, Hume, Minors, & Waterhouse, 1994; Buysse, et al., 1989).

Three-factor model: The structure of hallucinations experienced that are specific to sleep paralysis; hallucinations include the intruder (threatening sensed presence of visual and auditory hallucinations), incubus (characterized by sensations of physical assault, chest pressure, difficulty breathing, and erotic sensations), and unusual bodily sensations (sensations of floating, out of body experience, and bliss; Cheyne, 2003).

Assumptions

With the present study, it is notable to consider the implication suggestive of a sleep disorder meaning poor sleep quality. This might not apply to a parasomnia such as ISP due to the subjective interpretation of some who have experienced ISP in a blissful or less fearful manner (Cheyne et al., 1999). It might also be assumed that objective and retrospective measures generally support each other, which is not always the case (Rosa & Bonnett, 2000), especially as it regards the subjective nature of ISP. Although a retrospective study is central to the correlational approach, it might pave the way for future experimental research in determining cause and effect regarding ISP in relation to sleep quality and other psychosocial variables. In consideration of the present retrospective survey-type study there is also the potential for inherent respondent bias influenced by individual cognitions and perceptions (Nisbet & Wilson, 1977).

It is also not guaranteed that the study participants had responded truthfully to the questionnaires. In this regard, it is important to encourage participants to exercise integrity as a criterion for the benefit of the study outcome regarding ISP and the population experiencing it. With regards to representativeness, it is also assumed that of a random sample of individuals with ISP for the present study would be easily attainable due to high

rates of sleep disorders and the bi-directionality between sleep disruption and the occurrence of ISP (Takeuchi, Murphy, & Fukuda, 1992). However, due to the sensitivity of those who experience ISP especially with dreadful hallucinations and the time restraints for completion of this research study it was more expedient to use convenience sampling.

Scope and Delimitations

For the present study involving a nonprobability convenience sample, an inherent delimitation is associated with data collection in survey research. It is uncertain that every member of the population of concern would be surveyed. In addition, with the inclusion and exclusion criteria set to limit extraneous variables, the results are ungeneralizable to a total population of individuals with ISP. Notably, a limitation often associated with nonexperimental designs is that the threat to internal validity generally increases (Creswell, 2014), however, causality is not inferred with the present study.

A correlational design was appropriate for the present research to determine the relationship among subjective sleep quality and fear associated with ISP and specific psychosocial variables. The study interest for this quantitative, cross-sectional survey research is to further inform on the topic of isolated sleep paralysis regardless of the specific population demographics. The limitation of self-selection is a consequence of delimitation associated with using intact groups such as Walden Participant Pool and online sleep paralysis communities, including the Reddit forum (Keeble, Law, Barber, & Baxter, 2015). Self-selecting respondents with specific traits or qualities which are not representative of the general population can affect external validity (Ahern, 2005).

Limitations

The inability to truly control for hidden confounding variables with the present study when collecting and analyzing data is a limitation to consider. Although the exclusion criteria included in the study is specific to those with ISP not better accounted for by alcohol abuse, drug abuse, and chronic medical conditions that requires prescription medications that affect sleep, participant compliance is not certain. Other stress related factors and cultural implications are likely to be present in the study but uncontrollable. This may lead to a Type-II error (false negative) or a Type-1 error (false positive) with the latter involving incorrectly saying no about an effect that does exists and an incorrect rejecting of the null hypothesis for the former (Frankfort-Nachmias & Nachmias, 2009).

With an intention to minimize any potential extraneous influences that might compromise the results, compliance with the exclusion criteria is emphasized in the study invitation. As such, it is important that interested parties respect the inclusion criteria specific to participants who are otherwise healthy and experiencing ISP without narcolepsy. As such, the value of the outcome is limited to a single study that is not representative of the total population of individuals with ISP.

A few other limitations specific to the present study involved internal and external validity due to use of the Internet as a major mode of data collection. For example, sectors of the population were automatically excluded due to lack of access to the Internet or usability concerns possibly affecting external validity. In this regard, due to the nature of Internet questionnaire/surveys, further limitations may include self-selection bias (where individuals self-select to participate), coverage bias, insufficient response rates, inaccuracy

of personal information and questionnaire responses, as well as the innate bias associated with the inclusion criteria.

Although there is less of a concern for generalizability with regards to individuals who experience ISP in association with lucid dreaming (Conesa, 2002; Dodet, Chavez, Leu-Semenescu, Golmard, & Arnulf, 2015), there is a limitation for those who experience lucid dreaming associated with narcolepsy (Dodet et al., 2015). As such, it was important to ensure that all potential participants were aware of the exclusion criteria for the sake of external validity. In addition, the possibility of mortality or low response rate with internet research can affect generalizability. Finally, it is noteworthy to mention my own personal experience with ISP as a potential for limitation involving bias.

Significance

Frightening episodes of isolated sleep paralysis have occurred at least once in a lifetime in 40-50% of the average population while deemed harmless or benign by some professionals and researchers (Avidan & Kaplish, 2010; Solomonova et al., 2008). In juxtaposition, the relationship of ISP with poor sleep quality may exist due to the impending, unpredictable, and fearful expectation of having an episode of ISP. For example, poor subjective sleep quality, as per some case studies, has been attributed to the frequent awakenings experienced at night (McCarty & Chesson, 2009; Nair, Kalra, & Shah, 2013) to prevent having an episode (Sharpless & Grom, 2016). On the contrary, others have experienced ISP in the absence of or at lower levels of fear (Cheyne & Girard, 2007) as seen with lucid dreaming (Denis & Poerio, 2016; Conesa, 2002). In this regard, it

was beneficial to quantify the subjective sleep quality of those who experience ISP according to levels of fear, which is currently lacking in the literature.

Subjective sleep quality measures are conducive for the present study because subjective and objective measures of sleep quality can be inconsonant with each another (Buysse et al., 1989). For example, in a study by Hsieh et al. (2010) the PSQI results were assessed as poor, while the Epworth sleepiness score was found to be normal even with less than the recommended amount of sleep hours (e.g., two to four hour). In a study by Rosa and Bonnett's (2000), reported chronic insomnia was not indicative of poor objective sleep quality.

More specific to the present research, it is important to highlight the need to examine the sleep quality of individuals who might suffer with ISP and to exercise caution in discerning harmlessness of this sleep disorder in the absence of immediate noticeable harmful physiological effects. In this regard, considering the possible long-term negative effects due to sleep disruption (i.e., chronic diseases: Liu et al., 2013) is in line with a biopsychosocial model for a holistic approach to health care. Perhaps sleep assessments should be included in routine medical examinations especially for this population where disrupted sleep can trigger episodes of ISP (Takeuchi, Murphy, & Fukuda, 1992). Furthermore, there is a dire need for health care professionals to address sleep for this population due to the embarrassment in confiding with others about the experience (Cheyne & Pennycook, 2013), deterring help seeking behavior.

On the contrary, if sleep quality is found to be poor (i.e., alternative hypothesis), and significant relationships are found to exist between sleep quality and maladaptive

beliefs about sleep, (Woosley et al., 2012), the results might help to inform intervention programs to treat ISP, such as cognitive behavioral therapy as suggested by Solomonova et al. (2008). While cognitive behavioral therapy and mindfulness techniques were supported empirically for intervention purposes involving insomnia (Ong, Ulmer, & Manber, 2012; Siebern & Manber, 2011) hypnosis has also been found successful in the past for coping with ISP (Nardi, 1981; Sharpless & Doghramji, 2015).

Summary

Examining the subjective sleep quality of those who experience ISP has potential implications for the long-term health of this population, who may be unaware of the effect on overall health that impaired sleep of this nature might have. In this regard, quantifying the subjective quality of sleep for this population in association with fear is a primary research question of investigation. Possible influences of sleep perceptions (i.e., DBAS), LOC, and social phobia might have some attribution to how one experiences ISP. One important rationale for the study is to increase awareness of individuals with ISP (experienced with fear) who are particularly vulnerable to sleep loss due to the association with ominous and hallucinatory aspects. On the other hand, the results might indicate that those who experience ISP with fear have equally good quality of sleep regardless of levels of fear, possibly related to culturally related interpretations (Hufford, 2005; Jalal & Hinton, 2013; Walsh, 2009). Thus, this substantiates the need to conduct the study in investigation of the proposed relationships. It is not within the scope of this present study to delve deeper into cultural implications and influences on perceptions of sleep quality, however, such information may benefit future research.

It is also noteworthy to consider the cumulative effect associated with reticence about disclosing (Cheyne & Pennycook, 2013), leading to more comfortability with seeking medical health information about ISP from online resources. Additionally, with some medical website professionals and researchers viewing ISP as not being harmful (Hsieh et al., 2010; McCarty & Chesson, 2009; QualityHealth, 2016), individuals might be less prone to seek further professional advice. This can be detrimental to health in the long-term if disrupted or impaired sleep is ignored.

Perhaps, as a result of the present research study for this population, an ease of engagement might be encouraged for patients with ISP to share their concerns with health care professional, even if quality of sleep is not perceived as poor. In addition, further exploration of specific psychological variables such as DBAS, social phobia, or LOC might also shed some light on possible influential aspects of ISP important to consider along with subjective assessments of sleep quality. The integration and application of the research variables and research questions will be referenced in the literature review. Moreover, the information garnered from the research study might also inspire intervention programs to improve cognitive approaches to sleep for this population.

Chapter 2: Literature Review

Introduction

The essential goal of this literature review is to establish the relevance and importance of investigating the subjective sleep quality as well as specific psychosocial factors of a population of individuals with a REM sleep disorder, namely, ISP. As one of the most common health-related problems, long-term sleep impairment has been associated with health risks for hypertension, diabetes, obesity, depression, heart attack, and stroke (Colten & Altevogt, 2006; Medic, Willie, & Hemels, 2017). For example, in a longitudinal study conducted by Hoevenaar-Blom, Spijkerman, Kromhout, van den Berg, and Verschuren (2011), lower sleep duration along with poor sleep quality was associated with increased incidence for cardiovascular disease.

As such, measuring the subjective sleep quality of individuals who experience fear related ISP is foundational to raising awareness among those suffering from ISP and with health care professionals regarding the danger of long-term impaired sleep potentially associated with ISP. This is especially pertinent to individuals with ISP who have used medical websites for advice (Weisgerber, 2014) and been assured of the harmlessness of ISP (AASM, 2018). Individuals are not always alerted about the possible negative health consequences of long-term sleep disruption such as cardiovascular disease, obesity, diabetes, and hypertension (Medic, et al., 2017). With Internet comfortability and ease of access, some individuals have felt less need to consult their family physicians about their ISP and sleep concerns (Cheyne & Pennycook, 2013).

Information sharing is important for a population with ISP especially as it regards its subjective nature, where vividness of hallucinations incite fear (Cheyne et al., 1999; Dahlitz & Parkes, 1993; Mellman, Aigbogun, Graves, & Lawson., 2008; Ramsawh et al., 2008; Sharpless et al., 2008). As such, in my view it was feasible to employ the PSQI Buysse et al., 1989) to assess the subjective quality of sleep based on each individual's experience of ISP. Objective modes of sleep measures such as actigraphy and polysomnography as an alternative to subjective measures (e.g., PSQI) have shown differentiation between sleep quality of populations with and without ISP (Hsieh et al., 2010). Similarly, as explained by sleep state misperception involving insomnia, while one's perception of sleep can be determined as *poor*, assessment of sleep via objective measures might be considered *good* (Edinger & Krystal, 2003; AASM, 2018). In this regard, including subjective sleep measures in sleep assessments for the present study population can be beneficial.

Examining sleep quality via subjective means was specifically relevant for this research on a parasomnia such as ISP, which is experienced in line with a three-factor model (i.e., incubus, intruder, and unusual bodily sensations; Cheyne et al., 1999). Certain aspects of the three-factor model that characterize ISP (e.g., intruder, incubus), which are associated with higher levels of fear, might be correlated with subjective psychosocial factors such as external LOC (Arikawa et al., 1999), higher social phobia (Simard & Nielsen, 2005), and higher DBAS with a possible significant impact on objective measures of sleep quality (e.g., arousal from sleep).

Due to the fear laden hallucinatory aspects of SP and false awakenings, self-reports on sleep quality may not match up with objective measures. In other words, sleep state perception due to the nature of ISP might result in inaccurate measures on some aspects of subjective sleep quality while objective measures such as a PSG may be more accurate with detecting sleep arousal (Mendelsohn, 1987; Orff, Drummond, Nowakowski, & Perlis, 2007). However, in a similar study by Hsieh et al. (2010), subjective sleep quality was measured for a population with ISP, with and without sleep apnea, as results were unattainable by means of objective measures. Moreover, for future research purposes it might be more feasible to employ both sleep quality measures.

Besides sleep arousals, another aspect of sleep that might be affected due to fear associated ISP is sleep latency. The possible psychological impact from ISP episodes varying from only once in a lifetime to several times per week (Cheyne, 2005), regardless of frequency, might be driven by the memory of the experience (Cheyne & Pennycook, 2013) and unpredictability. Even though episodes of ISP can be infrequent, the dysfunctional ruminating thoughts fomented by fear might lead to sleep latency and further impairment of sleep, thus increasing the potential for having more episodes (Takeuchi et al., 1992). Moreover, investigating the subjective perceptions of sleep quality might be more effective in guarding against possible adverse health repercussions from the cumulative debt of impaired sleep (Lauderdale et al., 2008).

While frequency of ISP episodes remains a primary feature of recurrent isolated sleep paralysis (RISP), the determining factor for sleep quality as good or poor was not specifically limited to the rate of occurrence (Sharpless & Doghramji, 2015) for the present

study. An individual's subjective perception of sleep quality could be associated with dysfunctional beliefs about sleep as referenced in the DBAS Scale (Morin et al., 2007). For example, due to atonia and fearful hallucinations associated with ISP individuals might become fearful of the unpredictable throughout the night (even in the absence of frequent episodes) thereby affecting sleep quality.

The fearful hallucinations associated with parasomnias such as ISP have also been found with psychotic disorders (Plante & Winkelman, 2008; Sharpless & Doghramji, 2015), albeit, not in association with sleep transitions. The psychological impact due to the fear of negative scrutiny has caused some apprehension about disclosing due to perceived stigma and the fear of shame and embarrassment (Cheyne et al., 1999; Connor et al., 2000; Otto et al., 2006; Sharpless & Doghramji, 2015), which partially explains the inclusion of the variable of social phobia for this study.

Some researchers have found that scoring higher on social phobia is directly associated with restrained information sharing due to a self-protective mechanism to prevent negative evaluation (Cuming & Rapee, 2010). Perhaps, substantiating the sleep quality for individuals with ISP might encourage ease of engagement between physicians and patients and highlight the need for inclusion of sleep assessments in routine medical examinations. As such, one primary goal of this quantitative study is to help pioneer research to quantify the subjective sleep quality of a population sample with ISP.

Past ISP research studies which involved measuring subjective sleep quality via the PSQI have been scarce. Some studies included the use of measures such as a modified version of the Stanford Sleepiness Scale, the Epworth Sleepiness Scale and the PSQI

(Hsieh et al., 2010; Takeuchi, Fukuda, Sasaki, Inugami, & Murphy, 2002; McCarty & Chesson, 2009; and Nair, Kalra, & Shah, 2013). Ironically, more recent ISP research studies have been conducted in support of investigating subjective sleep quality (Denis & Poerio, 2016; Denis et al., 2017; and Denis, 2018). Other researchers, on the other hand, have referenced subjective sleep quality, but more specific to other sleep disorders such as sleep apnea and insomnia (Harvey et al., 2008; Rosa & Bonnett, 2000; Woosley et al., 2012). Although insomnia is a separate diagnostic entity from parasomnias like ISP, the association between insomnia and sleep loss increases the propensity for developing sleep paralysis (Sawant, Parkar, & Tambe, 2005).

In conclusion, on a subjective level, possible impaired sleep from ISP as presented in this study might be associated with aspects of fear (i.e., intruder and incubus; Cheyne et al., 1999), unpredictability related to an external LOC (Arikawa,et al., 1999), DBAS (Carney et al., 2010; Espie, 2007; Harvey et al., 2008; Voinescu, Coogan & Orasan, 2010; Voinescu & Szentagotai, 2014), and social phobia (Ramsawh et al., 2009). Variables such as social phobia and LOC along with DBAS might factor in when considering the relationship between levels of fear associated with ISP and the concomitant subjective sleep quality.

Chapter 2 will continue with a literature search, theoretical foundations, literature review and synthesis specific to research questions, key variables, and summary.

Literature Search Strategy

The prospective literature query involves the investigation of subjective sleep quality as well as beliefs and attitudes of those who experience ISP within parameters of

fear, also in association with LOC and social phobia. The main databases for current peer-reviewed full text articles are multidisciplinary to include Walden University Library (e.g., Academic Search Complete, PsycARTICLE, ProQuest Central, and ScienceDirect); U.S. National Institutes of Health's National Library of Medicine, SLEEP Journal, Journal of Health Psychology, Psychology and Behavioral Sciences, and Google Scholar. Furthermore, searching within the references of the most recent and closest related literature have generated resources pertinent to the present study. The focus of the literature review search has been directed on articles within the past five years; however, due to the lack of available articles on the exact topic, some articles were extended beyond five years.

The main research query for subjective sleep quality of those with ISP included *subjective sleep quality*, *isolated sleep paralysis*, *fearful isolated sleep paralysis, familial sleep paralysis, hypnagogic and hypnopompic paralysis, predormital and postdormital paralysis, recurrent isolated sleep paralysis, lucid dreaming* as well as *sleep paralysis* used singularly or together. I also applied the Boolean operators *AND NOT* for *narcolepsy.* When used together these key term combinations generated a minimal number of hits, indicating some gaps that existed in the literature. As such, a search for other closely related literature was necessary such as a closely related parasomnia (e.g., nightmares) and sleep disorder such as insomnia. Other terms I included in the search were locus of control, dysfunctional beliefs and attitudes about sleep, and social phobia, social anxiety, and anxiety disorder searched in association with the main search terms (e.g., isolated sleep paralysis, nightmares, and insomnia used interchangeably with subjective sleep quality. With regards to the aspect of fear as presented in the research topic and study, I searched

within the context of two aspects of the three-factor model (Cheyne, Rueffer, & Newby-Clark, 1999), incubus and intruder as generated from the listed items.

Theoretical Foundation

There are several important theoretical frameworks pertinent to the present research study such as cognitive appraisal theory (Folkman & Lazarus, 1984), the three-factor model of ISP (Cheyne et al., 1999), and the continuity hypothesis of dreaming (Domhoff, 2011; Hall & Nordby, 1972; Schredl & Hoffman, 2003), which when considered comprehensively infers a biopsychosocial (BPS) interrelationship (Engel, 1977). As such, the inherency of a BPS model to address the problem might appropriately support a holistic approach for intervention purposes and in office medical assessments of such sleep disorders (Kales & Kales, 1987).

An *integrated theoretical framework* with implications for an inherent BPS context (Engel, 1977) are conducive to support the present study. For example, with the BPS model, the biological aspect is presented to explain the intrusive paralysis along with the sense of fear and threat associated with ISP via the threat vigilance system (TVS; Cheyne, 2001). In other words, during REM sleep the limbic system becomes highly activated via the amygdala (Hobson, 2002). The lingering REM paralysis triggers a perceptual warning system (i.e., TVS) creating an apparition or hallucination (Cheyne, 2001) as seen with aspects of the three-factor model associated with ISP (i.e., incubus, intruder, and unusual bodily sensations; (Cheyne et al., 1999).

Less directly specific to the present research, psychosocial aspects of social rejection and stigmatization were found to also trigger the TVS (Macdonald & Leary,

2005; Mendes, Major, McCoy, & Blascovich, 2008). Notwithstanding, this might inform the relationships between sleep quality and aspects of ISP fear regarding social phobia. In other sleep disorder research, the biological association has been supported involving ISP and bizarreness of dream quality due to altered sleep physiology and possible unresolved waking state issues (Schredl, 2009).

The relationship between the three-factor model (intruder, incubus, unusual bodily sensations) as it relates to fear and proposed associations with specific psychosocial factors might predict the quality of sleep experience for this population. The explanation of hallucinatory aspects associated with sleep paralysis was universally consistent with the three-factor model that includes incubus (INC), the intruder (INT), and unusual bodily sensations (UBS; Cheyne et al., 1999). The intruder aspect has been perceived as a threatening observing presence (Cheyne, 2012), while incubus involves a tactile sense of being physically overpowered or feeling suffocated, in addition to some element of eroticism (Hufford, 1982).

The aspect of unusual bodily sensations (UBS) are less fearfully experienced and involve sensations of flying/floating, out-of-body experiences, and feelings of bliss. The incubus and intruder aspects of ISP are more hallucinatory and fear-oriented while UBS is less associated with fear (Sharpless & Doghramji, 2015) as seen with lucid dreaming (Conesa, 2002). The inherent fear experienced by some in association with ISP (Sharpless & Grom, 2016) might be associated with sleep impairment, which in turn can trigger episodes of ISP (Takeuchi et al., 1992). Subsequently, this might lead to a looming

psychological effect impacting sleep quality in fearful expectation of the occurrence of an unpredictable episode of ISP.

In further regard to theoretical underpinnings, it is noteworthy to reference cognitive appraisal in association with ISP, where individuals vary in how the stressfulness of such an event is interpreted (Lazarus & Folkman, 1984), possibly moderating the perception of sleep quality. For example, with the rates of ISP occurring higher among African-Americans (Bell et al., 1984; Bell, Dixie-Bell, & Thompson et al., 1986; Ohaeri, Awadalla, Makanjuola, & Ohaeri, 2004) in correlation with higher rates of life stress and panic disorders (Paradis, Friedman, & Hatch, 1997), perceived stressfulness in conjunction with ISP might affect how sleep quality is appraised. Perhaps the possible fear associated with sleep paralysis might further exacerbate already existent stress (Cheyne & Pennycook, 2013). Consequently, this increases the potential for having an episode when sleep is interrupted (Takeuchi et al., 1992) implying a bidirectional relationship between stress and impaired sleep.

Individuals' perceptions of ISP and the cognitions attached to it either consciously or subconsciously might easily affect the perception of sleep quality in relation to fear. The application of fear for some individuals involves a concern that the paralysis itself might be permanent (Ramsawh, et al., 2008), fear of dying (Cheyne & Girard, 2007), and the commonly shared fear of shame and embarrassment from the experience associated with social phobia (Otto et al., 2006). In applying cognitive appraisal of stressful events, other pertinent factors involve uncontrollability, uncertainty, threat to self-esteem, predictability,

and frequency of occurrence (Lazarus & Folkman, 1984), which are central to measuring the subjective sleep quality of this population.

In further regards to the association of perception of sleep quality with cognitive appraisal, aspects of primary appraisal, which include the potential for harm (threat), motivation (challenge), and importance of well-being (centrality), should be considered (Peacock &Wong, 1990). The appraisal or subjective assessment of the demands of an environment or situation is not only instrumental in the examination of the subjective sleep quality but also the psychosocial aspects of ISP. For example, predictability as a factor of cognitive appraisal has been directly associated with the psychosocial factor of LOC. Rucas and Miller (2013) have found positive correlations between external LOC and sleep loss. Similarly, the aspect of cognitive appraisal (i.e., secondary appraisal) regarding threat to self-esteem has been associated with social phobia (Izgic, Akyuz, Dogan, & Kugu, 2004) with a possible influence on subjective sleep quality.

Moreover, individuals who experience ISP fearfully or as a threatening presence, as implied by the intruder and incubus aspects of the three-factor model (Cheyne et al., 1999), might perceive sleep differently from those who experience ISP with bliss or unusual bodily sensations. As such, the core essence of the research questions involves the need to learn about the subjective quality of sleep experienced by those with ISP (with or without the frightening presence); as the primary concern is the possibility of unaddressed sleep insufficiency for this population.

Another aspect of the cognitive process might involve whether one perceives the importance of sleep to be intricately connected with well-being, which might affect one's

appraisal of sleep quality. For example, Beck (1979) and Harvey et al. (2008) suggested that the meaning of sleep quality for individuals with insomnia might turn out to be important for a full recovery from insomnia. The basis for this suggestion has been attributed to cognitive theories highlighting the importance of the meaning or interpretation attached to an event as a possible critical cause of distress (Lazarus & Folkman, 1984), compared to the event itself. This supports the notion that negative perceptions of sleep (i.e., DBAS) as a repercussion of fearful ISP, might further exacerbate the distress experienced.

Cognitive appraisal can further be applied to DBAS influencing the measure of sleep quality, especially if one believes that good quality of sleep is not important or essential for good health. In this regard, perhaps an item regarding individual importance of sleep should be considered for future research. With Cheyne and Pennycook's (2013) research regarding post-episode distress from sleep paralysis, higher levels of fear were found when beliefs about sleep paralysis were supernatural in nature rather than analytical, implying that supernatural beliefs about sleep might be considered dysfunctional.

Appraisal of sleep might also be influenced by the intermittent arousal during sleep in avoidance of the supine sleep position, commonly associated with the occurrence of an episode, (Cheyne, 2002). This might develop into an adaptive behavior due to perceived fear regardless of episodic occurrence contributing to more DBAS. As such, beliefs that a certain position of sleep is associated with having an episode might affect sleep continuity and subsequent sleep quality (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). In this regard, cognitive restructuring might be a useful therapeutic technique to help minimize

DBAS in association with ISP. Although unassociated with ISP, Carney et al. (2010) found that maladaptive beliefs were higher amongst all groups with insomnia compared to those without insomnia. Interestingly, with other closely related research conducted by Okajima, Nakajima, Ochi, and Inoue (2014) in addressing DBAS regarding insomnia, reduction in dysfunctional beliefs via cognitive behavior therapy did not effectively reduce insomnia.

With the application of cognitive appraisal theory to explain DBAS affecting one's appraisal of ISP sleep quality, other proposed psychosocial factors such as social phobia and LOC might be explained by dream continuity hypothesis (DCH). In this regard, dreams were deemed to be reflections of emotion-based appraisals (Lazarus, 1991) as seen with waking state consciousness (Domhoff, 2011; Hall & Nordby, 1972). For example, the ominous hallucinations experienced during REM sleep disruption might be associated with waking emotional states or unresolved conflicts (Sharpless & Barber, 2011; Sharpless & Grom, 2016).

In the field of dream research, dreams of flying have been associated with positive emotions and personality traits experienced in waking consciousness (Schredl, 2008). On the contrary, fear laden sleep paralysis might be indicative of some degree of stress in the waking state (Paradis & Friedman, 2005) as similarly proposed by the DCH (Domhoff, 2011). An opposing view of the continuity hypothesis is discontinuity, where dreams do not portray a mirror image of waking state but a deeper reflection of unfulfilled desires and emotions in waking states (Hobson & Schredl, 2011). The theoretical models for the present study were presented to explain the relationship between the psychosocial

variables, the physiological fear perceptions of ISP, and cognitive associations with subjective sleep quality.

Literature Review Related to Key Variables and/or Concepts

ISP Fear and Social Phobia

A major construct included in this research study is the fear associated with the experience of sleep paralysis in addition to that occurring outside the context of sleep. Although ISP has been explained within a three-factor model inclusive of incubus, intruder, and unusual bodily sensations (Cheyne et al., 1999), the former two aspects are generally associated with fear and distress. However, it is uncertain whether the degree of fear experienced is attributed mostly to the paralysis alone, as a conscious physiological experience without fearful hallucinations (Sharpless & Doghramji, 2015) or to SP with a sense of something being present (PRES; Simard & Nielsen, 2005) and accompanied by fearful hallucination (Cheyne et al., 1999).

According to Cheyne and Pennycook (2013) feelings of threat associated with hallucinations such as sense of other presence, depressed breathing, feelings of imminent death and unusual bodily sensations (e.g., flotation, falling, out of body experiences) were all associated with post sleep paralysis episode distress. As hypothesized by Cheyne et al. (2013), the sensory experiences that underlie fear, precipitate an amplified mental impression of events ultimately acting as a catalyst for ISP. In this regard, cognitive style, levels of sensitivity, and supernatural belief about sleep paralysis are factors that have distinguished distress levels (Cheyne et al., 2013).

In addition, the distinctions in fear experienced might be relative to individual dysfunctional beliefs and meanings attached, possibly underlying one's assessment of ISP sleep quality. For example, Mellman et al., (2008) found that the fearful hallucinations were experienced by 31.7% of African Americans, who generally referred to SP as "the witch riding my back" (Hufford, 2002). Similarly, Wing, Lee, and Chen (1994) found that 58.60% of Chinese participants had reported fearful aspects of ISP referred to as "ghost oppression". However, the significance of the relationship between fear associated with ISP and the assessment of sleep quality has yet to be established.

The investigation of the psychosocial variable of social phobia in parallel with the aspect of fear associated with ISP might further guide the research in respect to sleep quality. Other researchers have shown that social phobia was positively correlated with poor sleep quality (Ramsawh, Stein, Belik, & Sareen, 2009), which might be further exacerbated in conjunction with ISP. The factor of social phobia, also known as social anxiety (Connor et al., 2000) specific to the present study, has similar characteristics to the fear related to aspects of ISP.

In other words, fear associated with hallucinatory aspects of ISP involves a sense of being scrutinized, criticized, observed, and embarrassed in association with authoritative and unfamiliar people (APA, 2013), which are items specified in the Social Phobia Inventory (SPIN; Connor et al., 2000). In a study involving a population in Japan, an overwhelming sense of fear and embarrassment connected with offending others has been attributed to the high rate of social phobia (Clarvit, Schneier, & Liebowitz, 1996). With nightmares and sleep paralysis as REM sleep parasomnias found prevalent among

adolescents in Japan (Munezawa et al., 2011), a relationship with social phobia might also exist with regards to the present study.

Munezawa et al. (2011) found via regression analysis that nightmare frequency was significantly associated with subjective sleep quality as indicated in past research (Cheyne et al.'s, 1999; Levin & Nielsen, 2007), thus linking ISP to nightmares and fear associated disruptive sleep. Levin and Nielsen (2007) asserted that nightmares were a result of the failure to mitigate fear in daily life, consequently causing sleep disruption. As such, this might imply that those with more fear associated ISP have worse sleep quality; however, retrospective reporting has also been considered an inadequate measure for nightmare frequency due to the propensity for underestimation (Robert & Zadra, 2008). Contrarily, the level of distress and anxiety experienced with the ISP participants is not dependent solely on frequency of episodes but the unpredictable fearful expectancy of an episode that may not occur.

A study by Simard and Nielsen (2005) initially showed that higher levels of social anxiety were correlated with ISP with hallucinations, also known as sense presence (PRES; Simard & Nielsen, 2005), compared to ISP without hallucinations. However, when the researchers controlled for psychopathology, such as depression and other simple phobias (e.g., heights, disease), no significant differences were found in the degree of social anxiety regardless of ISP with or without PRES. As such, the factor of PRES did not contribute to the distinctions in social anxiety. In this regard, perhaps the variables such as simple phobias or depression moderated the effect on the relationship of social anxiety with hallucinatory aspects of ISP.

Similarly, with the present study the social phobia was one psychosocial variable which was tested as a possible moderator of the relationship between levels of fear associated with ISP and subjective sleep quality. As posited by Simard and Nielsen (2005), PRES has been associated with the fear of being observed by others, as seen with social phobia (APA, 2013; Cheyne, 2001). In this regard, higher social anxiety had been associated with PRES hallucinations especially if other fears or psychopathology were factored in. Moreover, with the present research study, distinctions might be found between levels of fear associated with ISP due to hallucinations and the degree of social phobia.

ISP and Locus of Control

A previous study, specific to the present study, involved the investigation of LOC in a nonclinical population in Japan with sleep paralysis (Arikawa, Templer, Brown, Cannon & Thomas-Dodson, 1999). A positive correlation was found between LOC (EO) and ISP. The findings are relevant to the present research study in making the association of specific psychosocial factors such as LOC that may have some bearing on the interplay between ISP and subjective sleep quality.

Due to the feeling of helplessness and uncontrollability associated with the intruder and incubus aspects of ISP (Cheyne et al., 1999), some relationship to an external other LOC (Arikawa, Templer, Brown, Cannon, & Thomas-Dodson, 1999) might be found. On the other hand, perceived loss of control may not be directly related to the hallucinatory aspects but more specific to the paralysis itself (Rapee, 1997). In Arikawa et al.'s (1999) study a positive correlation was found between external other LOC (i.e., the attribution of life circumstances to uncontrollable external sources; Brown & Marcoulides, 1996) and the

ISP experience, where helplessness was felt as external pressure upon one's body as seen with the incubus aspect of ISP (Cheyne, et al., 1999). However, it is important to note that out of the total nonclinical population of respondents, 57.2% were women while 37.2% were men, which might partially explain the positive direction of correlation for this population, due to gender norms for LOC deeply rooted in Japanese culture (Arikawa et al., 1999).

Although less specifically related to ISP or LOC in general, one other particular study referenced *sleep* locus of control (SLC) having a mediating effect on computerized cognitive behavioral treatment towards a more internal sleep locus of control (Vincent, Walsh, & Lewycky, 2010). In the present study, I examined the incubus and intruder aspects of ISP in relationship to the construct of LOC, with possible outcomes that might inform treatment options if sleep quality was found to be poor (Vincent et al., 2010). Cognitive style has been addressed in research by Kozhevnikov (2007) and associated with LOC also in conjunction with ISP (Arikawa, et al., 1999). The application here is that LOC (INT) might be associated with lower levels of fear or threatening presence thus leading to a better quality of sleep.

Dysfunctional Beliefs and Attitudes About Sleep

Research conducted by Carney et al. (2010) referenced the cognitive connection and influence of unhealthy beliefs about sleep existing across different patient groups with and without insomnia along with the differentiation in levels of beliefs across subtypes of insomnia. Comparisons were made based on data from previous insomnia studies regarding the Dysfunctional Beliefs and Attitudes About Sleep Scale (DBAS; Morin et al. 2007).

Inferential statistics from the DBAS were suitable for distinguishing between the sleep beliefs of individuals *with insomni*a and *good sleepers* (Carney et al., 2010) as more adaptive beliefs about sleep has been associated with improvement in sleep quality (Morin, Blais, & Savard, 2002) and vice versa. In this regard, the construct of DBAS as presented in the present study might also apply to sleep quality assessments within the context of ISP within parameters of fear. An example of items on the subscales of the DBAS scale pertinent to the present study involve beliefs about consequences and effects of ISP sleep as well as sleep-related worry and helplessness, which might only exacerbate associated distress (Carney et al., 2010).

Conversely, with other research conducted by Okajima, Nakajima, Ochi, and Inoue (2014), which examined DBAS, there was a different outcome. The study involved a comparison of good sleepers and those with insomnia in the general population versus those with insomnia who underwent cognitive behavioral treatment (CBT). Researchers found a significant correlation via regression analysis that the DBAS scores in the CBT insomnia group were significantly higher than good sleepers while not significantly better than patients with insomnia, in general. As such, a decrease in DBAS scores (less dysfunctional beliefs about sleep) did not necessarily imply improvement in insomnia. Notably, this study particularly regarding DBAS and insomnia, was specific to Japan and might hold some socio-cultural implications, which investigation is outside the confines of the present research. Thus, there exists the need to investigate the application of DBAS in an ISP population, which has not been conducted in my estimation.

More closely related research was conducted by Cheyne and Pennycook (2013) who attributed cognitive style as a factor influencing post episode distress, which might have some similarities to the factor of DBAS referenced in the present study. In this regard, cognitive style, along with supernatural belief about sleep paralysis were included as factors that impacted distress levels (Cheyne et al., 2013). For example, individuals with ISP and an analytical cognitive style held fewer supernatural beliefs and experienced less post-episode distress. This might be attributed to one's ability to use an analytic approach for the associated fear, possibly minimizing the distress. Contrarily, with a more heuristic orientation (mental shortcuts) involving supernatural beliefs about sleep paralysis there was an increase in ISP post-episode distress.

One other important aspect of Cheyne et al.'s (2013) research regarding the effect of post-episode distress associated with sleep paralysis, involves the distress from the memory of an event possibly reinforcing the fear, which might pertain to the present research as it applies to beliefs and attitudes affecting perceived sleep quality. The vestiges from the memory of an ISP episode might influence how individuals perceive sleep quality, as fear from an episode was not necessarily found to diminish with frequency of episodes (Cheyne, 2005). On the other hand, the most recent diagnostic criteria for ISP has been categorized under other-specified sleep wake disorders (code 307.49) if distress is clinically significant, which is a requirement of the (AASM, 2014). However, diagnostically, the measure of distress has yet to be associated with fear related to ISP impacting sleep quality. As such, in the present study Appendix B includes an item regarding sleep quality and fear of approach to sleep (Belicki, 1992) in concert with the

impact of fear from the unpredictability of a distressful event (Cheyne and Pennycook, 2013).

It is noteworthy to mention that individual fear response might be a factor to investigate with future research on ISP, as this might be interpreted differently across cultures, as noted with other fear response research where the amygdala reaction to fearful faces was found to be greatest amongst Caucasian and Japanese respondents (Chiao, et al., 2008). However, the population response from this particular study was somewhat skewed with 88% of respondents being Caucasian when the prevalence rates for SP have been deemed highest for African-Americans and Asians among students and psychiatric populations with other research (Sharpless & Barber, 2011). On the other hand, comparative rates for the general population in Sharpless and Barber's (2011) study excluded estimates for Caucasian participants, which is a concern for generalizability.

Subjective Sleep Quality

The most recent sleep disorder/sleep disturbance research in respect to the construct of subjective sleep quality was conducted by Hartmann, Carney, Lachowski, and Edinger (2015) on insomnia patients with and without comorbidity to determine the differences in sleep quality based on two types of subjective measures (i.e., retrospective self-report and prospective sleep diaries). The distinctions between sleep quality from retrospective measures such as the PSQI and prospective measures (e.g., sleep diary derived sleep quality) were moderated based on diagnostic status. Insomnia with and without psychiatric comorbidity distinguished the construct of sleep quality when measured retrospectively (e.g., PSQI) versus prospectively (sleep diary). For example, individuals with insomnia

alone, without other psychiatric disorders, showed a more significant negative relationship between measures, such that sleep quality was found significantly better based on the PSQI in comparison to the sleep diary measures.

Multiple regression analysis showed that worse sleep quality was found for those with comorbid insomnia when measured by the PSQI; however, these results did not apply to sleep diary measures. In this regard, if distinctions in appraisal of sleep quality differ according to the measure used, it might benefit future sleep quality research to include both measures. With the present study, although psychiatric comorbidity was not a factor, future studies regarding the impact of ISP fear on appraisal of sleep quality might offer more conclusive results by employing both retrospective and prospective measures.

Subjective sleep quality might not be solely based on the measure outcomes, but also according to the respondents' cognitive approach, perhaps due to either other stress-related experiences or cultural influences. These are limitations of the present study due to possible confounding factors. However, it is important to note that the nature of this present study is to not infer causation. Similar to the Hartmann et al. (2015) study, I used a multiple regression analysis with this study to measure sleep quality via PSQI with a population of individuals who experience ISP, initially within the three levels of fear (i.e., no fear, low, and high fear) and in correlation with other psychosocial variables.

On a more similar yet broader note, Hsieh et al. (2010) investigated the impact of ISP on the sleep quality of patients with obstructive sleep apnea (OSA) based on objective versus subjective measures. Pertinent to Hsieh et al.'s (2010) study based on the results from the polysomnography, a univariate analysis showed no significant differences

between those patients with or without ISP. Conversely, differences were found between those with and without ISP via the subjective measures (e.g., Epworth Sleepiness Scales [ESS] and the PSQI. Results from the t-tests showed that those with ISP had significantly higher scores in ESS (sleepiness), and a majority of PSQI subscales indicated worse nocturnal sleep quality than patients without ISP. The researchers have asserted that interpretation of ISP amongst the Chinese population may have influenced the perception of sleep quality as well as the threatening hallucinatory aspects of ISP (Hsieh et al., 2010).

Summary

A majority of research literature on ISP has been focused on attempting to understand the etiological, psychological, and physiological aspects of this parasomnia (Sharpless, et al., 2010; Otto et al., 2006; McNally & Clancy, 2005; Solomonova, et al., 2008; Ramsawh, Raffa, White & Barlow, 2008) and less directed towards determining whether effects upon sleep quality exist. Although, the sleep architecture associated with ISP has been well established (Adler, 2011), the subjective quality of sleep of this population has been less researched. One reason for this might be attributed to past clinical association of sleep paralysis as part of the criteria for narcolepsy (APA, 2005; Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV), further amplifying the importance of the present research, as isolated forms of sleep paralysis without narcolepsy were less reported (Schneck, 1960). ISP left unaddressed and undisclosed, especially where fear and embarrassment (Otto et al., 2006) are concerned, might have implications for long-term negative health consequences (National Institute of Neurological Disorders and Stroke, 2014).

Hsieh et al.'s (2010) study demonstrated the importance of considering a subjective quality of sleep measure in research studies similar to the present study, as an objective measure such as a PSG might not capture every aspect of an individual's sleep. For example, DBAS, LOC and social phobia are not measurable with a PSG. Hsieh et al.'s (2010) study is the closest quantitative study, thus far, which investigated the variable of subjective sleep quality with regards to ISP via the PSQI, albeit, in conjunction with obstructive sleep apnea. On the contrary, other researchers (Harvey et al., 2008; Woosley et al., 2012) focused on perceived sleep quality for individuals with insomnia.

While other researchers studying sleep paralysis or ISP have examined the psychophysiological aspects in relation to anxiety (Nair, et al., 2013; Otto, et al., 2006) and posttraumatic stress disorder (Sharpless et al., 2010), a single etiological explanation has not been found; however, stress and chronic fear are considered predisposing factors of ISP (Simard & Nielsen, 2005). Moreover, few studies have examined the underlying psychosocial factors as presented in the present study which are possibly related to certain psychophysiological aspects of ISP (e.g., intruder, incubus), subsequently influencing one's perceived sleep quality. An investigation into the specific psychosocial factors possibly associated with distress related to ISP and adversely influencing sleep quality might ultimately be effective in designing sleep paralysis treatment protocols to improve sleep.

Although, unrelated to sleep paralysis, personality research involving insomnia investigated correlates of self-directedness and temperament attribution such as harm avoidance (de Saint Hilaire, Straub, & Pelissolo, 2005) where the former was found to be lower in correlation with insomnia compared to the latter. A similar association might be

considered when investigating the relationship between LOC or social phobia as it regards the subjective sleep quality of those with ISP. More similarly, Park et al. (2012) found that sleep quality and dysfunctional sleep-related cognitions were mediated by psychobiological and sociocultural personality factors influencing the severity of insomnia and subjective quality of sleep. These factors were instrumental for designing intervention programs to treat insomnia and might similarly be applied with regards to fear related ISP.

The present investigation on subjective sleep quality might also pave the way for future qualitative research to explain reluctance about discussing ISP, possibly due to either a low perceived effect of disturbance or embarrassment (Sharpless & Doghramji, 2015), which again supports the need to conduct the present study. To advance knowledge in the field regarding this particular population with ISP, it is important to increase awareness concerning potential poor sleep quality, especially when there is relative risk for negative health consequences (National Institute of Neurological Disorders and Stroke, 2014). In addition, the circular nature of ISP episodes, triggered by sleep disruption (Takeuchi, Murphy, & Fukuda, 1992), can become intensified from fear associated with the paralysis (Sharpless & Grom, 2016) or the distressful memory of the event (Cheyne & Pennycook, 2013), which might incite future fearful expectations of unpredictable recurrences.

The psychological measures of LOC, social phobia, and DBAS might parallel certain psychosocial qualities of this population, possibly having an influence on subjective sleep quality. In addition, the perceptions of sleep quality for those with ISP might be related to underlying unconscious aspects of unresolved emotions (Boswell, et al., 2010) possibly surfacing as incubus and intruder. These aspects might mirror Jung's (1964)

archetypal concept of *the shadow* in relation to repressed hidden unconscious elements. In this regard, Nardi (1981) found that hypnosis was beneficial for sleep paralysis to lessen any underlying sensitivities to fear and associated anxiety, thus reducing the frequency of attacks.

Accordingly, with the present quantitative study I used the PSQI to assess the subjective sleep quality of a nonclinical ISP population within levels of fear which has not been conducted thus far to my knowledge. The main gap in literature involves the lack of a full quantifiable measure of subjective sleep quality via the PSQI to distinguish the categories of fear that individuals report as well as the potential influence of the specific psychosocial variables. An underlying concern to highlight in the present study involves the distinction between harmlessness limited to the experience itself and harmfulness associated with the potential development of long-term health consequences due to poor sleep.

As such, Chapter 3 involves the use of descriptive statistics to examine ISP in relation to fear, based on items extracted from the Waterloo Unusual Sleep Experience Questionnaire (WUSEQ; Cheyne, 2002). Initially, I sought to identify a trichotomous sample of individuals with isolated sleep paralysis within categories of no fear (XFISP), low fear (LFISP), and high fear (HFISP) to investigate the subjective sleep quality for this population. However, due to poor response rate for the no fear category, I limited the analysis to only include the low fear and high fear categories to measure subjective sleep quality (independent samples t-test). This was followed by multiple regression analysis and

MANOVAs to further examine associations or interactions with psychosocial variables (i.e., LOC, social phobia, and DBAS) to investigate further about fear related ISP.

Chapter 3: Research Method

Introduction

This chapter begins with an overview of the study, which includes the purpose for the research as well as the rationale for the study design. In addition, the population sample, study variables, hypotheses and research questions, and methodology are addressed. The chapter also includes a discussion on any threats to validity and the ethical considerations for this study.

Purpose of the Study

The primary purpose of the study was to quantify (via a subjective measure) the sleep quality of a cross section of individuals experiencing ISP and possible distinctions based on parameters of fear. Second, I examined possible correlates associated with ISP (i.e., social phobia, DBAS, and LOC) as modulating factors of subjective sleep quality. Another purpose of this investigation was to examine whether differences in distress from fear associated ISP can distinguish subjective sleep quality.

The concern of sleep quality being poor becomes amplified when considering a population of individuals experiencing ISP who are embarrassed about disclosing this condition to their health care professionals (Cheyne & Pennycook, 2013). These individuals may be driven to seek health information via online sleep paralysis communities and health forums for support and feel less need to consult their health professionals. However, some researchers (Hsieh et al., 2010; McCarty & Chesson, 2009; and QualityHealth, 2016) have discounted the association of potential long-term sleep loss with harmfulness such as, cardiovascular disease, obesity, diabetes, and hypertension

(Medic, Willie, & Hemels, 2017). Measuring the subjective quality of sleep of individuals who suffer with ISP is necessary for increasing awareness about the potential danger of long-term impaired sleep quality (National Institute of Neurological Disorders and Stroke, 2014).

The purpose of quantifying the subjective sleep quality of those suffering with ISP is to establish whether there is a concern about sleep insufficiency that warrants the attention of a healthcare professional. Additionally, if subjective sleep quality is found to be concerning due to associated fear, the investigation of psychosocial factors closely associated with certain aspects of ISP might be beneficial to assist those distressed from it with finding ways to help alleviate the negative effects of this sleep disorder. As such, in this chapter, I detail the main components that were used to conduct the present study. These include the research design, research questions, sample ISP Fear questionnaire items, population sampling, procedures for participant recruitment, data collection (e.g., letters of permission to use instrument, consent forms, and study invitation), as well as ethical procedures and validity concerns.

Research Design and Rationale

I used the nonexperimental static group design to quantify and compare the subjective sleep quality (via the PSQI; Cheyne, 2001) of three intact groups with isolated sleep paralysis based on three levels of fear. The intact quasi independent variables investigated were initially XFISP, LFISP, and HFISP referring to no fear, low fear, and high fear categories, respectively, to examine several dependent variables, including sleep quality. After data collection was completed the no fear category with an inadequate

response rate was excluded from the analysis; consequently, I only used the low and high fear categories in the study.

I performed a statistical analysis via a MANOVA to examine whether the psychosocial variables taken as a group (dependent variables) were able to predict the LFISP and HFISP (quasi independent variables) categories in which participants belonged. To further examine whether the psychosocial variables (predictive variables) predicted subjective sleep quality (dependent variable) I conducted a multiple regression analysis. I also employed an Independent samples t-tests to explain specific associations found between the two categorical variables (independent) and a continuous (outcome) variable, and a separate MANOVA to investigate associations between the continuous outcome variables and two categories of an independent variable.

I selected specific variables for this study to test whether possible associations existed, for example, between the high ISP fear (IV) category and higher scores on DBAS (DV), which might possibly be related to poor subjective sleep quality for this sample population. As such, it was conducive to examine the subjective sleep quality within fear parameters of ISP along with the specific psychosocial factors to discover more about individuals who experience ISP in association with potential poor sleep quality. Identifying specific factors that might predict differences between groups with regard to the following research questions can be helpful in informing future research interests and intervention programs concerning the study population (MacKinnon, 2011).

Research Questions and Hypotheses

RQ1: Is there a significant predictive relationship between the fear category a participant belongs to (i.e., LFISP and HFISP) and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs-M).

$H_0$1: There is no significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belongs to and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs).

H_a1: There is a significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belongs to and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs).

RQ2: Are there differences in measures of the LOC (EO, ES, and INT, DBAS and social phobia that significantly predict subjective sleep quality scores?

$H_0$2: There are no significant difference in the measures of the LOC (EO, ES, and INT), DBAS and social phobia that significantly predict subjective sleep quality scores?

H_a2: There are significant differences in the measures of the LOC (EO, ES, and INT), DBAS, and social phobia that significantly predict subjective sleep quality scores?

RQ3: Are there significant differences in the dependent variable measures for the LOC subscales (EO, ES, and INT) for the participants in the HFISP compared to LFISP categories? (MANOVA)

$H_0$3: There are no significant differences between LOC scores based on the three subscales (EO, ES, INT) for the HFISP category compared to the LFISP category.

H_a3: There are significant differences in the LOC subscales of EO, ES, and INT (DVs) for the HFISP category compared to the LFISP category.

RQ4: Are there significant differences between the reported subjective sleep quality scores (dependent variable) of individuals who experience ISP as quasi independent variables of high fear associated ISP (HFISP) and low fear associated ISP (LFISP)?

H_04: There are no significant differences between the subjective sleep quality scores of participants with HFISP and LFISP.

H_a4: There are significant differences between scores of Individuals with HFISP regarding reported quality of sleep (dependent variable) compared to those with LFISP.

RQ5: Are there significant differences in social phobia scores between participants with LFISP and HFISP?

H_05: There are no significant differences in social phobia scores between participants with HFISP and LFISP.

H_a5: There are significant differences in social phobia scores between participants with HFISP and LFISP.

RQ6: Are there significant differences between DBAS scores for participants with LFISP and HFISP?

H_06: There are no significant differences between DBAS scores for participants with LFISP and HFISP.

H_a6: There are significant differences between DBAS scores for participants with HFISP and LFISP.

Methodology

Participants and Sampling

Due to a lack of specific databases that include all aspects of the population experiencing ISP and meeting the set criteria, I employed a nonrandom probability convenience technique to allow access to more than one mode of data collection. Participants were recruited from the Walden Participant Pool via links to SurveyMonkey which was also accessed by recruits from the Internet sleep paralysis sites and forums such as the Sleep Paralysis Project and Sleep Paralysis Sub-Reddit upon permission granted by administrators.

Exclusion criteria for the study pertained to individuals under age 18, those with a psychiatric diagnosis, substance abuse problems, and other sleep disorders, as well as those using medications or with medical conditions that cause sleep disturbance. Such exclusions might decrease representativeness of all elements of a population with ISP; however, mitigating possible influences of other factors is not due to a concern of causality. Moreover, within the tradition of a nonprobability sampling strategy, utilizing a convenience approach was beneficial for obtaining an adequate sample size and response rate.

Sample Size

Individuals experiencing sleep paralysis were not readily accessible via a database, as such, I used a convenience approach for this study which is not generalizable to the total population of individuals with ISP. With nonprobability convenience approaches, the sample size can be determined by researcher judgment (Frankfort-Nachmias & Nachmias,

2009) compared to calculations based on a proportion of the sampling frame as in probability sampling. It would also be unfeasible to employ an unreasonable sample count for this study due to time and resource constraints.

In this regard, to employ an adequate number of participants, one option was to examine the sample sizes of other similar studies as a guide for the present study. One study that closely approximated the present research included Hsieh et al.'s (2010) investigation of the impact of ISP on sleep and life quality with regards to Chinese-Taiwanese obstructive sleep apnea, who used a sample size of 107 participants. In this regard, taking into consideration the collection of data for several measures and constructs, a minimum of 100 participants sufficed. In addition, with a lack of accessible lists for this population due to specific inclusion and exclusion criteria the certainty of obtaining an appropriate sample size was questionable.

I used the G*Power Version 3.1 statistical power analysis program for social and behavioral sciences (Mayr, Buchner, Erdfelder, & Faul, 2007) to determine an adequate sample size. With an alpha level set at .05, power at .95 and a medium effect size of 0.15 for both the multivariate analyses (MANOVAs) and multiple regression the recommended sample sizes were $n = 138$ and $n = 74$, respectively. As such, for the present study I employed a sample size of 159 participants to investigate the predictive ability of five continuous psychosocial variables with respect to ISP fear categories and subjective sleep quality via MANOVA, regression analyses, followed by univariate analyses.

Procedure

Following approval of this study by Walden University's Institutional Review Board (approval number 03-22-17-0017655), recruitment began with an invitation to the study for participants who have experienced isolated sleep paralysis (i.e., being unable to move either upon falling asleep or upon awakening unassociated with narcolepsy) within the specified criteria as referenced in the participant section. Due to several different venues employed for data collection, the invitation to the study and administration of online questionnaires varied accordingly. For example, Internet data collection tools (i.e., SurveyMonkey) were used for recruiting from the Walden Participant Pool and SP online support groups such as Sleep Paralysis Project and the Sleep Paralysis Sub-Reddit. With regards to the Upstate Sleep Clinic (USC), based on a past communication (IRB office at Upstate Sleep Clinic, personal communication, December, 22, 2016), a faculty member at the University would have been necessary to collaborate with me on the research. Recruitment of potential participants from the USC would be infeasible for the present study due to time constraints.

All subsequent recruitment, including Walden University Participant Pool was initiated via an invitation to study which referenced inclusion and exclusion criteria. More specifically, the study was restricted to those who have experienced only the isolated form of sleep paralysis. The invitation specified the exclusion of those individuals below 18 years of age also those who experience SP with narcolepsy, those who abuse drugs or alcohol, and those with chronic medical conditions requiring prescription medications that affect sleep.

Informed consent was implied by completion of surveys or questionnaires in compliance with procedures, protocols, as well as compliance with the inclusion and exclusion criteria as indicated by the invitation to the study. The invitation also addressed risks/benefits, confidentiality, anonymity, and the voluntary nature of the study. Those participants who fit the criteria, confirmed such by completing the study and exiting via a link post survey completion.

Measures

Instrumentation. The operationalization of constructs began with a selection of questions taken from the WUSEQ (Cheyne, 2002) not only as a measure to assure individuals are experiencing the isolated form of sleep paralysis but also to assist with distinguishing fear categories in association with ISP. Upon completion of the PSQI (Buysse et al., 1989), the SPIN (Connor et al., 2000), the BLOC (Brown, 1990), and the DBAS (Morin et al., 2007), categories of fear were required to be indicated on each survey.

Waterloo Unusual Sleep Experience Questionnaire

The WUSEQ was instrumental in assuring that participants met the criteria set forth in the study consent confirming their experience was within the criteria specific to sleep paralysis. Subsequently, participants completed a selection of items taken from the Waterloo Unusual Sleep Experience Questionnaire (WUSEQ; Cheyne, 2002) to categorize the sample population into two groups based on characteristics of the same quasi-independent variable (i.e., isolated sleep paralysis). Initially, I categorized the groups according to three different intensity levels of fear (no, low, and high fear) associated with ISP; fewer individuals experience ISP without fear (i.e., blissful) and more with higher

levels of fear (Cheyne & Girard, 2007). As asserted by Sharpless and Doghramji (2015), the operationalization of the meaning of fear associated with ISP might not be universally understood. In this regard, using a cookie-cutter model was not feasible, albeit the WUSEQ was considered appropriate for distinguishing ISP fear categories.

I selected items from the WUSEQ to assign participant categories based on fear associated with the experience. As such, questions from the scale were included only in relation to hallucinations specific to the three-factor model.

The specific items on the scale referenced aspects of fear categorized according to factors of incubus, intruder, and unusual bodily sensations. The visual hallucinations and sensed presence felt by those experiencing sleep paralysis (i.e., incubus and intruder) have been associated with fear more so than the unusual bodily sensations (UBS) one might feel (Cheyne et al., 1999). The construct of fear associated with sleep paralysis, in general, has been well established in the research (Cheyne, et al., 1999; Dahlitz & Parkes, 1993; Mellman et al., 2008; Ramsawh et al., 2008; Sharpless et al., 2010; Sharpless et al., 2011; Sharpless & Grom, 2016; Simard & Nielsen, 2005).

The WUSEQ is a scale frequently used in sleep paralysis studies since 1999 (Cheyne, 2002). The face validity (Frankfort-Nachmias & Nachmias, 2009) of this instrument has been subjectively sufficient in establishing the construct of sleep paralysis as referenced in the Cheyne's (2002) Technical Report as well as the parameters of fear (Sharpless & Doghramji, 2015). The reliability of the WUSEQ, test-retest reliability has been established in past studies using a parallel forms technique (Ohaeri, et al., 2004) in identifying similar constructs of ISP in an African population. The Nigerian study (Ohaeri

et al., 2004) showed internal consistency for the continuous variables with a Cronbach alpha (.66), as adequately significant and for categorical variables the Kappa coefficient showed high agreement (.76 - .94). Reliability has also been confirmed via parallel studies twice repeated amongst college students in Sudan applied a week apart (Ohaeri et al., 2004). Test-retest reliability of key items was assessed by Kappa coefficient for response agreement in rating, with categorical yes and no responses showing high inter-rater agreement (.74 - .88).

The WUSEQ includes items specific to sleep paralysis as it is experienced more blissfully which is often the case with lucid dreaming (Cheyne,2001) and explains the initial inclusion of a no fear category for the present study. The Scores for parameters of fear, based on the WUSEQ, were determined by the compilation of questions below regarding, intensity of fear (question 2 below), fear associated with the hallucinations (question 1 below), and fear intensity associated with the anticipation of episodes or approach to sleep (Alvaro, 2005; Cheyne & Pennycook, 2013) as seen with question 3 below. Responses from questions 2 and 3 below were measured based on a Likert response format (Carifio & Perla, 2007) from does not apply (0), to vague (1) to very clear (7) where more clarity of hallucinations (or a higher number) implied more fear. As such, categories of responses regarding fear were classified as no fear (XFISP), low fear (LFISP), or high fear (HFISP).

Examples of questions used from the WUSEQ referenced fear associated with the hallucinatory aspects, intensity of fear associated with ISP, and fear expectation associated with sleep as listed below (see complete questionnaire in Appendix D):

1. Check all ISP hallucinations that apply below (incubus [INC], intruder [INT], and unusual body sensations [UBS]) and apply "0" to indicate no fear associated and "1" to indicate some associated. The summation of responses for INC, INT, and UBS was instrumental in determining the assigned fear category (no/low or high fear). For example, for items A-E as demonstrated below, a sum of scores can range from 0 to 5
    A. Feelings of pressure on Chest (INC) = 1
    B. Feeling of getting out of bed or of being awake only to discover you are not awake and have not moved (UBS) = 0
    C. Up and down elevator-like body sensations (UBS) = 0
    D. Out of body sensations (UBS) = 0
    E. Sounds, (e.g., foots steps, voices, noises) (INT) =1
2. Intensity of fear associated with ISP (does not apply [0], 1, 2, 3, 4, 5, 6, 7) was used to categorize groups as no fear, lower fear and higher fear (Cheyne, 2002, p.15).
3. When approaching sleep and during sleep how afraid are you of having an episode? (0, 1, 2, 3, 4, 5, 6, 7) was used to categorize groups as no fear, lower fear, and higher fear.

Pittsburgh Sleep Quality Inventory (PSQI)

The employed the PSQI (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) to assess the dependent variable of subjective sleep quality in both clinical and nonclinical populations, including those with ISP (Hsieh, et al., 2010). The PSQI is standardized and

widely used to assess subjective sleep quality and sleep disturbance to discriminate between good and poor sleepers over a one-month period (Ferris, Williams, Shen, O'Keefe, & Hale, 2005). The inventory contains nine questions overall, inclusive of 19 specific items, with a few items more specific to subjective sleep quality as related to the present study. The sleep quality overall rating is based on a Likert scale with responses of 0 (Very Good), 1 (Fairly Good), 2 (Fairly Bad), and 3 (Very Bad).

The rating scale for the remaining item subscales measured sleep quality as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction with response choices 0 (not during the past month), 1 (less than once a week), 2 (once or twice a week), and 3 (three or more times a week). Question six regarding sleep medication is less pertinent to the present study as per study criteria as well as question 10, which is more objective. Notwithstanding, the global score for this scale is cumulative of the seven sub-scores ranging from 0 to 21 with the higher PSQI scores (greater than 5) meaning worse sleep quality (Buysse et al., 1989).

Cronbach's alpha coefficient produced an average internal consistency reliability estimate .80 for the global PSQI score across numerous patient populations with a variety of different ailments (Lawson, Johnson, Carpenter, & Andryowski, 1998). Additionally, the PSQI was shown to be more highly correlated with sleep problems (r = .69 - .77) than with unrelated constructs, such as mood symptoms and depression (r = .22 - .65; Lawson et al., 1998). Backhaus, Junghanns, Broocks, Riemann, and Hohagen (2002) reported an average

global PSQI score test-retest reliability correlation coefficient .87 in a group of 80 patients with primary insomnia over a test-retest interval from two days to two weeks.

Brown Locus of Control Scale (BLOCS)

The BLOCS (Brown & Marcoulides, 1996; Brown, 1990) is a 25-item inventory containing three subscales which provides three scores: the internal LOC subscale (i.e., when one feels in control of their destiny), external social LOC (i.e., attributing events in one's life to others people and the social environment), and the external other LOC subscale (i.e., life is perceived to be ruled by fate, luck, chance, or God). The scale contains 25 items with the three subscales, the internal LOC subscale (9-items), external social LOC (9-items) and 7-items on the external other LOC subscale (Brown, 1990; Brown & Marcoulides, 1996). The scale was rated on a 6-point Likert scale with responses of 6 (very strongly agree), 5 (strongly agree), 4 (agree), 3 (disagree), 2 (strongly disagree), and 1 (very strongly disagree). Higher scores represented more of an association with each type of LOC (e.g., those in the low fear category scored higher on the internal LOC subscale).

The BLOCS has been used in Japanese studies for kanashibari, where positive correlations were found between LOC (EO) and kanishbari (Arikawa, et al., 1999), with similarities to aspects of ISP regarding uncontrollability and unpredictability as applied to the present study. Test-retest reliability has been established for a two-week period with correlation scores on all three LOC subscales at .81 (INT), .91 (ES), and .84 on the EO subscale. Internal consistency was established with alpha coefficients for .66 for the EO subscale, .71 for the ES and .74 for the LOC (INT).

Social Phobia Inventory (SPIN)

The used the SPIN (Connor, Davidson, Churchill, Sherwood, Foa, & Weisler, 2000) in the present research study to measure the construct of social phobia possibly related to the intruder and incubus aspects of ISP. Research conducted by Simard & Nielsen (2005) found similarities between social anxiety and the sensed threatening presence seen with ISP, closely associated with the incubus and intruder aspects of ISP. Connor et al.'s (2000) SPIN includes 17 items regarding fear associated with people (e.g., being watched by others, authoritative figures, embarrassment), avoidance (e.g., avoiding speaking to people due to fear of embarrassment, avoid being criticized), physiological discomfort (e.g., blushing, sweating, trembling, palpitations). The items were rated on a range from 0-4 (not at all, a little bit, somewhat, very much, and extremely, respectively) with a global score ranging from 0-68, and higher scores meaning greater social phobia.

Validation for the SPIN has been established in sufficient correlation with other scales such as the Liebowitz Social Anxiety Scale and the Brief Social Phobia Scale to name a couple (Connor et al., 2000), with an internal consistency of .94 for total SPIN. Vilete, Figueira, and Coutinho (2006) also reported a good internal consistency for the scale (Cronbach's $\alpha = .88$), and test- retest reliability (correlation coefficient = .78) for total scores for Brazilian populations and Cronbach alpha was reported at .85 for a population of psychology students (Ofan, Rubin, & Amodio, 2012).

Dysfunctional Beliefs and Attitudes About Sleep Scale (DBAS-16)

I used the DBAS 16 to measure possible sleep disruptive cognitions such as faulty beliefs and appraisals, unrealistic expectations, as well as perceptual and attention biases

(Morin et al., 2007). The original DBAS 30 is a self-report measured on a Likert type scale with 30-items to assess beliefs about sleep rated from 0 (*strongly disagree*) to 10 (*strongly agree*), with a summation of items averaged together for a final score. Those with item scores of five or lower are indicative of less dysfunctional sleep beliefs and those with item scores of six or higher show more unrealistic expectations or thoughts about their sleep.

Although the DBAS was originally designed with regards to insomnia research has shown that ISP can be experienced interchangeably with insomnia (Sawant, Parkar, & Tambe, 2005). In addition, the DBAS has been used in research regarding sleep disruption resulting from other factors outside of any specific sleep disorder (Li, Huang, & Zhang, 2011). The scale might also apply to the present study to investigate whether such beliefs factor in concerning the subjective measure of sleep quality in a population of individuals with ISP and whether such potential cognitions can be applied for therapeutic treatment.

The scale showed adequate validation via good internal consistency (Cronbach alpha = .80), average item-total correlations (.37), and sufficient convergent and discriminant validity. The DBAS-16 (Morin et al., 2007) taken from the original DBAS-30 retained 16 self-report items is an equally reliable and valid scale showing adequate internal consistency (Cronbach alpha = .79), average item-total correlation (.39), and acceptable convergent validity for research studies.

Data Analysis and Explanation of Variables

The following summary of application of variables are presented here as a premise to data analysis. The three factors associated with ISP (i.e., incubus, intruder, unusual bodily sensations) were used to determine the fear categories individuals identified with

while closely approximating the psychosocial variables of LOC (EO, ES, and INT), and social phobia.

For example, a high fear (HFISP) category might parallel the incubus and intruder aspects of the three-factor model (Cheyne et al., 1999). The intruder aspect involves an overwhelming fear-laden sense of observation by some perceived presence, somewhat akin to the psychosocial variable of social phobia. The incubus aspect might be perceived as even more subjective, as one feels a sense of being attacked, assaulted, or overcome by a presence, previously associated with the psychosocial variable of LOC (Arikara et al., 1999). On the contrary, those participants in a no or lower fear category might be more associated with the unusual bodily sensation aspect of the three-factor model and possibly correlated with a LOC (INT) and less social phobia. The psychosocial variable of DBAS was included as a measure to further inform the subjective appraisal of sleep for this population sample.

In summary, I tested the predictive relationship between high fear (HFISP) and low fear (LFISP) in conjunction with the psychosocial variables of the LOC subscales (EO, ES, INT), DBAS, and social phobia via a multivariate analysis. I also used multiple regression to test the predictive ability of the psychosocial variables on subjective sleep quality, followed by univariate analysis to identify any independent differences between groups.

Descriptive and Inferential Analysis

I used the most recent version of the SPSS statistics Grad pack software to help summarize the data responses specific to two ISP categories in association with fear (low fear and high fear) via summation of codes for specific items based on the three-factors

associated with ISP (INT, INC, UBS) taken from the WUSEQ (Cheyne, 2002) as detailed in Appendix D. Descriptive statistics included frequency distributions of ISP categories based on fear (i.e., LFISP and HFISP), means (*M*), standard deviation (*SDs*), and percentages as it applies to the specific continuous measures and research questions.

To measure the subjective sleep quality of each ISP participant, I used the PSQI with coded categories specific to each group (no fear [XFISP], low fear [LFISP], and high fear [HFISP]) as determined by selected items taken from the WUSEQ (see Appendix D). I also used The PSQI scoring database via Microsoft access to calculate each score for the subjective sleep quality measure. I analyzed scores for subjective sleep quality (SSQ-DV) to establish whether significant differences existed across categories of fear associated with ISP as well as with regards to the predictive ability of the psychosocial variables (i.e., social phobia, DBAS and the LOC subscales (EO, ES and INT) for SSQ.

I conducted a one-way multivariate analysis of variance (MANOVA) to determine whether there were any significant contributions associated with the level of fear one experienced with ISP (grouping variable) and the outcome variables of LOC (subscales: ES, EO, and INT), DBAS, and social phobia. MANOVA can be used when there is more than one dependent variable and an independent categorical variable. MANOVA is designed to look at several outcomes simultaneously and can detect group differences along a combination of variables. Subsequently, I conducted univariate testing to identify the specific dependent variables that contributed to the effect. The assumptions of multicollinearity, linearity, homogeneity of variances, and normality were also met for the MANOVA.

In addition, I employed a multiple regression to examine whether predictor variables of LOC (EO, ES, and INT), DBAS, and social phobia contribute to any predictive effect in the outcome variables of subjective sleep quality scores. The multiple regression checks for linear relationships between quasi independent and dependent variables via scatterplots as well as testing for normality which violation of assumption might be a concern for external validity in the present study due to selective sampling that might limit variability.

In interpreting multiple regression, a sample model summary determining the model fit might include a multiple correlation coefficient R (e.g., .75 might be considered a good level of prediction with $p < .05$) representing the quality of prediction of subjective sleep quality while the coefficient of determination R^2 is the amount of variance in the outcome variable (subjective sleep quality) explained by the IVs. Additionally, a $R^2 = .575$ might explain 57.5% of the variability of the DV with an adjusted R^2 also part of such analysis. It is also essential that all assumptions for multiple regression regarding linearity, normality, independence of observations, and homoscedasticity are met. Also, prior to analysis, data would need to be screened for univariate outliers to remove any offending cases.

Hypothetically, a multiple regression write-up for the present study might resemble the following:

A multiple regression analysis was conducted to predict subjective sleep quality from the predictors such as LOC (ES, EO, and INT), social phobia, and DBAS. These variables

significantly predicted subjective sleep quality, $F(5, 95) = 22.39$, $p < .05$, $R^2 = .577$. All four variables added statistical significance to the prediction, $p < .05$.

The independent samples t-test was conducted to determine if group differences existed between the fear levels of ISP in conjunction with the psychosocial variables of social phobia and dysfunctional beliefs about sleep as measured by the SPIN and the DBAS, respectively. A multivariate analysis of variance test was used to determine differences in ISP categories for fear with regards to LOC on the three subscales (external social, external other and internal) as measured by the BLOCS. To obtain specifics on which groups significantly differed, I conducted separate ANOVAS.

The assumption of normality for normal distribution of scores was tested via the Kolmogorov-Smirnov test or by examining continuous variables for skewness and kurtosis. Homogeneity of variance was assessed using Levene's test for the Equality of Error Variances (*F*-test) assuming both groups had equal error of variances. In the event of a nonnormal distribution, data was analyzed to identify outliers via use of boxplots or via Mahalanobis distance. *F*-tests were two- tailed, with alpha levels (probability of rejecting the null hypothesis when it is true), set at $p < 0.05$ to ensure a 95% confidence interval or certainty that the relationships did not occur by chance.

Threats to Validity

External validity concerns might involve the use of the internet as a major mode of data collection and the automatic exclusion of participants due to lack of internet access or usability. Due to the use of a convenience nonrandom sample, generalizability might not pertain to a broader population of individuals with ISP with characteristics outside the

exclusion and inclusion criteria. The Internet has been deemed a familiar resource to obtain support and health advice about sleep paralysis via forums, communities, and other sleep paralysis related websites (Weisgerber, 2014).

Limiting the data collection to the internet alone has implications for interaction effects of selection bias affecting external validity as well as generalizability across settings (Ahern, 2005). Moreover, there is an increased need to exercise caution about making broad generalizations considering sectors of population with ISP (e.g., non-Internet users) who were not represented in the sample. Although, the present research was more directed towards a specific group of individuals with ISP that meet a certain exclusion criterion of being otherwise healthy (e.g., no chronic medical conditions), the option remains open for the study to be replicated to include aspects of a broader population.

With the use of five online surveys, there is a possible threat to internal validity regarding mortality (Campbell & Stanley, 1963) resulting in an imbalance in response rates between ISP higher and lower fear categories. The lower rate of participant response in the high fear category might have been attributed to participant fear of having an episode when there is an increased focus on sleep paralysis (Hufford, 2002, 2005). Additional concerns with internal validity in survey research might involve errors with completing questionnaires, low response rate (Frankfort- Nachmias & Nachmias, 2008), and question sensitivity especially with regards to ISP populations (Hufford, 2005).

Ethical Considerations

The participants' rights were clearly indicated as well as any harmful, deceptive, or disrespectful elements associated with the study. Informed consent involved implied

agreement by participants based upon completion of the survey and also referenced confidentiality and anonymity, as the online survey (e.g., SurveyMonkey) did not require any identifiable information. I also included additional information to address privacy and to clarify all aspects of the study to avoid uncertainty or any other misunderstanding. With regards to ISP and the associated negative effect involved with the experience, it was important to mention the participants' right to discontinue the study in the event of any adverse effect on participants. A required protocol prior to conducting the study regarding all procedures and related aspects, involved gaining approval from the institutional review board (IRB) of Walden University. All IRB documents regarding permission and approval were included in the final dissertation with IRB approval number, 3-22-2017 0017655.

Summary

I used the static group design (SGC) for the present quantitative research study to direct attention towards a sector of society experiencing isolated sleep paralysis (ISP) with a potential impact on sleep quality due to associated fear. ISP hallucinations experienced during episodes might have a negative impact upon the quality of sleep regardless of frequency of episodes if fear is a significant factor. The SGC design was the best fit for the present study to answer the research questions involving individuals who experience low fear and high fear ISP (a no fear category was excluded from the analysis due to low response rate), with respect to the measure of subjective sleep quality, LOC (including subscales of EO,ES, and INT), social phobia, and DBAS.

Due to specific universal characteristics associated with the experience of ISP (i.e., incubus, intruder, and unusual bodily sensations) certain psychosocial variables (i.e., three

subscales for LOC [ES, EO, ad INT], social phobia, and DBAS), were examined via independent samples t-tests and MANOVAs to assess for any significant differences in the means between the two fear groups. In addition, I used multiple regressions analysis to test for predictive differences of all variable scores between fear groups and subjected sleep quality scores.

With intact groups, as seen with a nonrandom SGC design, there is no control over manipulating independent variables which is a weakness with regards to cause and effect (Campbell & Stanley, 1963). However, the purpose of the present study was not to infer causation but to examine whether predictive differences existed between groups. Moreover, the results can be applied for future research and to inform intervention programs for this population.

Chapter 4: Results

Introduction

There were several components to this quantitative quasi experimental research study, one of which was to examine whether subjective sleep quality was impacted differently for individuals who experience ISP within no, low, and high fear categories (the no fear category was later excluded). In addition, I investigated the psychosocial variables of DBAS, social phobia, and the subscales of LOC (external social, external other, and internal) to determine whether any significant differences existed between individuals with ISP in both categories of fear. Studies involving the quantification of the subjective sleep quality of an ISP population as a factor of fear and in association with specific psychosocial variables have not been previously researched to my knowledge. As such, I included descriptive and inferential statistics in the analysis to distinguish the fear categories in conjunction with dependent variables and to test the ability of the criterion variable (DV) to predict a certain outcome, respectively.

I begin Chapter 4 by referencing the results of the pilot study I conducted and addressing any need to change implementation or instrumentation of the final study. The chapter includes the findings from tests of the research hypotheses concerning the impact of fear on ISP and the associated sleep quality. The assumptions for each specific statistical test referenced normal distribution of variables, the presence of outliers, homoscedasticity, and multicollinearity. I conducted one-way multivariate analysis of variances analyses (MANOVAs), multiple regression analyses, and independent samples t-tests to answer the following research questions and hypotheses:

RQ1: Is there a significant predictive relationship between the fear category a participant belongs to (i.e., LFISP and HFISP) and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs)?

$H_0$1: There is no significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belong to and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs).

H_a1: There is a significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belong to and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs).

RQ2: Are there differences in measures of the LOC (EO, ES, and INT), DBAS and social phobia that significantly predict subjective sleep quality scores?

$H_0$2: There are no significant difference in the measures of the LOC (EO, ES, and INT), DBAS and social phobia that significantly predict subjective sleep quality scores.

H_a2: There are significant differences in the measures of the LOC (EO, ES, and INT), DBAS and social phobia that significantly predict subjective sleep quality scores?

RQ3: Are there significant differences in the dependent variable measures for the LOC subscales of (EO, ES, and INT for the participants in the HFISP compared to LFISP categories?

$H_0$3: There are no significant differences between the LOC scores based on the three subscales (EO, ES, INT) for the HFISP category compared to the LFISP category.

H_a3: There are significant differences in the LOC subscales of EO, ES, and INT (DVs) for the HFISP category compared to the LFISP category.

RQ4: Are there significant differences between the reported subjective sleep quality scores (dependent variable) of individuals who experience ISP as quasi independent variables of high fear associated ISP (HFISP) and low fear associated ISP (LFISP)?

$H_0$4: There are no significant differences between the subjective sleep quality scores of participants with HFISP and LFISP.

H_a4: There are significant differences between scores of individuals with HFISP regarding reported quality of sleep (dependent variable) compared to those with LFISP.

RQ5: Are there significant differences in social phobia scores between participants with LFISP and HFISP?

$H_0$5: There are no significant differences in social phobia scores between participants with HFISP and LFISP.

H_a5: There are significant differences in social phobia scores between participants with HFISP and LFISP.

RQ6: Are there significant differences between DBAS scores for participants with LFISP and HFISP?

$H_0$6: There are no significant differences between DBAS scores for participants with LFISP and HFISP.

H_a6: There are significant differences between DBAS scores for participants with HFISP and LFISP.

Data Collection

I conducted a pilot prior to the study, which I administered to a total of 20 participants consisting of friends and family (not included in the main study) to test how

long it took for the five surveys representing the research variables or scales in question. The results indicated an average time frame of 20 minutes maximum to complete all five surveys with approximately six months for total data collection. The pilot results did not impact the original plan for the study administration.

Following approval of the main study by Walden University's Institutional Review Board (approval number 3-22-20170017655), I compiled questionnaires/surveys for data collection taken from five different instruments: the WUSEQ (Cheyne, 2002), the SPIN (Connor et al., 2000), the DBAS (Morin et al., 2007), the BLOC (Brown, 1990), and the PSQI (Buysse et al., 1989). The surveys were uploaded to SurveyMonkey, an online platform for survey design and data collection (Massat, Mckay, & Moses, 2009). An invitation to the study linked to SurveyMonkey was posted to online sleep paralysis groups and forums such as Reddit (e.g., sleep paralysis and lucid dreaming subgroups), the Sleep Paralysis Project Facebook page, as well as the Walden Participant Pool. Although somewhat limiting in representativeness, I recruited a convenience sample of 159 participants to complete five surveys. Data were saved as an Excel document and entered into SPSS for data analysis. Survey responses with missing questions or without a fear category indicated (e.g., no fear, low fear, and high fear) were not included in the analysis.

Descriptive Statistics

I used descriptive statistics to distinguish three categories of the explanatory variable, ISP Fear (i.e., no fear, low fear, and high fear), based on the sleep paralysis experience questionnaire as seen in Appendix D. However, post data collection, the "no fear" category response rate was inadequate to include as part of data analysis; thus, I

excluded the study to include only the low fear and high fear categories. For example, 5.3% of the total responses (n = 59) were in the "no fear" category compared to 55.0% of total responses in the "low fear" category and 39.6% in the "high fear" category. Complete data responses were necessary to answer the six research questions regarding the variables of subjective sleep quality, the LOC subscale variables (i.e., external other, external social, and internal), social phobia, and the DBAS. The only demographic information for the participants was an age restriction of 18 and over.

Hypotheses, Assumptions, and Outcomes

Research Question 1

RQ1: Is there a significant predictive relationship between the fear category a participant belongs to (i.e., LFISP and HFISP) and the measures of the LOC subscales (EO, ES, INT), DBAS, and social phobia (DVs)?

$H_0$1: There is no significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belong to and the measures of the LOC subscales (EO, ES, and INT), DBAS, and social phobia (DVs).

H_a1: There is a significant predictive relationship between the fear categories (i.e., LFISP and HFISP) participants belongs to and the measures of the LOC subscales (EO, ES, and INT), DBAS, and social phobia (DVs).

I conducted a MANOVA for RQ1, based on the following assumptions being met, in examination of whether the categories of fear significantly influenced the measures of dependent variables. MANOVA tests the differences in the means of the multiple dependent variables, between categories of the independent variables. The dependent

variables in the analyses are specific to the LOC subscale values (EO, ES, and INT), DBAS, and social phobia and the independent variables are categorical referring to low and high fear ISP.

RQ 1 normality assumption. I have assessed the assumption for normality by measuring the skewness and kurtosis on the continuous scale variables (i.e., social phobia SocPho, DBAS, and LOC [EO, ES, and INT)] based on categories of fear. The measure of positive or negative skewness applied if Z scores were found greater than +/-3.29 for medium-sized samples greater than 50 but less than 300 (West, Finch, & Curran, 1995). Social phobia was approximately normally distributed with a skewness and kurtosis in the LFISP category at .33 (*SE* = .26) and -.60 (*SE* = .51), respectively; the HFISP category, skewness was at .21 (*SE* = .32) and kurtosis at -.63 (*SE*= .60). LOC (ES) for LFISP category showed normal distribution with skewness at .79 (*SE* = .26) and kurtosis approximately normally distributed at .78 (*SE* = .51); the HFISP category showed a skewness to be approximately normally distributed at .24 (*SE* = .32) and kurtosis at -.42 (*SE* = .62). LOC (EO) for the LFISP category had an approximately normal distribution at .50 (*SE* =.26) and kurtosis at .29 (*SE* = .51); the HFISP category of LOC (EO) showed skewness to be approximately normally distributed at .04 (*SE* = .32) with kurtosis at -1.04 *(SE* = .62). LOC (INT) skewness was approximately normal at -.33 (*SE* = .26) for the LFISP category with kurtosis at .06 (*SE* = .51); and for the HFISP category LOC (INT) skewness was approximately normally distributed at -.78 (*SE* = .32) and kurtosis at 1.4 (*SE* = .62). DBAS was approximately normally distributed for the LFISP category with a skewness at .38 (*SE* = .26) and kurtosis at - .14 (*SE* = .51); an approximately normal skew

was found for the HFISP category at -.28 (*SE* = .32) and kurtosis at .34 (*SE* = .62). In summary the continuous variables were all approximately normally distributed.

RQ 1 absence of outlier assumption. There was an absence of multivariate outliers according to Mahalonobis distance with the maximum output value at 14.59, the assumption was met. A maximum Mahalonobis distance allowable was 20.52 for 5 DVs, as indicated by the critical values table (Frankfort-Nachmias & Nachmias, 2008).

RQ 1 multicollinearity assumptions. Multicollinearity exists when predictors within a model are highly correlated which is an assumption that should be absent with MANOVA. As such, the predictors in the present model were not highly correlated: SocPho, Tolerance = .889, VIF = 1.125; LOC (ES), Tolerance = .895, VIF =1.118; LOC (EO), Tolerance = .924, VIF = 1.082; LOC (INT), Tolerance = .941 VIF = 1.062; DBAS, Tolerance = .904, VIF = 1.107. Nevertheless, a separate univariate analysis of variation was conducted for each outcome variable.

RQ 1 linearity assumption. I assessed the assumption of linearity by plotting a scatterplot matrix to show that a linear relationship existed between each pair of dependent variables per group of the independent variables (low and high fear categories) for DBAS, LOC-INT, LOC-ES, LOC-EO and SocPho (See Figure 1).

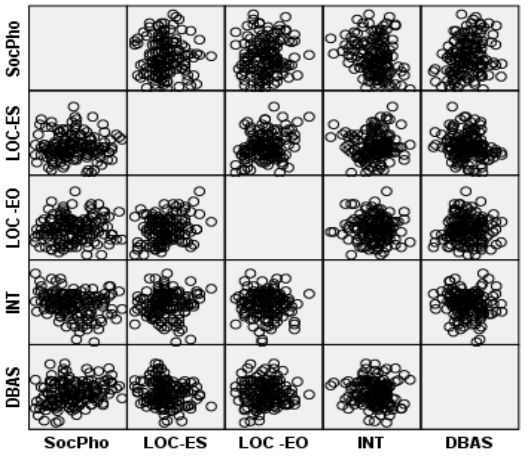

Figure 1. Scatterplot matrix for psychosocial variables.

RQ 1 homogeneity of variance and covariance assumptions. Based on the Box's M test of equality being nonsignificant at p > .001 (p = .02), the homogeneity of covariances matrices resulted in equality of the variance and covariance matrices for both groups. The assessment of the assumption for equal variances was satisfied for all dependent variables via the Levene's test which failed to reject the null hypothesis of equal population variances at the univariate level of $p > .05$: SocPho, $p = .717$; LOC (ES), $p = .213$; LOC (EO), $p = .165$; LOC (INT), $p = .052$; and DBAS, $p = .492$.

RQ 1 Outcomes. I conducted a MANOVA at an alpha level (α) of .05 (confidence interval = .95) and the null hypothesis was rejected with regards to the two mean vectors of groups being equal, indicating the two groups differed when considered together on the five dependent variables. The results indicated that significant differences existed between fear categories (HFISP and LFISP) of individuals with isolated sleep paralysis (ISP) when

considering social phobia, DBAS, and LOC (EO, ES, INT), together as a group; Wilk's Λ = .90, $F(5,139) = 3.26$, $p = .008$, partial $\eta^2 = .11$.

The multivariate η^2 based on Wilk's Λ indicated a moderate effect size (.11) interpreted as 11% of multivariate variance of the dependent variables being associated with the ISP fear category. A post hoc power analysis indicated an observed power at .88 and was adequate to detect an effect size of .11 (medium effect) at an α level of .05.

To specify exactly where this difference existed, a separate univariate analysis via ANOVA was conducted for each dependent variable with each ANOVA evaluated at significance level $p < .05$. A one-way ANOVA did indicate a significant difference between HFISP and LFISP categories on social phobia. $F(1,143) = 8.48$, $p = .004$, partial eta squared $\eta^2 = .06$), with HFISP ($M = 30.81$) scoring higher than LFISP ($M = 24.14$). There was also a significant difference between the HFISP and LFISP categories on LOC (EO), $F(1, 143) = 4.92$, $p = .03$, partial eta squared ($\eta^2 = .033$), with LFISP ($M = 27.80$) scoring higher on the LOC (EO) variable than the HFISP ($M = 26.00$). There was not a significant difference between the HFISP and LFISP categories on LOC (external social [ES]). $F(1, 143) = 2.53$, $p = .114$, partial eta squared $\eta^2 = .02$. There was not a significant difference between the HFISP and LFISP categories on LOC (INT), $F(1, 143) = .30$, $p = .59$, partial $\eta^2 = .002$. There was not a significant difference between the HFISP and LFISP categories on DBAS, $F(1,143), = 1.78$, $p = .186$, Partial eta squared ($\eta^2 = .012$).

Based on the findings of the MANOVA the results indicated a partial rejection of the null hypothesis due to statistically significant difference found between HFISP and LFISP categories in regard to social phobia and LOC (EO). Table 1 exhibits the estimated

marginal means or means and standard deviations for the dependent variables (SocPho, DBAS, and LOC [EO, ES, and INT]).

Table 1

Means and Standard Deviations for Social Phobia, LOC (EO, ES, INT), and DBAS, by Fear Category

Dependent variables	*Fear category*	*M*	*SD*
Social phobia	LFSP	24.14	1.44
	HFISP	30.81	1.79
DBAS	LFISP	4.60	.164
	HFISP	4.95	.204
LOC-EO	LFISP	27.86	.507
	HFISP	26.00	.631
LOC-ES	LFISP	31.90	.520
	HFISP	30.58	.646
LOC-INT	LFISP	26.11	.512
	HFISP	25.67	.636

Research Question 2

RQ2: Are there significant differences in measures of LOC (subscales; EO, ES, and INT), DBAS, and social phobia that significantly predict subjective sleep quality scores?

$H_0$2: There are no significant difference in the measures of LOC (subscales; EO, ES, and INT), DBAS, and social phobia that significantly predict subjective sleep quality scores?

H_a2: There are significant differences in the measures of LOC (subscales; EO, ES, and INT), DBAS, and social phobia that significantly predict subjective sleep quality scores?

I conducted a multiple regression analysis to examine whether the five dependent variables could predict the explanatory variable of subjective sleep quality, contingent to meeting the following assumptions. With multiple regression analysis it is assumed that there would be a normal distribution of residuals, absence of multicollinearity between independent variables, linear relationship between dependent and independent variables, and homoscedasticity (samples have similar variances).

RQ 2 assumption of normality. The outcome variable of sleep quality met the assumption for a normal distribution as seen via the symmetrical bell-shaped histogram below (Figure 2). The normality assumption was also supported by the Shapiro-Wilks test with $p = .072$, showing a nonsignificant result for the outcome variable of sleep quality.

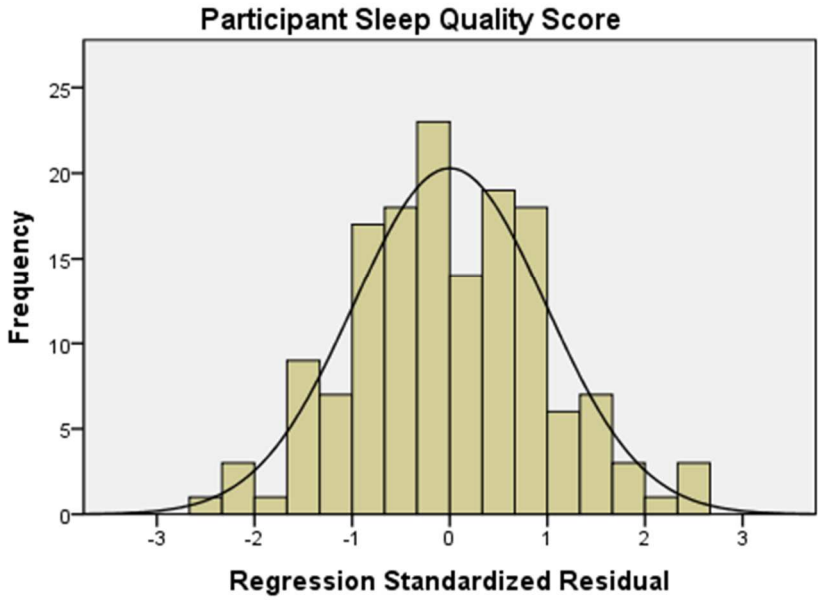

Figure 2. Histogram –Normal distribution of sleep quality scores.

RQ 2 assumption of multicollinearity. The assumption for multicollinearity was also met as the predictor variables were not highly correlated: SocPho, *Tolerance = .930, VIF = 1.076;* LOC (ES), *Tolerance = .89, VIF = 1.125;* LOC (EO), *Tolerance = .908, VIF = 1.101;* LOC (INT), *Tolerance = .965 VIF = 1.036;* DBAS, *Tolerance = .917, VIF = 1.091*

RQ 2 assumption for absence of outliers. The assumption for outliers was tested using the Mahalonobis distance (max. 19.062) with a maximum allowed of 20.52, based on the critical values table for the five predictor variables, (Frankfort-Nachmias & Nachmias, 2008). Thus, the assumption for an absence of outliers was met.

RQ 2 assumptions for homoscedasticity and linearity. This assumption for homoscedasticity was assessed via a scatterplot showing the standardized predicted values

and standardized residual values. The assumption was met because the points on the scatterplot showed error values remaining within +/- 3 on both X (predictor) and Y (residual) axes across all values of the independent variables and there was an equal distribution with no obvious direction or fanning out of scores (Figure 3). The assumption for linearity was also confirmed, based on the homoscedastic relationship, as the points were equally dispersed about the "0" line, showing no clear relationship for the predicted and residual values (Figure 3-below).

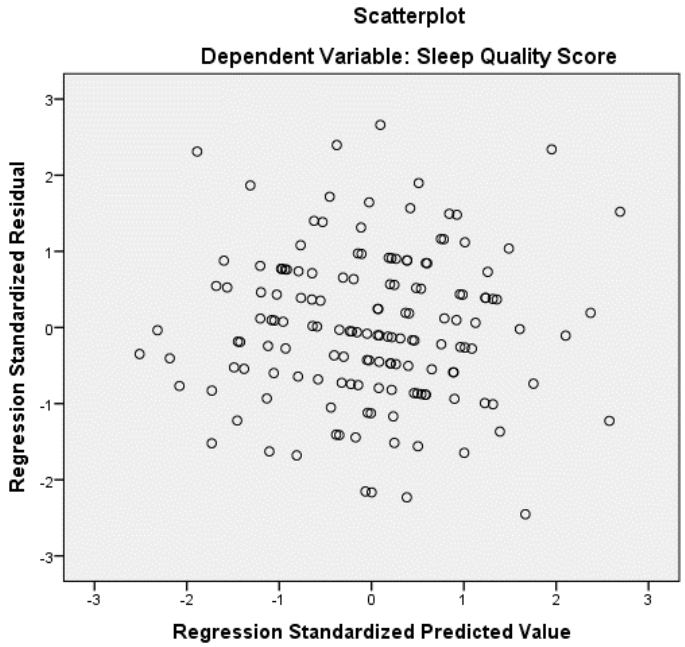

Figure 3. Residuals scatterplot for homoscedasticity and linearity for sleep quality.

RQ 2 outcomes. The overall regression model summary when taking all predictors together, social phobia, and DBAS, was not significant. $R^2 = .03$, is not significantly greater than 0, with $p > .05$ ($p = .49$). The model did not predict or account for any variance in the criterion variable of subjective sleep quality $F(5,144) = .89$, $p =$, $R^2 = .03$. There was a

failure to reject the null hypothesis for RQ2 as there were no significant unique contributions to variance in sleep quality scores by the predictor variables social phobia (SocPho) p > .05 = .695 (not a significant predictor of SSQ); LOC (ES) (not a significant predictor of SSQ) $p > .05 = .927$; LOC (EO) (not a significant predictor of SSQ) $p > .05 = .799$; LOC (INT) (not a significant predictor of SSQ) $p > .05 = .081$; and DBAS (not a significant predictor of SSQ) $p > .05 = .197$.

Research Question 3

RQ3: Are there significant differences in the dependent variable measures for LOC (subscales; EO, ES, and INT), for the participants in the HFISP compared to LFISP categories?

$H_0$3: There are no significant differences between LOC scores based on 3 subscales for the HFISP category compared to the LFISP category. In other words, there will be no significant difference between categorical scores on the 3 subscales (EO, ES, INT).

H_a3: There are significant differences in the LOC subscales of EO, ES, and INT (DVs) for the HFISP category compared to the LFISP category.

A multivariate analysis of variance (MANOVA) was conducted for RQ3, based on the following assumptions being met, in examination of whether significant differences existed between categories of fear with respect to the measures of dependent variables. The dependent variables in the analyses are specific to the LOC subscale variables (EO, ES, and INT) and the independent variables are categorical referring to low and high fear ISP.

RQ 3 normality assumption. I tested normality via skewness and kurtosis at Z scores between +/-3.29 (West et al., 1995) on the continuous variables of LOC for the

three subscales: the subscale for LFISP LOC (ES) showed an approximate normal distribution with a skewness of .79 (*SE* = .26) and a kurtosis of .78(*SE* = .51) while HFISP (LOC-ES) was approximately normally distributed with a skewness of .67 (*SE* = .30) and kurtosis at 1.18 (*SE* = .60); LFISP LOC (EO) was approximately normally distributed with a skewness of .50 (*SE* =.26) and kurtosis of .29 (*SE* = .51), while HFISP LOC-EO was approximately normal for a skewness of -.09 (SE = .30) and kurtosis at -.86 (*SE* = .60); LFISP LOC (INT) skewness was approximately normally distributed with a skewness of -.33 (*SE* = .26) and kurtosis at .06 (*SE* = .51) and HFISP LOC (INT) was approximately normally skewed

at -.60 (*SE* = .30) and kurtosis at 1.52 (*SE* = .60). As such, the variables for LOC (ES, EO, and INT) were approximately normally distributed based on the skewness and kurtosis results.

RQ 3 absence of outliers assumption. I used Mahalonobis distance to check for multivariate outliers with the maximum output value at 13.81 and a minimum of .066. The maximum allowable critical value for three dependent variables was 16.27 (Frankfort-Nachmias & Nachmias, 2008), thus the assumption for absence of outliers was met.

RQ 3 linearity assumption. I assessed the assumption of linearity via a **s**catterplot matrix to show that a linear relationship exists between each pair of dependent variables per group of the independent variables (low and high fear categories) for LOC (ES, EO, and INT as seen in Figure 2 below:

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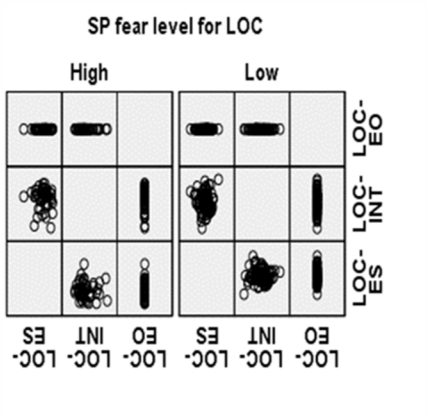

Figure 4. Scatterplot matrices to assess relationship between LOC (subscales; EO, ES, and INT), based on low and high fear.

RQ 3 homogeneity of variances/covariance assumption. I tested for homogeneity of covariances for both groups (high fear and low fear) which was met based on Box's M test of equality and found not significant at $p > .001$, $p = .03$.

Equality of variances was assessed and satisfied for all dependent variables via the Levene's test which failed to reject the null hypothesis of equal population variances at the univariate level of $p > .05$. The assumption of equal variances was met for the three dependent variables LOC (ES, $p = .213$); LOC (EO, $p = .165$); and LOC (INT, $p = .052$).

RQ 3 outcomes. The MANOVA main effect of FISP (low and high fear categories) when considered jointly on the main vector differences of the dependent variables of LOC (EO, ES, INT), was not significant, at an alpha of .05, Wilks $\Lambda = .957$, $F(3,141) = 2.13$, $p = .099$, partial $\eta^2 = .04$.

On the univariate level the equal variance assumption was satisfied by the Levene's test of homogeneity. A separate ANOVA was conducted for each outcome variable (DV) with each ANOVA evaluated at an alpha level of .05. Results of the one way ANOVA

showed there was a significant difference between the low fear category and the high fear category on the LOC (EO) variable, $F(1,143) = 4.92$, $p = .028$, partial $\eta^2 = .03$. Post hoc analysis via marginal means indicated which dependent variable showed specific differences in FISP. The lower fear category ($M = 27.80$) showed a statistically significantly higher score for the LOC (EO) variable compared to the high fear category ($M = 26.00$). There was not a statistically significant result for LOC (ES) between the low and high fear categories, $F(1,143) = 2.53$, $p = .114$, partial $\eta^2 = .02$. There was not a statistically significant result for LOC (INT) between the low and high fear categories, $F(1,143) = .30$, $p = .59$, partial $\eta^2 = .002$. Thus, the null hypothesis was partially rejected for research question three.

Research Question 4

RQ4: Are there significant differences between the reported subjective sleep quality scores (SSQ-dependent variable) of individuals who experience ISP as quasi independent variables of high fear associated ISP (HFISP) and low fear associated ISP (LFISP)?

$H_0$4: There are no significant differences between the subjective sleep quality scores of participants with HFISP and LFISP**.**

H_a4: There are significant differences between scores of individuals with HFISP regarding reported quality of sleep (dependent variable) compared to those with LFISP.

I used the independent samples t-test to determine whether a statistically significant difference existed between the means of the two categories (low and high) of the independent variable (FISP) relative to the continuous DV (SSQ). The two assumptions

applicable to the independent samples t-test includes normal distribution of the dependent variable and homogeneity of variance as referenced below.

RQ 4 normality assumption. I tested the assumption of normality for the continuous variable (SSQ) for skewness and kurtosis at each level of the independent variable to avoid the chance of a type one error. SSQ was approximately normally distributed with a skewness and kurtosis in the LFISP category at .31 (*SE* = .26) and .45 (*SE* = .51), respectively, and for the HFISP category, approximate normal distribution was found for skewness and kurtosis at -.01 (*SE* = .31) and -.72 (*SE* = .62), respectively. Normality was also established based on the Shapiro Wilk's value for both levels of the independent variable for SSQ with a non-statistical result of $p > .05$; low fear, $p = .05$, and high fear, $p = .32$.

RQ 4 homogeneity of variance assumption. To test the assumption that error variances were equal for both categories of fear regarding SSQ the Levene's test was employed at an α level of .05. Homogeneity of variance was assessed and resulted in statistical insignificance at an α greater than .05, ($p = .582$), thus, the assumption of equal variances was met for subjective sleep quality.

RQ 4 outcomes. The independent samples t- test results indicated that there was not a statistically significant difference between the reported subjective sleep quality scores of participants in categories of HFISP as compared to LFISP**,** $t(144) = -1.40$, $p = .16$. The participants in the low fear category ($N = 88$) scored lower on SSQ ($M = 9.00$) in comparison to those in the high fear category ($N = 58$), who scored higher on SSQ ($M =$

9.69). Thus, there was a failure to reject (accept) the null hypothesis for research question four.

Research Question 5

RQ5: Are there significant differences in social phobia scores between participants with LFISP and HFISP?

$H_0$5**:** There are no significant differences in social phobia scores between participants with HFISP and LFISP.

H_a5: There are significant differences in social phobia scores between participants with HFISP and LFISP.

The independent samples t-test was used to test for any significant difference between the means of the two categories (low and high) of the independent variable (FISP) with regard to the continuous dependent variable social phobia (SocPho). The independent samples t-test assumes an approximate normal distribution of the dependent variable and that the variances of the two groups are equal in the population as referenced below.

RQ 5 normality assumption. To test the normality of the continuous variable of social phobia, I analyzed the skewness and kurtosis for each category of the sample population (independent variable). The LFISP category for social phobia showed an approximate normal distribution with a skewness and kurtosis at .33(*SE* = .26) and -.60 (*SE* = .51), respectively, and for the HFISP category, approximate normal distribution was found for skewness and kurtosis at .18 *(SE* = .314*)* and -.77 *(SE* = .62*),* respectively. To further test the normality of the sample population the Shapiro-Wilks test was employed with subsequent results met**,** $p > .05$ (i.e., LFISP, $p = .06$; HFSP, $p = .29$).

RQ 5 homogeneity of variance assumption. To test the assumption that error variances were equal for both categories of fear (i.e., LFISP and HFISP) regarding social phobia, I conducted a Levene's F test at an α level of .05. Homogeneity of variance resulted in statistical insignificance at $p > .05$, $F(144) = .16$, $p = .69$. Thus, the assumption of equal variances was met for social phobia.

RQ 5 outcomes. The results of the independent t test showed a statistically significant effect $t(144) = -3.03$, $p = .003$ in response to the hypothesis of whether there was a statistically significant difference in social phobia scores between participants with LFISP and HFISP. The participants in the low fear category ($N = 88$) scored lower on social phobia $M = 24.14$ in comparison to those in the high fear category ($N = 58$), who scored higher on social phobia $M = 31.03$. As a result, the null hypothesis was rejected.

Research Question 6

RQ6: Are there significant differences between DBAS scores for participants with LFISP and HFISP?

$H_0$6: There are no significant differences between DBAS scores for participants with LFISP and HFISP.

H_a6: There are significant differences between DBAS scores for participants with HFISP and LFISP.

An independent samples t-test was used to test whether any significant differences were found between the means of the two categories (low and high) for the independent variable of fear associated ISP (FISP) as it pertains to the continuous dependent variable,

DBAS. The assumptions of normality and homogeneity of variances for the dependent variable are specific to an independent samples t-test and are referenced below.

RQ 6 assumption of normality. I tested the normality of the continuous variable of DBAS with skewness and kurtosis for each category of the sample population. The LFISP category for DBAS showed an approximate normal distribution with a skewness and kurtosis at .38 (*SE* = .-26) and -.14 (*SE* = .51), respectively and for the HFISP category, approximate normal distribution was found for skewness and kurtosis at .-.31*(SE* = .31*)* and .31 *(SE* = .62*),* respectively. The test for normality of the sample population was further substantiated by Shapiro -Wilk's test with subsequent results met**,** $p > .05$ (i.e., LFISP, $p = .07$; HFSP, $p = .92$).

RQ 6 assumption of homogeneity of variance. To test the assumption that error variances were equal for both categories of fear (i.e., LFISP and HFISP) regarding DBAS the Levene's F test was employed at an α level of .05. Homogeneity of variance resulted in statistical insignificance at $p > .05$, $F(144) = .42$, $p = .52$. As such, the assumption of equal variances was met for DBAS.

RQ 6 outcomes. The results of the independent sample t test showed there was not a statistically significant effect $t(144) = -1.44$, $p = .15$ in response to the null hypothesis of whether there was not a statistically significant difference in DBAS scores between participants with LFISP and HFISP. The participants in the low fear category ($N = 88$) scored lower on DBAS ($M = 4.60$) in comparison to those in the high fear category ($N = 58$), who scored higher on DBAS ($M = 4.97$); however not significantly. Consequently, the results failed to reject the null hypothesis.

Summary

The main purpose of the quantitative quasi experimental study was to examine the subjective sleep quality of a sub population of individuals who experienced isolated sleep paralysis experienced within categories of fear (low fear and high fear) as well as associations with specific psychosocial correlates. The results for research question one based on the MANOVA indicated that there was a main effect of significant differences between fear categories for at least one of the predictor variables (i.e., LOC subscales [EO, ES, and INT], DBAS, and social phobia). Univariate analyses (F tests) specifically identified statistical significance with social phobia and LOC (EO). The results showed that with the high fear category the scores were significantly higher on social phobia versus the lower fear category. In addition, with LOC (EO), the participants in the LFISP category scored significantly higher than those in the HFISP.

I used a multiple regression to test the hypotheses for research question two as to whether the LOC subscales (i.e., EO, ES, and INT), DBAS, and social phobia effectively predicted subjective sleep quality scores. The results showed that there were no significant unique contributions to variance in sleep quality scores, thus the null hypothesis was not rejected. A multivariate analysis of variance was used to analyze research question three with regards to whether any associations were found between the three subscales of LOC and low and high categories of fear associated ISP (LFISP, HFISP). The results indicated that the LFISP participants scored significantly higher on LOC (EO) variable compared to the HFISP participants.

For the remaining three research questions four through six, separate independent sample t-tests were employed to examine the associations between LFISP and HFISP categories and subjective sleep quality scores, social phobia, and DBAS, respectively. Regarding subjective sleep quality in research question four, no significant differences were found between the LISP and HFISP categories. The results for research question five indicated that significant differences were found between LFISP and HFISP participants, with regards to social phobia. Participants in the lower fear category scored significantly lower on social phobia than did those in the HFISP category.

Finally, for research question six there was also a failure to reject the null hypothesis as there were no significant differences found between the LISP and HFISP categories with regards to DBAS.

In chapter five I elaborate further on other aspects of the study that are associated with the results, address limitations, and reference implications for social change. I conclude the chapter with how the results from the study might be applied for future research and offer recommendations for specific therapeutic programs and interventions.

Chapter 5: Discussion, Recommendations, and Conclusion

Introduction

I based the present quasi experimental study on a collection of self- reported data from a sample population of individuals who have experienced a peculiar type of sleep disorder, namely, ISP. The aim of this study was to offer a more precise understanding of the relationship between ISP and associated parameters of fear that might distinguish subjective sleep quality as well as certain psychosocial factors. Because ISP has been found to be distressing for some sufferers due to the aspect of fear (Cheyne & Pennycook, 2013), a primary concern for this population is sleep quality associated with sleep disturbance (Sharpless & Grom, 2016).

A main assumption of the quantitative investigation was that differences in fear reported by participants can significantly predict the subjective quality of sleep reported. I expected that participants in a high fear category would score significantly different in subjective sleep quality compared to those in the low fear category. In addition, levels of fear (high fear and low fear) in association with ISP (the quasi independent variable) might be correlated with certain psychosocial factors such as external other LOC and social anxiety (Arikawa et al., 1999; Solomnova et al., 2008), which by implication, are approximately related to the incubus and intruder aspects of ISP. Subsequently, determining whether any predictive effects of the psychosocial variables (i.e., LOC subscales, social phobia, and DBAS) exist in appraisal of ISP sleep quality was another key aspect of this investigation.

The statistical analyses included a few separate multivariate techniques to test whether any part of the combined dependent psychosocial variables such as the subscales of LOC (i.e., EO, ES, and INT), social phobia, and DBAS, included in the model as a unit, might predict sleep quality or parameters of fear. I also tested the LOC subscales against fear parameters independently. Univariate analyses were further used to identify whether the mean scores of the dependent variables were significantly different across the categories of low fear and high fear. ISP fear categories as a distinguishing factor in the study helps to inform about the impact of fear on sleep quality as well as its association the psychosocial factors, the objective of gaining knowledge to assist individuals who suffer from ISP. The results might offer some guidance for future research and inform therapeutic treatment for this population.

Interpretation of the Findings

I specifically chose the set of psychosocial variables for RQ1 to test categorical associations of fear with ISP. As such, a significant result for this set of variables was that some or all the variables made a specific contribution to the category of fear (low or high) that a participant identifies with regarding ISP. Consequently, the results of the multiple univariate analysis for RQ1 showed that at least one of the dependent variables in the equation indicates that a significant difference exist between fear categories, leading to a partial rejection of the null hypothesis. I conducted univariate analyses to identify the specific variables (i.e., LOC [EO]) and social phobia which showed significant differences in fear categories.

Although the results of the multivariate analysis of variance for RQ3, which consisted of the three subscales of LOC (EO, ES, INT), did not make a significant contribution in distinguishing ISP fear categories (low and high); the univariate analysis did indicate significantly higher scores in the low fear category for LOC (EO), which supports the partial rejection of the null hypothesis as confirmed by RQ1. Moreover, significant results indicate that distinctions exist between categories of high and low fear for social phobia via the ANOVA in RQ1. An independent sample t-test for social phobia that I conducted to answer RQ5 further supports these results leading to a rejection of the null hypothesis.

With a multiple regression model for RQ2 I tested whether it is possible to significantly predict sleep quality scores from the psychosocial variables (i.e., the LOC subscales [EO, ES, INT], social phobia, and DBAS). Sleep quality scores that measured greater than five were indicative of poor sleep quality as referenced in past literature (Buysse et al., 1989). The results of RQ2 indicated that the psychosocial predictor variables did not show any significant contribution to sleep quality scores. However, in the likelihood of a rejection of the null hypothesis, and in the event that psychosocial variables are found to predict sleep quality scores, it was important to test for any contribution of differences between the low and high fear categories as it relates to subjective sleep quality (RQ4).

I included RQ2 into the analyses a priori to identify any potential moderating effects of the psychosocial variables on sleep quality in the event of a significant finding for RQ4**,** which was not the case. The outcome for RQ4 via the independent sample t-test

was a failure to reject the null hypothesis, as there were no significant differences in fear categories as they relate to sleep quality scores. Subjective sleep quality scores across both categories in this study did not indicate any significant differences. Overall, the scores did indicate poor sleep quality across categories. This is important to note, as the alternative hypothesis was that a difference in ISP fear regarding sleep quality would be a significant finding; however, the results did not support this assumption.

The results for RQ6 via the independent samples t-test showed no differentiation for parameters of fear with regards to DBAS scores, resulting in a failure to reject the null hypothesis. I expected this outcome due to the results of the MANOVA in RQ1 where DBAS did not offer any significant contribution to variance in distinguishing sleep quality between categories of ISP fear. A follow-up univariate analysis (ANOVA) also did not indicate any significant distinction between DBAS scores for low fear ($M = 4.60$) and high fear DBAS scores ($M = 4.97$). Although the distinctions between scores are statistically insignificant, scores of five or lower are indicative of less dysfunctional beliefs and attitudes about sleep (Morin, et al., 2007). I will further elaborate on this outcome in the recommendations section.

The key finding from the analysis show that the category of fear one identifies with regarding ISP is significantly associated with social phobia and LOC (EO). Notably, although distinctions were not found between fear categories for sleep quality, the results for distinctions in fear regarding LOC(EO) and social phobia might have more of an influence in association with poor sleep quality for the sample population. This raises the question of a possible bidirectional link between poor sleep quality for participants where

the fear category is distinguished by LOC(EO) and social phobia. Similar findings have been indicated in other ISP research (Arikawa, et al., 1999; Simard & Nielsen, 2005); however, the present study is uniquely specific to distinguishing fear with regards to subjective sleep quality.

Theoretical Explanation

The present study is framed within a biopsychosocial model due to an interfacing of social, biological, and psychological aspects of inquiry which is implied by the study variables of subjective sleep quality, fear related ISP, LOC, social phobia and DBAS. The theoretical foundation for the research inquiry and selected variables was inspired by the works of Cheyne et al. (1999) who proposed a three-factor model based on associations found between physical symptoms of sleep paralysis and certain features of the experience, namely, incubus, intruder, and unusual bodily experiences. The distinction between the three-factors are based on the degree of fear associated with each feature. The intruder and incubus aspects are experienced more intensely with higher fear due to the distress of hallucinations and ominous presence. Contrarily, the unusual bodily sensation factor is associated with either no fear or lower fear (Sharpless & Doghramji, 2015).

One aim of the present study is to investigate aspects of fear related to ISP (low fear [LFISP] and high fear [HFISP]) as implied by the three-factor model which parallels specific psychosocial factors, some of which were researched in past sleep paralysis studies. For example, higher levels of social phobia referenced as social anxiety by Simard and Nielsen (2005) were correlated with ISP with hallucinations and the fearful sense of being observed by some other presence. However, research to specifically differentiate

categories of fear associated with characteristics of ISP in relation to social phobia has not been conducted. This supports the results of the present study where scores on social phobia have been found to be significantly higher in the HFISP category, although it was necessary to delete the category of no fear for this study due to low response rate.

The parameters of fear associated with ISP are also directly related to how one appraises sleep quality (Lazarus & Folkman, 1984). The cognitive appraisal aspect of ISP sleep is related to a fearful anticipation of an impending stressful event ranging from the fear of the paralysis becoming permanent (Ramsawh et al., 2008) to a fear of dying (Cheyne & Girard, 2007). Cognitively, individual experience of ISP and sleep appraisal influenced by social phobia and a LOC (EO) might be related to the dream continuity hypothesis (Domhoff, 2011), which might be addressed with future research.

Similarly, Solomonova et al. (2008) have found correlations between negative social imagery in waking state and distress of ISP hallucinations, which is also in line with the continuity hypothesis (Hall & Nordby, 1972). This is also referenced by Denis and Poerio (2016) where waking dissociative experiences are reflected in dissociation during REM sleep. In addition, cognitive imagery experienced less pleasantly has also been associated with less social anxiety (Solomonova et al., 2008). As such, for the present study it would be remiss to disregard the cognitive association of ISP with sleep quality, DBAS, social phobia, and LOC. Although, the aspect of causation is not pertinent to the present inquiry, the psychosocial variables factored in with ISP fear and the impact on sleep quality, might be considered for future qualitative studies.

Limitations

The present study was successful in fulfilling the overall purpose of collecting retrospective data from a population sample of participants to examine differences in parameters of fear associated ISP in conjunction with subjective sleep quality, and other psychosocial factors. Although, with survey research the verity of responses by participants is not guaranteed, the need for accuracy has been highlighted in the invitation to the study.

Additionally, there are several other limitations or weaknesses with the study that might affect generalizability to the total population of individuals that experience isolated sleep paralysis. One methodical weakness might involve the unequal sample sizes with regards to the categories of low and high fear, possibly attributing to an inability to detect significant differences in some instances. Although the intention for the research design initially included three categories, due to inadequate response rate for the no fear category, it was ultimately excluded from the analysis.

The study also has limitations as far as generalizability to the total population of individuals that experience ISP due to a lack of access to databases specific to those who experience ISP within the set inclusion and exclusion criteria. As such, the convenience approach allows for recruitment and data collection via Internet platforms such as Walden Participant Pool, the Sleep Paralysis Project, and the Sleep Paralysis Sub-Reddit communities with a link to SurveyMonkey. However, the imposition of inclusionary and exclusionary criteria can affect external validity. In further regards to generalizability issues, retrospective reports have been associated with recall bias and are often considered less accurate (Jansson & Linton, 2007), which is innately associated with survey research.

Due to time restrictions for the present study, the option of a multi-method approach to include both retrospective and prospective measures was not feasible; albeit, such a research design might offer a more well-rounded measure of sleep quality for future studies.

Another limitation for the present study involves the use of the online platform for sleep paralysis recruitment. There is a concern about influence on participant response by certain elements of the population from within this sample frame due to the nature of online sleep paralysis communities serving in a supportive capacity. In addition, accessing individuals who are more comfortable and familiar with online platforms might introduce coverage bias. With Sleep paralysis being a unique and culturally specific type of sleep disorder (DeJong, 2005) there is a possibility that individuals learn to view sleep paralysis more positively due to shared cultural beliefs (Spanos et al., 1995). This might ultimately influence how participants choose to respond to certain questions. On a final note, the inclusion of demographic data for updated prevalence rates might also need to be considered for future research. The highest rates in the general population documented in the research thus far, occur amongst African Americans and Asians (Sharpless et al., 2011).

Recommendations

In the present study each research hypothesis was tested to determine whether distinctions in fear categories and sleep quality scores were directly related to a unique set of the psychosocial variables. However, social phobia and LOC (EO) have been found to be statistically significant for individuals with ISP in the high fear category for the former variable and in the low fear category for the latter. An inference of cause and effect which

has not been researched previously is also impertinent to the present study and would need to be investigated with further research.

With past research closely related to the present study on ISP, also known as kanashibari in Japanese culture, Arikawa et al. (1999) found a significant positive association between LOC (EO) and those who experience ISP with lower fear, which is significantly confirmed by RQ1 and RQ3. Although the hypotheses for RQ1 and RQ3 are more specific to the association between fear and ISP as it relates to LOC (EO), the study by Arikawa et al. (1999) referenced death anxiety, which is unquestionably driven by fear (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). The unexpected finding of the lower fear category with significantly higher scores on the LOC (EO) variable might be attributed to a higher number of participants in the lower fear category. On the other hand, perhaps for future studies, fear with regards to ISP should be considered along a spectrum rather than discrete categories.

With regards to LOC and unpredictability with firefighting (an aspect of ISP, Cheyne, 2003) in association with sleep quality, Rucas and Miller (2013), found a positive correlation between external LOC (Rotter, 1990) and poor sleep quality. Although the study is not specific to ISP, fire fighters might be a population for future inquiry regarding isolated sleep paralysis, sleep quality, and LOC. However, for the present study a distinction in sleep quality has not been indicated in RQ2 nor in RQ4 with regards to LOC and fear categories, respectively.

Independent samples t-test findings for RQ4 show a nonsignificant difference between the mean scores for both low ($M = 9.00$) and high fear ($M = 9.69$) categories with

regards to subjective sleep quality. However, the results emerging from the analysis (although not specific to the research question) indicate that sleep quality is found poor for both categories of fear. For example, both past research and the present study indicate a positive correlation between external LOC (Rucas & Miller, 2013) and LOC (EO), respectively, in conjunction with poor subjective sleep quality.

In further support of the present research study, Hsieh et al. (2010) indicated that subjective sleep quality was considered worse in patients with ISP compared to those without ISP. However, it is important to note that the sample was specific to those individuals with obstructive sleep apnea. Parallel to Hsieh et al.'s (2010) study which referenced with and without ISP categories in the present study I used the independent variables of low and high fear related ISP categories to distinguish subjective sleep quality.

Although the present study results did not indicate any significant differences in sleep quality scores between categories, other useful information did inadvertently emerge from the analysis. The mean scores for each fear category of subjective sleep quality did fall within the poor quality of sleep range, low fear, $M = 9.00$ and high fear, $M = 9.70$ as referenced earlier in this section. With the results of RQ 2 (the total set of psychosocial variable scores did not significantly predict subjective sleep quality), this study can be extended to a broader sample population which might help to further validate the results.

According to the PSQI, participants with scores greater than five are considered to have clinically poor sleep quality (Buysse et al., 1989). The no fear category was excluded from the present study analysis due to a low response rate of $N = 8$; as such, the differences between group sizes with regards to low and high fear would not satisfy the homogeneity

of variance assumption. Notwithstanding, the mean score results for the excluded no fear category, inadvertently emerging from the analysis, did indicate better sleep quality, M = 7.25. This information may be revisited with future research with a larger sample size to add more statistical value in analysis. In this regard, extending this study to include a sufficient number of cases for a no fear or a more blissful ISP category (Cheyne, 2003) might offer more value to research regarding ISP as it relates to the psychosocial factors and sleep quality. For example, Denis and Poerio (2016), showed that the negative impact of sleep paralysis on sleep quality is less a concern for those who experience lucid dreaming with sleep paralysis.

The association of fear with SP has been widely established in research. For example, 98% of a World Wide Web sample has reported sleep paralysis with fear (Cheyne et al., 1999), while 20% of ISP episodes in another study were experienced without fear (Liskova, Mankova, & Buskova, 2017). As such, identifying psychosocial associations to distinguish low fear from high fear might shed some light on possible ways to alleviate the fear that has been associated with negatively impacting sleep quality (Denis & Poerio, 2016). I included fear categories (low fear and high fear) for participants with ISP to serve as a barometer to inform about the impact of fear on subjective sleep quality and on the psychosocial variables included in the study. However, the low and high fear categories were not contributing factors to distinguish subjective sleep quality for participants with ISP. Nevertheless, for future research perhaps the inclusion of a no fear group might inform more regarding subjective sleep quality for those with ISP. Other researchers who have conducted a study on the fear response involving the amygdala have found

differentiation in responses across different ethnicities (Chiao et al., 2008), which might also be a factor for further investigation in ISP research.

Regarding DBAS, I expected that higher fear associated with sleep would be positively correlated with higher scores on DBAS as it pertains to RQ 6. Even though the findings on DBAS are not linked to distinctions in fear categories, the scores for DBAS are similarly low (less dysfunctional beliefs) for both categories. Without significant distinctions found among categories of fear for both subjective sleep quality and DBAS, the low scores specific to both fear categories indicate poor subjective sleep quality as well as lower DBAS, respectively. A possible resulting implication is that poor sleep quality emerging from this sample population is not associated with higher DBAS as I expected.

In this regard, DBAS is unlikely to be a significant concern for this population with this study; however, this finding might be associated with the cognitive style of participants. For example, Cheyne and Pennycook's (2013) research regarding post-episode distress, has drawn some similarities to the construct of DBAS. The findings indicated that distress from sleep paralysis was correlated with higher levels of fear when beliefs about ISP were more supernatural or more dysfunctional compared to analytical. However, the perception and processing of supernatural beliefs might not parallel the dysfunctional perceptions associated with ISP sleep. Perhaps, with a qualitative investigation cognitive style differentiation with regards to individual perceptions concerning ISP might be better understood.

Although not applicable in the present study, other sleep disorder research involved insomnia which did support the hypothesis regarding DBAS. For example, in Carney et al.

(2010), DBAS scores were significantly lower among those without insomnia (good sleepers) as compared to those with insomnia. Although insomnia is clearly distinct from ISP, it is important to note that secondary insomnia can occur comorbidly with ISP, as well as bidirectionally, however this association was not addressed with the present research. Moreover, in the likelihood of an adequate response rate for the no fear category, there is no expectation that a similar outcome for DBAS as previously seen can be found with the present study. This might be partially attributed to the subjective sleep quality scores across categories of fear being equally poor; however, this can be further investigated with future research studies. From another perspective one might infer that the nonsignificant results from DBAS imply that the significant differences found with social phobia and LOC (EO) are not associated with maladaptive beliefs.

Past researchers have also related social anxiety with ISP (Nair et al., 2013; Simard & Nielsen, 2005; Solomonova et al., 2008); however, one specific study associated higher rates of ISP with social phobia (22.2%), rather than depressive disorders (Otto et al., 2009). Other ISP researchers have found that poor sleep quality was positively correlated with social phobia (Ramsawh et al., 2009) with others finding a bidirectional association between depression and poor sleep quality and ISP with fear (Szklo-Coxe, Young, Finn, & Mignot, 2007). Although references to social phobia in some past research studies are used interchangeably with social anxiety, the scale for the present study is specifically the Social Phobia Inventory (SPIN; Connor et al., 2000), with items closely depicting aspects of fear associated with the presence of others. To my knowledge, research utilizing the SPIN in conjunction with ISP has not been conducted aside from the present study. Future ISP

research might involve investigating associations between the aspect of the presence of others in relation to social phobia and the LOC (EO). In past studies external LOC has been linked with social phobia, although unassociated with ISP (Kennedy, Lynch & Schwab, 1998; Saric & McLeod, 1985).

Hallucinations (hypnopompic or hypnogogic) associated with ISP have been deemed more frightening than the most distressing dreams (Parker & Blackmore, 2002). This overwhelming sense of other presence in the absence of anything or anyone actually being present, is referred to as PRES (Cheyne et al., 1999) and has been associated with social anxiety with individuals who experience ISP with fearful hallucinations compared to those without fear-based hallucinations (Simard & Nielsen, 2005). This finding supports the hypothesis for RQ 5 resulting in a rejection of the null hypothesis, as higher scores on social phobia were significantly positively correlated with higher fear.

Implications

The research on fear associated with a sleep disorder such as ISP in connection with sleep quality and certain psychosocial factors clearly demonstrates the need to appreciate the integration of biology, psychology, and the sociocultural aspects in human research. The biopsychosocial (Engel, 1977) aspects associated with the study involves the measure of fear one experiences in connection with the limbic part of the brain (threat-activated vigilance system). This is directly associated with the REM aspect of paralysis normally occurring during sleep (Cheyne, 2001) which can be experienced differently based on influences from waking state psychosocial and situational factors (Shredl, 2009). With the quantitative nature of the present study, the results show a failure to reject the null

hypothesis regarding differentiation of fear with subjective sleep quality, this might imply the need for further exploration of these associations via a qualitative approach. Perhaps, research that includes open-ended questions would uncover more in-depth aspects of fear associated with ISP experiences, which might have not been addressed quantitatively.

In the promotion of positive social change, the significant findings from the study regarding social phobia and LOC (EO) should be directed more towards a qualitative platform to address the distress and embarrassment associated with ISP (Cheyne et al., 1999), which might help to increase individual confidence about disclosing. It might also benefit future research to encourage a more sensitive approach especially accounting for elements of the sleep paralysis population that are considered hidden due to negative stigma (Gray, Choubak, Jeffrey, & Crann, 2015). Raising awareness among health care professionals concerning ISP is mandatory to prevent undermining the importance of sleep assessments in routine medical examinations to address any associated poor sleep quality. Increased exposure on the topic might promote more ease of engagement between patients and physicians, thus encouraging more dialogue about ISP. Medical teaching institutions should consider the importance of including educational units on sleep paralysis in the curriculum to better inform future physicians on the topic, who were also referenced in the research literature as experiencing sleep paralysis (Ohaeri, et al., 1989; Penn et al., 1981).

Finally, in following through with the significant results garnered from the study, perhaps more experimental research should be conducted on social phobia and LOC for this population to add to the knowledge base on the topic as well as to inform intervention programs about treatment protocols. Perhaps the integration of mindfulness techniques,

hypnosis, and cognitive restructuring (Nardi, 1981; Sharpless & Doghramji, 2015; Solomonova et al., 2008) into CBT programs can benefit the population of concern. Moreover, a therapeutic focus to consider factors of social phobia and LOC (EO) might inadvertently help mitigate poor sleep quality for individuals distressed by ISP.

Conclusion

The historical account of the existence of sleep paralysis dates as far back as the Persian empire during the 10th century according to Golzari, et al. (2012), with sleep paralysis being referred to as "night-mare" at that time. Unbeknownst to some this peculiar parasomnia has been in existence for time immemorial. Although research on isolated sleep paralysis is slowly on the rise; the impact upon individuals who experience it distressfully should remain at the forefront, especially as it pertains to sleep quality. The goal is to draw more attention to isolated sleep paralysis which is common in the population, but often hidden and less referenced in the sleep disorder literature (ISP; APA, 2013). Consequently, due to the unpleasant features of sleep paralysis which often result in an uncomfortable discourse, individuals become reticent to discuss it or seek professional advice. Interestingly, past research referenced frequency of sleep paralysis amongst medical students (Penn et al., 1981; Ohaeri, et al., 1989); on the other hand, studies that include medical doctors as participants have been scarce.

Other researchers on ISP have found an association between poor sleep due to the fear and distress associated with having an episode (Denis & Poerio, 2016). However, with the present study, I uniquely presented ISP by categories of fear to predict a set of strategically selected psychosocial variables in order to gain a more comprehensive view

about ISP. To my knowledge, there have not been other studies that quantified subjective sleep quality via parameters of fear associated ISP and using the total PSQI in investigation of possible negative repercussions of sleep quality associated with a sample of this population. It is important to reiterate that sleep disorders related to sleep insufficiency and poor sleep quality, have been associated with increased risks for chronic diseases such as high blood pressure, heart disease, and diabetes (Liu et al., 2013; National Sleep Foundation, 2011).

Thus, there is a need for more transparency and discussion especially where populations of individuals distressed with ISP become obscure due to embarrassing, fearful, and uncontrollable hallucinations with the subsequent fear of being perceived as having psychosis or involved with substance abuse (Sharpless & Doghramji, 2015). Notably, ISP may also be experienced amongst some sectors of the population with bliss (e.g., lucid dreamers; Denis & Poerio, 2016), great anticipation, and without the concern of harmful effects, which knowledge can be applied therapeutically. However, when sleep paralysis is deemed harmless (e.g., Sleephealth.org, 2017), it is expedient to question whether negative health repercussions associated with long-term poor sleep or other unknowns have been addressed.

Sleep paralysis is known to be experienced along a spectrum of fear and distress (Sharpless & Grom, 2016) which warrants the importance of not minimizing the associated degree of potential harm. For example, more urgency might be seen with a population of Hmong immigrants from South-East Asia, where sleep paralysis has been directly associated with a high rate of sudden unexplained nocturnal death syndrome (Young,

Xiong, Finn, & Young, 2013). Even though fear of dying has been experienced along with ISP by some (Sharpless et al., 2010); there are other individuals who desire to have this experience as a gateway to lucid dreaming (Denis & Poerio, 2016). Unfortunately, for the present study I was unable to recruit an ample number of lucid dreaming participants to fill the no fear category. However, focus on filling this data deficit might be a consideration for future research.

Moreover, the information garnered from the present study does indicate that at least two out of the five psychosocial variables presented (social phobia and LOC [EO]) continues to hold significance as an important signaling mechanism in concern of ISP and compromised sleep, due to results for sleep quality tangentially emerging as poor. More recent research presented by Liu (2018) inferred that occasional sleep paralysis with hallucinations among student athletes is associated with higher levels of depression compared to those who have never experienced sleep paralysis. In this regard, student athletes might be a very interesting population of investigation in application of LOC (EO) and social phobia. I am hopeful that the significant results of the present research study will help to inform individual sufferers of ISP, researchers, intervention programs, health professionals, academics, and others who are concerned about the long-term health of those who experience ISP with fear and distress.

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Appendix A: Generic Letter for Permission to Use an Existing Survey

Date

Authors (specific to these instruments; PSQI, BLOCS, SPIN, DBAS)

Dear Sirs:

I am a Doctoral student working on my dissertation entitled, Subjective Sleep Quality of Isolated Sleep Paralysis: Fear Parameters and Psychosocial Correlates, under direction of my dissertation committee chair. I would like your permission to reproduce and use your survey instrument (name of instrument) in my research study, as I will not sell, use, reproduce it for any financial compensation or for any purpose outside the confines of my dissertation.

Appendix B: Sample Survey Questions to Distinguish ISP Fear Categories

Survey questions extracted from the Waterloo Unusual Sleep Experiences Questionnaire (Cheyne, 2001) to be included with questionnaires to isolate three groups based on levels fear. Questions below reference f*ear* associated with the hallucinatory aspects (#1) **intensity** of fear associated with the overall experience of ISP (#2) and fear associated with approach to sleep (#3):

1. Place within the blanks a 0 (no fear) or 1 (low fear), 2 (high fear) next to all ISP hallucinations that applies (incubus [INC], intruder [INT] and unusual body sensations [UBS]). Cumulative scores will determine fear level associated with each type of hallucination. In the example below the lowest obtainable score is 0 indicating no fear associated with hallucinations and the highest obtainable score for fear associated with the hallucinations as well as questions two and three below is 28. The sample score of 10 below will be added to the subsequent scores in questions 2 and 3.
    A. Feelings of pressure on Chest (INC) _0__
    B. Feeling of being awake only to discover you are not awake and have not moved from the bed (UBS)__2
    C. Up and down elevator-like movements (UBS)_0__
    D. Sounds, (e.g., foots steps, voices, noises) (INT)_2_
    E. Feel Pain (INC)_0__
    F. A sense of threatening presence in the room or of seeing something in the room (INT)_2_

G. Sensations of body either falling, flying, floating, spinning, turning (UBS)_1__

H. Fear associated with feeling of dying (INC)__0_

I. Choking and smothering (INC)__1_

J. Sensations of eroticism (INC)_1_

K. Sense of someone touching you or pulling off covers (INT)__2

L. Seeing your body from outside yourself (UBS)_0__

2. When you think about your overall sleep paralysis episodes what category of fear would you chose to describe your experience? "0" (no Fear), "1" (low fear), "2" (high fear)__2

3. When approaching sleep and throughout the night how afraid are you of having an episode? "0" (no Fear), "1" (low fear), "2" (high fear) ___2

Lowest cumulative score = **0**; **Highest** cumulative score = **28**

THREE CATEGORIES: No fear (XFISP) category = 0; low fear (LFISP) = 1-14; high fear (HFISP) 15- 28

Sample Cumulative score: Question 1=**11**; question 2 = **2**; question 3 = **2**

TOTAL = **15** (HFISP)

Appendix C: Permission to Use Scales, Agreements, and Communications

1) **Dysfunctional Beliefs and Attitudes About Sleep Scale-Communication and permission for use-**

Charles M. Morin
to me

Please check back with that platform and it should be available as of today. If not, come back to me. Charles Morin

---

Envoyé : 1 décembre 2016 11:26
À : Charles M. Morin
Objet : Re: Permission to use DBAS

Hello

Yu l
to Charles

Hello Dr. Morin

2) Pittsburgh Sleep Quality Index-permission to use communication

Hi Judy,

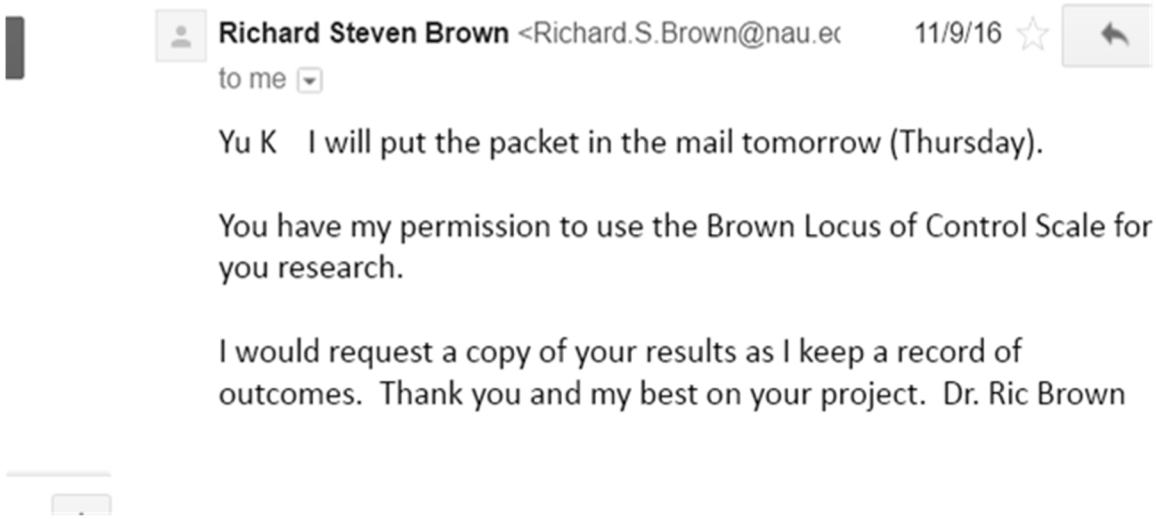
Yes, we have received your signed license agreement to use the PSQI electronically. You should be good to go now with your research.

Good luck!

Carolyn

Carolyn J. Weber, MBA
Licensing Associate
<image001.jpg>

3) Brown Locus of Control Scale communication- permission to use communication



Richard Steven Brown <Richard.S.Brown@nau.ec 11/9/16

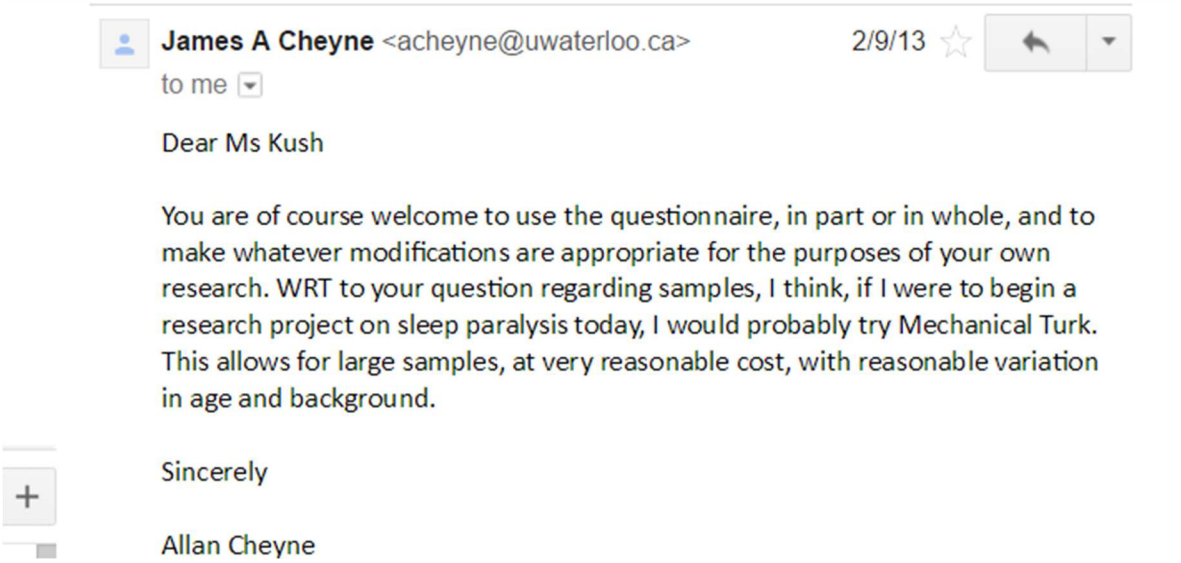
to me

Yu K I will put the packet in the mail tomorrow (Thursday).

You have my permission to use the Brown Locus of Control Scale for you research.

I would request a copy of your results as I keep a record of outcomes. Thank you and my best on your project. Dr. Ric Brown

4) Waterloo unusual Sleep Experience Questionnaire- permission to use



James A Cheyne <acheyne@uwaterloo.ca> 2/9/13

to me

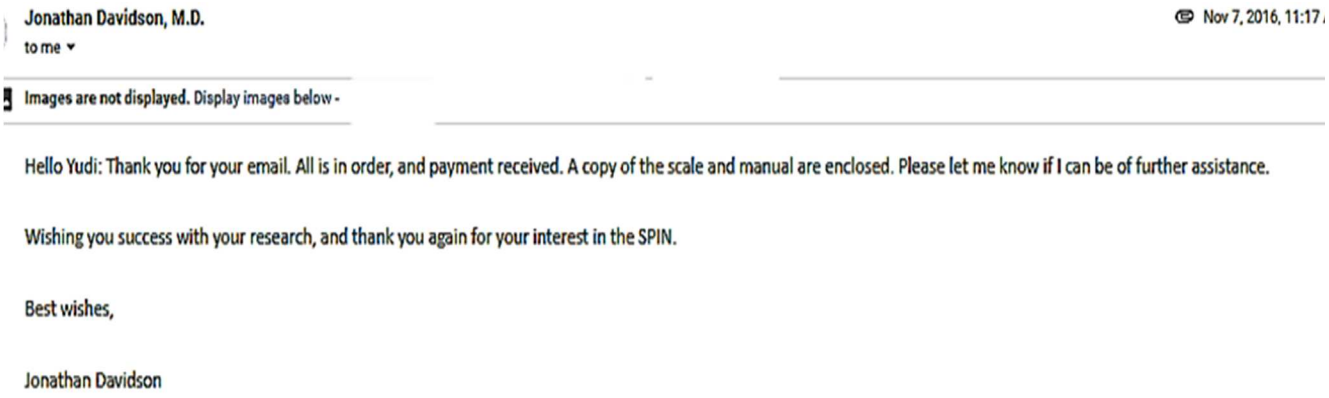
Dear Ms Kush

You are of course welcome to use the questionnaire, in part or in whole, and to make whatever modifications are appropriate for the purposes of your own research. WRT to your question regarding samples, I think, if I were to begin a research project on sleep paralysis today, I would probably try Mechanical Turk. This allows for large samples, at very reasonable cost, with reasonable variation in age and background.

Sincerely

Allan Cheyne

5) Social Phobia Inventory-



Jonathan Davidson, M.D.
to me

Nov 7, 2016, 11:17

Images are not displayed. Display images below -

Hello Yudi: Thank you for your email. All is in order, and payment received. A copy of the scale and manual are enclosed. Please let me know if I can be of further assistance.

Wishing you success with your research, and thank you again for your interest in the SPIN.

Best wishes,

Jonathan Davidson

Appendix D: Correspondence Related to Permission to Reprint Inventories and Scales

1. DYSFUNCTIONAL BELIEFS AND ATTITUDES ABOUT SLEEP SCALE

Dear Yudyahn,

Thank you for your continued interest in the DBAS-16.

We ask that you please kindly respect the below conditions:

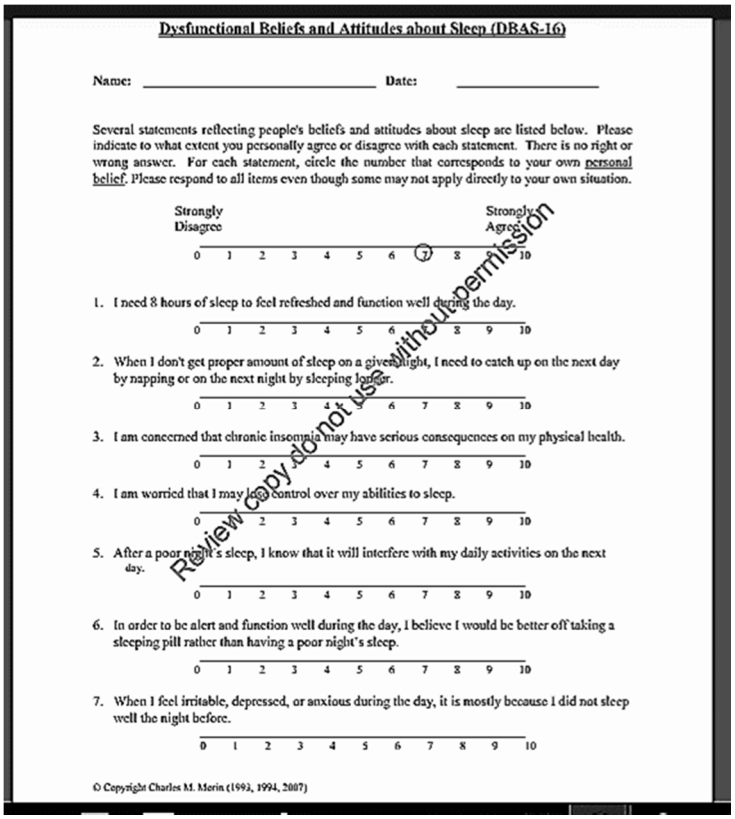
In the case of a publication, article, study or observation on paper or electronic format of the Questionnaire, the User undertakes to respect the following special obligations:

- not to include any full copy of the Questionnaire, but a protected version with the indication "sample copy, do not use without permission"
- to indicate the name and copyright notice of the owner
- to include the reference publications of the Questionnaire
- to indicate the details of MRT for any information on the Questionnaire as follows: contact information and permission to use: Mapi Research Trust, Lyon, France – Internet: https://eprovide.mapi-trust.org/
- to provide MRT, as soon as possible, with a copy of any publication regarding the Questionnaire, for information purposes
- to submit the screenshots of all the Pages where the Questionnaire appears to MRT before release to check that the above-mentioned requirements have been respected.

Enclosed please find the watermarked copy we will ask you to use. Please kindly send us screen shots.

Regards,

Kelly Epstein (US Contact)
Information Resources Specialist
PROVIDE™
Mapi Research Trust



Dysfunctional Beliefs and Attitudes about Sleep (DBAS-16)

Name: _____ **Date:** _____

Several statements reflecting people's beliefs and attitudes about sleep are listed below. Please indicate to what extent you personally agree or disagree with each statement. There is no right or wrong answer. For each statement, circle the number that corresponds to your own personal belief. Please respond to all items even though some may not apply directly to your own situation.

Strongly Disagree — Strongly Agree

0 1 2 3 4 5 6 (7) 8 9 10

1. I need 8 hours of sleep to feel refreshed and function well during the day.

0 1 2 3 4 5 6 7 8 9 10

2. When I don't get proper amount of sleep on a given night, I need to catch up on the next day by napping or on the next night by sleeping longer.

0 1 2 3 4 5 6 7 8 9 10

3. I am concerned that chronic insomnia may have serious consequences on my physical health.

0 1 2 3 4 5 6 7 8 9 10

4. I am worried that I may lose control over my abilities to sleep.

0 1 2 3 4 5 6 7 8 9 10

5. After a poor night's sleep, I know that it will interfere with my daily activities on the next day.

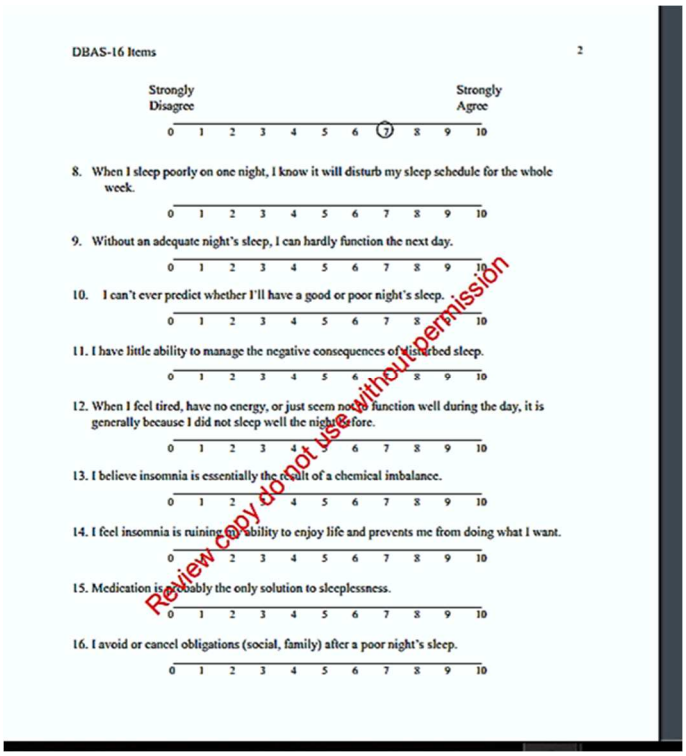
0 1 2 3 4 5 6 7 8 9 10

6. In order to be alert and function well during the day, I believe I would be better off taking a sleeping pill rather than having a poor night's sleep.

0 1 2 3 4 5 6 7 8 9 10

7. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.

0 1 2 3 4 5 6 7 8 9 10



Strongly Disagree — Strongly Agree

0 1 2 3 4 5 6 (7) 8 9 10

8. When I sleep poorly on one night, I know it will disturb my sleep schedule for the whole week.

0 1 2 3 4 5 6 7 8 9 10

9. Without an adequate night's sleep, I can hardly function the next day.

0 1 2 3 4 5 6 7 8 9 10

10. I can't ever predict whether I'll have a good or poor night's sleep.

0 1 2 3 4 5 6 7 8 9 10

11. I have little ability to manage the negative consequences of disturbed sleep.

0 1 2 3 4 5 6 7 8 9 10

12. When I feel tired, have no energy, or just seem not able to function well during the day, it is generally because I did not sleep well the night before.

0 1 2 3 4 5 6 7 8 9 10

13. I believe insomnia is essentially the result of a chemical imbalance.

0 1 2 3 4 5 6 7 8 9 10

14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.

0 1 2 3 4 5 6 7 8 9 10

15. Medication is probably the only solution to sleeplessness.

0 1 2 3 4 5 6 7 8 9 10

16. I avoid or cancel obligations (social, family) after a poor night's sleep.

0 1 2 3 4 5 6 7 8 9 10

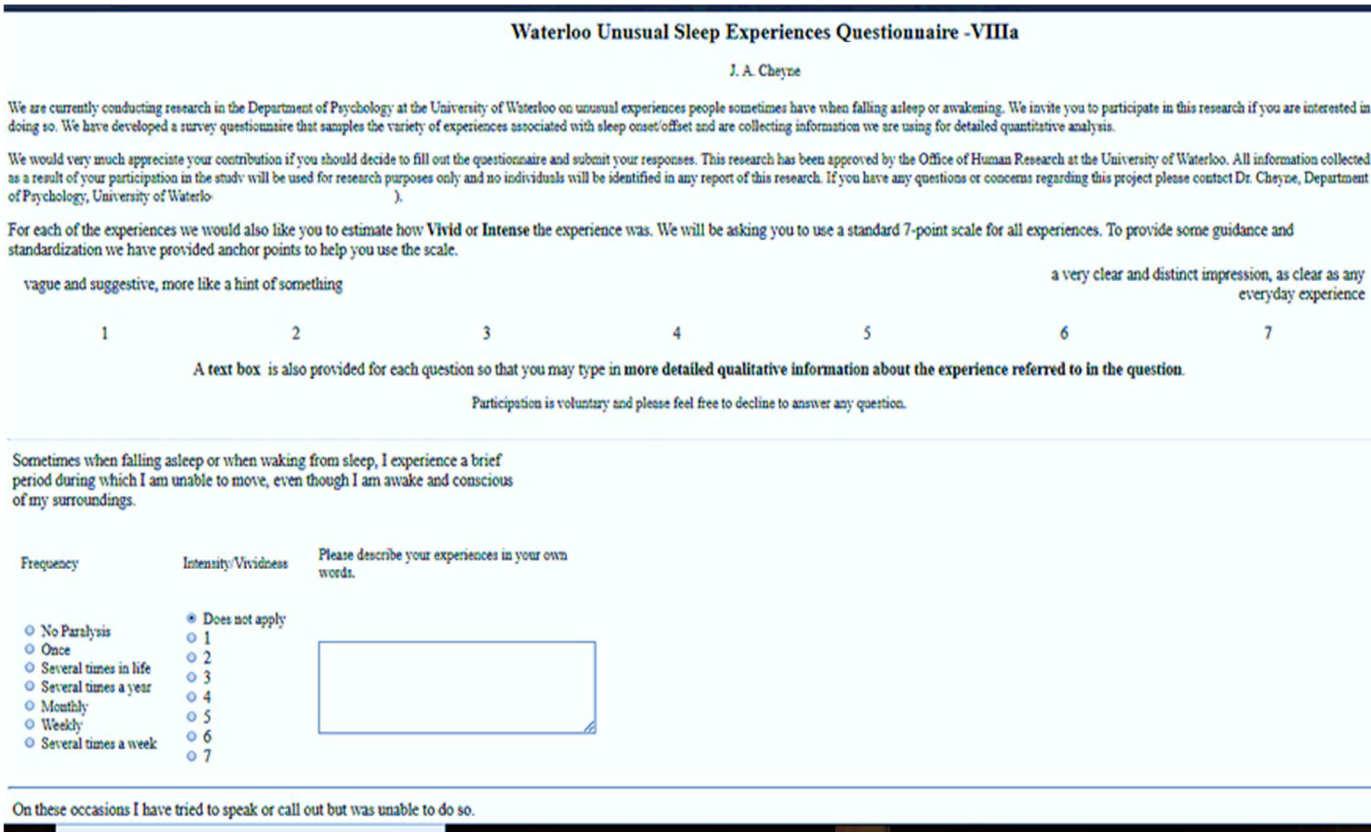
2. WATERLOO UNUSUAL SLEEP EXPERIENCE SCALE

Hello Yudy Kush:

You are quite welcome to use, copy, or publish all or any part of out questionnaire or other of our writings. I do have or consider myself to have

Best wishes for success in your project.

Allan Cheyne



Waterloo Unusual Sleep Experiences Questionnaire -VIIIa

J. A. Cheyne

We are currently conducting research in the Department of Psychology at the University of Waterloo on unusual experiences people sometimes have when falling asleep or awakening. We invite you to participate in this research if you are interested in doing so. We have developed a survey questionnaire that samples the variety of experiences associated with sleep onset/offset and are collecting information we are using for detailed quantitative analysis.

We would very much appreciate your contribution if you should decide to fill out the questionnaire and submit your responses. This research has been approved by the Office of Human Research at the University of Waterloo. All information collected as a result of your participation in the study will be used for research purposes only and no individuals will be identified in any report of this research. If you have any questions or concerns regarding this project please contact Dr. Cheyne, Department of Psychology, University of Waterlo).

For each of the experiences we would also like you to estimate how **Vivid** or **Intense** the experience was. We will be asking you to use a standard 7-point scale for all experiences. To provide some guidance and standardization we have provided anchor points to help you use the scale.

vague and suggestive, more like a hint of something — a very clear and distinct impression, as clear as any everyday experience

1 2 3 4 5 6 7

A **text box** is also provided for each question so that you may type in **more detailed qualitative information about the experience referred to in the question**.

Participation is voluntary and please feel free to decline to answer any question.

Sometimes when falling asleep or when waking from sleep, I experience a brief period during which I am unable to move, even though I am awake and conscious of my surroundings.

Frequency

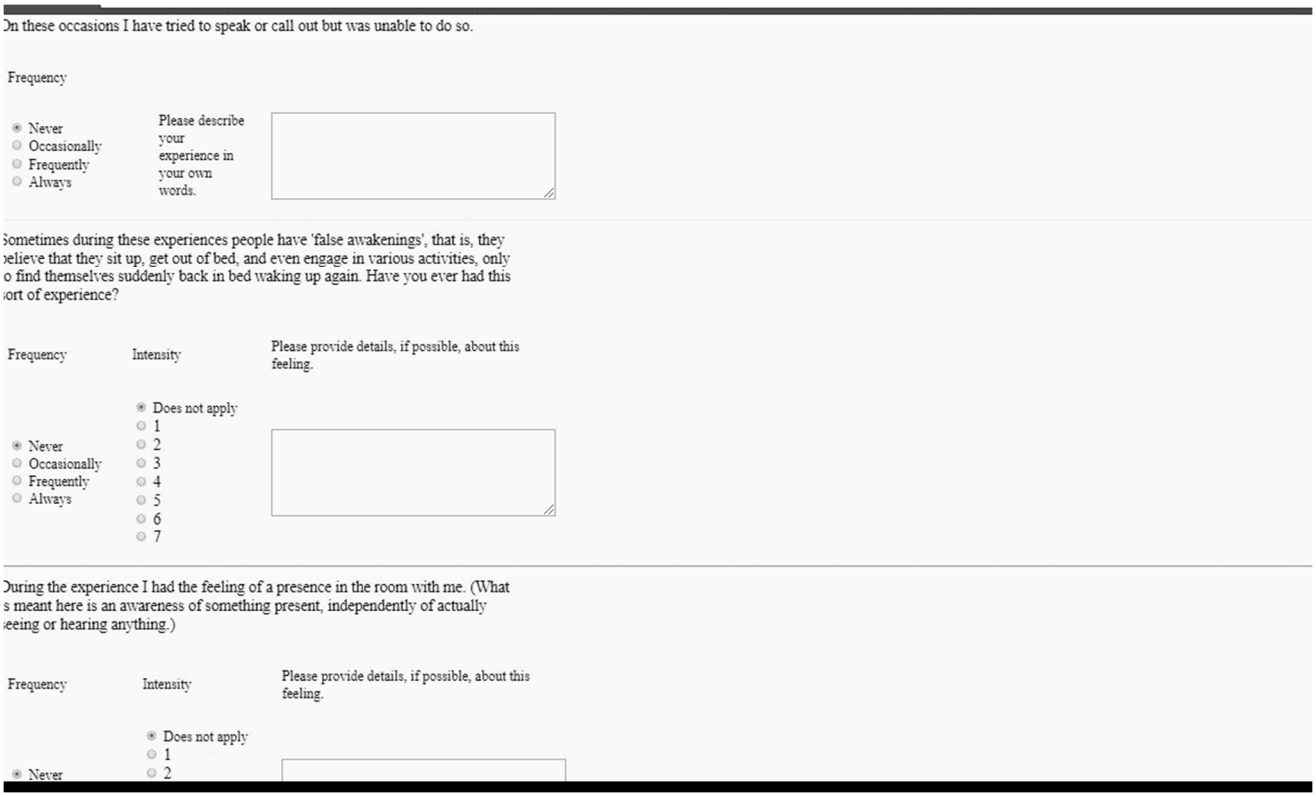
- No Paralysis
- Once
- Several times in life
- Several times a year
- Monthly
- Weekly
- Several times a week

Intensity/Vividness

- Does not apply
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Please describe your experiences in your own words.

On these occasions I have tried to speak or call out but was unable to do so.



On these occasions I have tried to speak or call out but was unable to do so.

Frequency

- Never
- Occasionally
- Frequently
- Always

Please describe your experience in your own words.

Sometimes during these experiences people have 'false awakenings', that is, they believe that they sit up, get out of bed, and even engage in various activities, only to find themselves suddenly back in bed waking up again. Have you ever had this sort of experience?

Frequency

- Never
- Occasionally
- Frequently
- Always

Intensity

- Does not apply
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Please provide details, if possible, about this feeling.

During the experience I had the feeling of a presence in the room with me. (What is meant here is an awareness of something present, independently of actually seeing or hearing anything.)

Frequency

- Never

Intensity

- Does not apply
- 1
- 2

Please provide details, if possible, about this feeling.

Please indicate if this felt like: a weight pressing down ☐ or a person or creature sitting on chest ☐

During the experience I felt as though I were being smothered.

Frequency	Intensity	Please provide details.
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I heard unusual sounds.

Frequency	Intensity	Please provide details of the sounds you heard.
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Please indicate if the sounds were: hard to specify background noises? ☐ , sounds of movement such as footsteps? ☐ , voices? ☐

During the experience I felt like I might die.

Frequency	Intensity	Comments:
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I felt numbness, vibrating or tingling sensations.

Frequency	Intensity	Please provide details, including parts of the body that were affected.
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I felt like I had temporarily left my body

During the experience I felt like I had temporarily left my body.

Frequency	Intensity	Please provide details about any particular sensations you might have experienced at that time.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I was able to see my own body as if from an outside vantage point.

Frequency	Intensity	Please provide details. For example, where did you seem to be when you saw yourself.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I noticed unusual odors.

Frequency	Intensity	Please provide details. Was the odor identifiable?
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I experience 'elevator' feelings of moving rapidly up or down.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I noticed that the bedcovers seemed to move on their own or as if pulled by someone or something.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I noticed that the bedcovers seemed to move on their own or as if pulled by someone or something.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I had the illusion that I sat up, or moved an arm or leg, or walked around the room, only to discover later that I had not moved at all.

Frequency	Intensity	Please provide details about the nature of the movements or the body parts involved.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I felt that I was falling.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I felt as though I were being strangled.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I felt like I was flying.

Frequency Intensity Please provide details.

During the experience I felt like I was flying.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ LUb:"J"> Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I felt my body was spinning or turning rapidly.

Frequency	Intensity	Please provide details.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the immobility I had the sensation of being physically touched?

Frequency	Intensity	Please provide details, including body parts involved.
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

During the experience I was able to open my eyes.

Frequency	Intensity	Comments
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

People may experience various feelings during sleep paralysis. Please indicate the frequency and rate the intensity of any of the feelings experienced during the sleep paralysis experience that are listed below.

Fear

Cold

Frequency	Intensity	Comments
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Sadness

Frequency	Intensity	Comments
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 5 ○ 6 ○ 7	

Anger

Frequency	Intensity	Comments
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Erotic feelings

Frequency	Intensity	Comments
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Shaking or trembling

People may experience various feelings during sleep paralysis. Please indicate the frequency and rate the intensity of any of the feelings experienced during the sleep paralysis experience that are listed below.

Fear

Frequency	Intensity	Comments
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Bliss

Frequency	Intensity	Comments
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Pain

Frequency	Intensity	Comments
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

Cold

Frequency	Intensity	Comments
● Never ○ Occasionally ○ Frequently ○ Always	● Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6	

○ I had this experience more than five years ago.

How awake or alert were you during the episode(s)?

Very Groggy / Sleepy						Very Alert / Wide Awake
○	○	○	○	○	○	○

At what times have you had this experience? (Check any that apply)

When Falling Asleep	When waking up	In the middle of a sleep period
☐	☐	☐

When do you have these experiences (Please check at least one):

During main period of sleep?	During Naps?	Other: Please specify in the text box below:
☐	☐	☐

Does the experience typically begin (Check any that apply):

- ☐ while you are lying awake and continuously conscious of your immediate waking environment?
- ☐ following a brief period of absent mindedness (i.e., unsure whether one was asleep or not)?
- ☐ upon waking from deep (i.e, dreamless) sleep?
- ☐ directly from a dream?
- ☐ other? Please explain.

At approximately what age (in years) did you have your first experience? ☐

Please indicate, by checking the appropriate boxes, if any of the following condition apply to you. Please use the dialogue box to elaborate on any of the items or to indicate if you have ever received a medical diagnosis or medication for any of following. Feel free to add any information about other conditions or medications that you might feel are relevant.

- ☐ Narcolepsy
- ☐ Sleep apnea
- ☐ Insomnia
- ☐ Cataplexy
- ☐ Daytime sleep attacks
- ☐ Frequent night waking

Comments, including the source of the diagnosis and any medications taken and their effects, if any, on these episodes:

Shaking or trembling

Frequency	Intensity	Comments
◉ Never ○ Occasionally ○ Frequently ○ Always	◉ Does not apply ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7	

In what position were you during the episode(s)?

If you have multiple experiences please indicate the most common position, if possible.

Comments

○ Don't Remember

○ Varies
○ On Back
○ Face Down
○ On Left Side
○ On Right Side

In what position do you normally lie when you are falling asleep?

Please indicate most common position (i.e., use "varies" only if you truly have no most common position

Comments

○ Don't Remember

○ Varies
○ On Back
○ Face Down
○ On Left Side
○ On Right Side

Approximately how long ago did you last have an episode of sleep paralysis?

I had the last experience within:

Comments

○ last few hours.
○ last 24 hours.
○ last week.
○ last month.
○ last six months.
○ last year.
○ last five years.

○ I had this experience more than five years ago.

- Frequent night waking
- Hypokalemic paralysis
- Epilepsy
- Panic disorder
- Depression
- Anxiety disorder
- Fibromyalgia
- Sexual abuse
- Physical abuse
- Post-traumatic stress disorder

Comments, including the source of the diagnosis and any medications taken and their effects, if any, on these episodes:

Have you noticed any particular conditions that seem to precede these experiences (e.g., changes in life style, sleep patterns, work schedule, emotional experiences, etc.)?

If you are currently having these experiences (i.e., within the last six months) please indicate any medications you currently using, or may have been using at the time you had any of the experiences described above.

Sex: ○ Female ○ Male

Current Age in years only:

Birth date: **Please use the following format (e.g., 06/25/1940)**

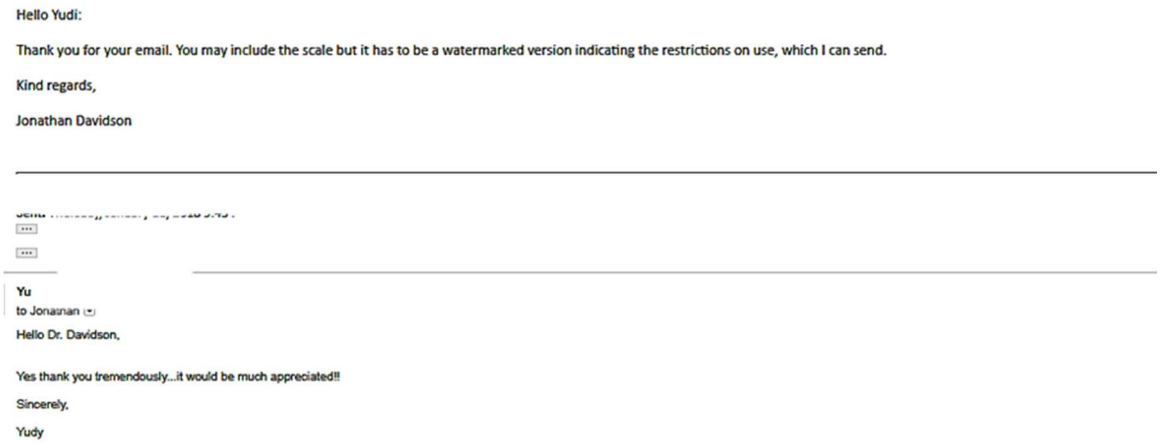
Citizenship (Country):

Ethnic Background:

Occupation:

Please feel free also to provide additional comments, especially if there were issues or experiences not covered in the survey questions, or if you found any items confusing, ambiguous, or otherwise problematic.

3. SOCIAL PHOBIA INVENTORY



Hello Yudi:

Thank you for your email. You may include the scale but it has to be a watermarked version indicating the restrictions on use, which I can send.

Kind regards,

Jonathan Davidson

Yu

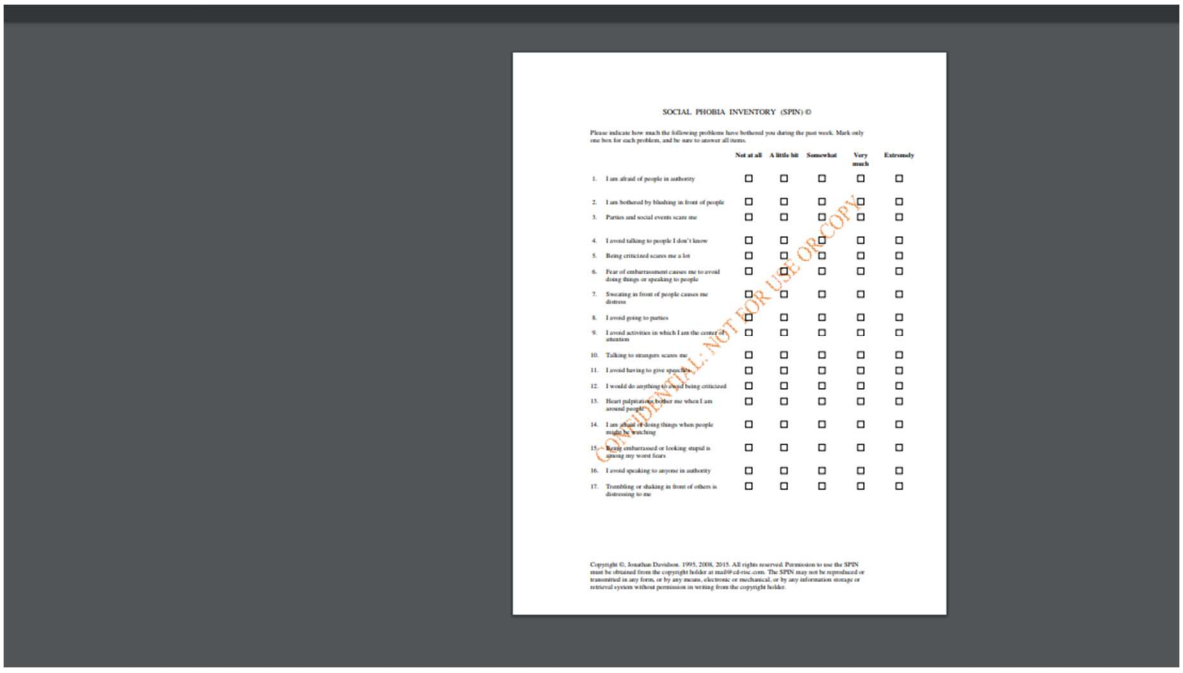
to Jonathan

Hello Dr. Davidson,

Yes thank you tremendously...it would be much appreciated!!

Sincerely,

Yudy



SOCIAL PHOBIA INVENTORY (SPIN) ©

Please indicate how much the following problems have bothered you during the past week. Mark only one box for each problem, and be sure to answer all items.

	Not at all	A little bit	Somewhat	Very much	Extremely
1. I am afraid of people in authority	☐	☐	☐	☐	☐
2. I am bothered by blushing in front of people	☐	☐	☐	☐	☐
3. Parties and social events scare me	☐	☐	☐	☐	☐
4. I avoid talking to people I don't know	☐	☐	☐	☐	☐
5. Being criticized scares me a lot	☐	☐	☐	☐	☐
6. Fear of embarrassment causes me to avoid doing things or speaking to people	☐	☐	☐	☐	☐
7. Sweating in front of people causes me distress	☐	☐	☐	☐	☐
8. I avoid going to parties	☐	☐	☐	☐	☐
9. I avoid activities in which I am the center of attention	☐	☐	☐	☐	☐
10. Talking to strangers scares me	☐	☐	☐	☐	☐
11. I avoid having to give speeches	☐	☐	☐	☐	☐
12. I would do anything to avoid being criticized	☐	☐	☐	☐	☐
13. Heart palpitations bother me when I am around people	☐	☐	☐	☐	☐
14. I am afraid of doing things when people might be watching	☐	☐	☐	☐	☐
15. Being embarrassed or looking stupid is among my worst fears	☐	☐	☐	☐	☐
16. I avoid speaking to anyone in authority	☐	☐	☐	☐	☐
17. Trembling or shaking in front of others is distressing to me	☐	☐	☐	☐	☐

4. PITTSBURG SLEEP QUALITY INVENTORY

Gasiorowski, Mary <
to me

Sent on behalf of Dr. Buysse

Dear Yudyahn,

You have my permission to use the PSQI for your research study. You can find the instrument, scoring instructions, the original article, links to available translations, and other useful information at www.sleep.pitt.edu under the Research/Instruments tab. Please ensure that the PSQI is accurately reproduced in any on-line version (including copyright information). We request that you do cite th any publications that result.

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Good luck with your research.

Sincerely,

Daniel J. Buysse, M.D.

PITTSBURGH SLEEP QUALITY INDEX

INSTRUCTIONS:
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?

   BED TIME _____

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

   NUMBER OF MINUTES _____

3. During the past month, what time have you usually gotten up in the morning?

   GETTING UP TIME _____

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

   HOURS OF SLEEP PER NIGHT _____

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

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

a) Cannot get to sleep within 30 minutes

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

b) Wake up in the middle of the night or early morning

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

c) Have to get up to use the bathroom

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

d) Cannot breathe comfortably

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

e) Cough or snore loudly

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

f) Feel too cold

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

g) Feel too hot

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

h) Had bad dreams

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

i) Have pain

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

j) Other reason(s), please describe_____

_____

How often during the past month have you had trouble sleeping because of this?

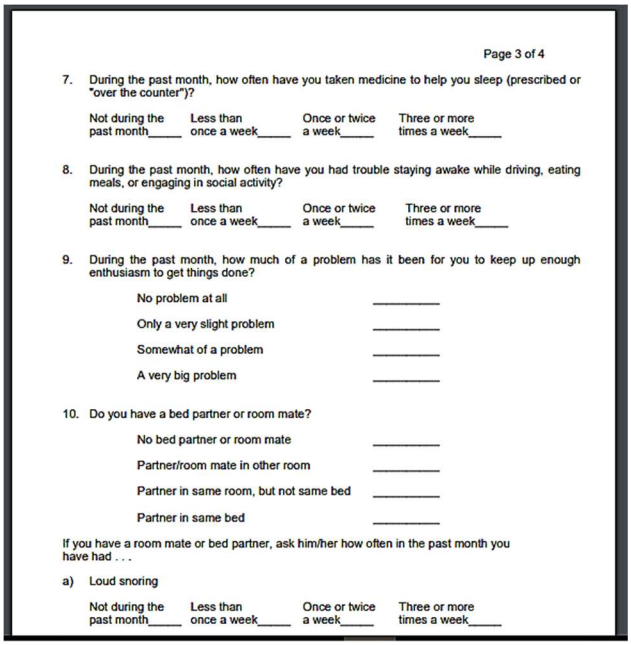
Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

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

   Very good _____

   Fairly good _____

   Fairly bad _____



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7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

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

No problem at all _____

Only a very slight problem _____

Somewhat of a problem _____

A very big problem _____

10. Do you have a bed partner or room mate?

No bed partner or room mate _____

Partner/room mate in other room _____

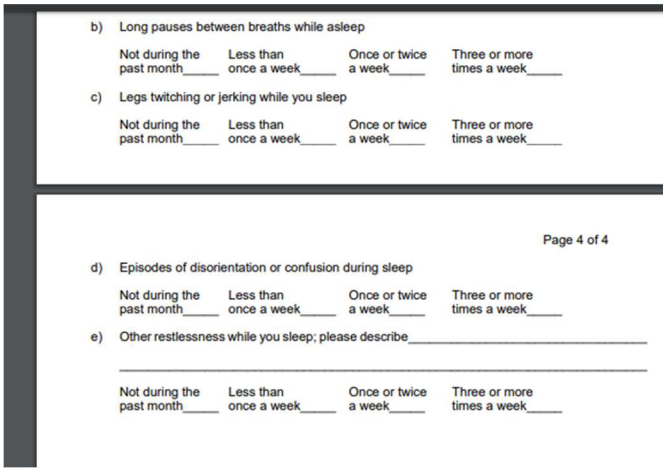
Partner in same room, but not same bed _____

Partner in same bed _____

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

a) Loud snoring

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____



b) Long pauses between breaths while asleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

c) Legs twitching or jerking while you sleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

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d) Episodes of disorientation or confusion during sleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

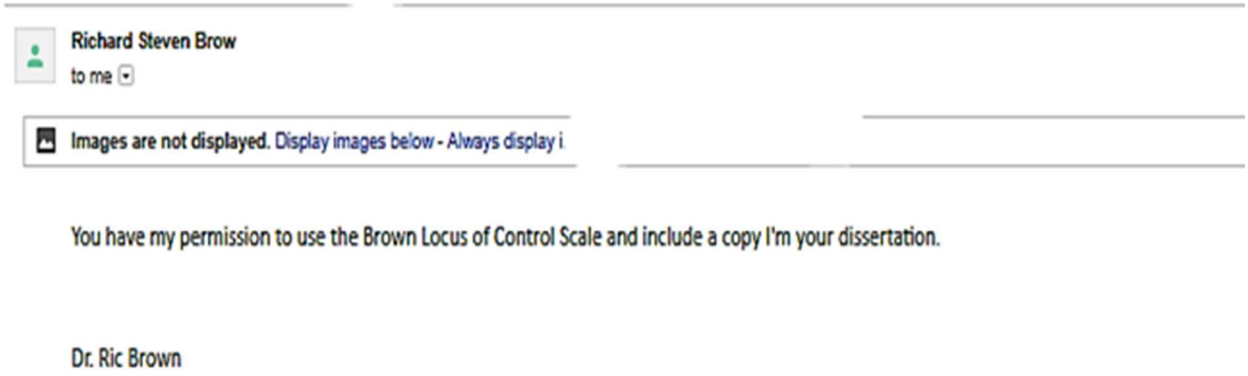
e) Other restlessness while you sleep; please describe_____

_____

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

Buysse,D.J., Reynolds,C.F., Monk,T.H., Berman,S.R., & Kupfer,D.J. (1989). The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. Psychiatry Research, 28(2), 193-213

5. BROWNS LOCUS OF CONTROL SCALE



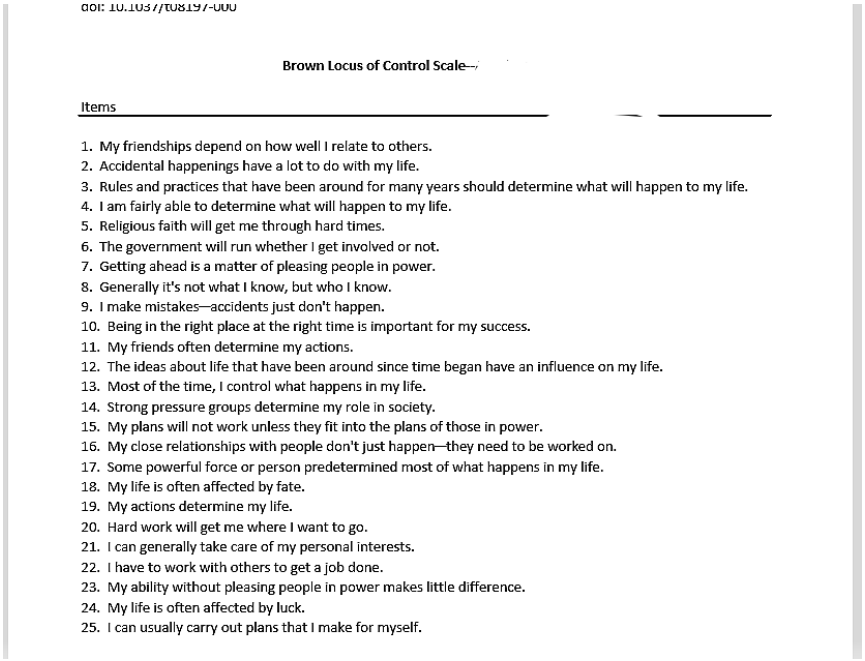
Richard Steven Brow
to me

Images are not displayed. Display images below - Always display i

You have my permission to use the Brown Locus of Control Scale and include a copy I'm your dissertation.

Dr. Ric Brown

Instructions: Please circle the degree to which you agree or disagree with the statements below on the following scale.
6- Very strongly agree; 5-Strongly agree; 4- Agree; 3 Disagree; 2- Strongly disagree; 1- Very strongly disagree



doi: 10.1037/t08197-000

Brown Locus of Control Scale—

Items

1. My friendships depend on how well I relate to others.
2. Accidental happenings have a lot to do with my life.
3. Rules and practices that have been around for many years should determine what will happen to my life.
4. I am fairly able to determine what will happen to my life.
5. Religious faith will get me through hard times.
6. The government will run whether I get involved or not.
7. Getting ahead is a matter of pleasing people in power.
8. Generally it's not what I know, but who I know.
9. I make mistakes—accidents just don't happen.
10. Being in the right place at the right time is important for my success.
11. My friends often determine my actions.
12. The ideas about life that have been around since time began have an influence on my life.
13. Most of the time, I control what happens in my life.
14. Strong pressure groups determine my role in society.
15. My plans will not work unless they fit into the plans of those in power.
16. My close relationships with people don't just happen—they need to be worked on.
17. Some powerful force or person predetermined most of what happens in my life.
18. My life is often affected by fate.
19. My actions determine my life.
20. Hard work will get me where I want to go.
21. I can generally take care of my personal interests.
22. I have to work with others to get a job done.
23. My ability without pleasing people in power makes little difference.
24. My life is often affected by luck.
25. I can usually carry out plans that I make for myself.