Comparison of Sleep Attitudes and Beliefs among Older Adult Vietnamese Migrants and Australians with and without Insomnia

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ABSTRACT

Sleep is an essential part of human life and is associated with both physical and mental health. When, where and how people sleep is known to vary across different cultures (Glaskin and Chenhall, 2013) but very little is documented about whether there are significant differences in attitudes and beliefs about sleep across different cultures or different ethnic groups. Previous research has found that both dysfunctional beliefs and attitudes about sleep and poor sleep hygiene knowledge can contribute to sleeping problems, especially for those with insomnia. As non-pharmacological treatments for insomnia often include addressing cognitive aspects related to sleep it is important that there is a good understanding of how sleep beliefs and attitudes may vary across groups and individuals, including possible ethnic differences. However, there has been no research, to the author's knowledge, investigating the possible differences in sleep attitudes and beliefs between older adult Vietnamese migrants and Australians. This study aimed to examine the dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and sleep perceptions between these two ethnic groups. Sex differences on the dependent variables were also of interest. Insomnia status was addressed as it is a possible confound. The participants consisted of 207 subjects (100 Vietnamese and 107 Australians). There were 36 males and 54 females for the Vietnamese sample with a mean age of 65.50 years (SD = 5.62). The Australian sample consisted of 50 males and 57 females with a mean age of 68.82 years (SD = 7.32).

Phase One of the study examined the psychometric properties, including factor analyses, of a number of new Vietnamese translations of the following self-report instruments; the Insomnia Severity Index, Athens Insomnia Scale, Dysfunctional Beliefs and Attitudes about

Sleep Scale 16, Sleep Beliefs Scale and Sleep Plots - where the latter assesses how sleep is perceived to vary across the night (Bruck, Dolan and Lack, 2015). Convergent validity between the Insomnia Severity Index and the Athens Insomnia Scale was also analysed. The results showed that the Vietnamese translated questionnaires had good psychometric properties with good reliability as well as correlations. Convergent validity of the Insomnia Severity Index was also good.

Phase Two investigated the insomnia status as well as sleep attitudes and beliefs between the two ethnic groups as measured by the Dysfunctional Beliefs and Attitudes about Sleep Scale 16, Sleep Beliefs Scale and Sleep Plots. The current study found that the Vietnamese sample reported more insomnia, had higher dysfunctional beliefs and attitudes about sleep, had poorer sleep hygiene knowledge and perceived the sleep of a healthy 60 year old differently to the Australian sample's perceptions (using Sleep Plots). For the Vietnamese sample significant differences were also found between the Insomnia and No Insomnia groups in relation to the perception of their own sleep using Sleep Plots. Interestingly, for both Vietnamese and Australian samples and irrespective of their insomnia status, the majority of participants perceived the sleep of a healthy 60 year old and their own sleep to represent a U shape on the Sleep Plots, with no awakenings during the night. It is speculated that these differences in the results between the Vietnamese and Australian samples may be related to cultural factors and/or ethnicity or socioeconomic (SES) factors, as insomnia levels were controlled for as far as possible.

Phase Three compared the insomnia status as well as sleep attitudes and beliefs between males and females across the entire sample. The results found no significant difference

between males and females according to their insomnia level, dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and perceptions of sleep. The findings are different to previous research where females have been found to report more insomnia than males.

This study adds to the limited body of research within the Vietnamese population group living in Australia. The results suggest that education related to the impact of dysfunctional beliefs and attitudes about sleep, sleep hygiene and perceptions of sleep need to be particularly implemented with Vietnamese older adults as they have more distorted views about sleep than their Australian counterparts. It is proposed that an increase understanding and knowledge about sleep will be helpful in the prevention and/or treatment of insomnia in older adult Vietnamese migrants living in Australia.

Doctor of Psychology Declaration

"I, Sandra Nguyen, declare that the Doctor of Psychology (Clinical Psychology) thesis entitled Comparison of Sleep Attitudes and Beliefs among Older Adult Vietnamese Migrants and Australians with and without Insomnia is more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any academic degree or diploma. Except where otherwise indicated, this thesis is my own work."

Signature: Date: 15/06/2017

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PERSONAL INTRODUCTORY COMMENTS

The Vietnam War started in 1955 and eventually ended on 30th April 1975 with the North Vietnamese (Viet Cong) defeating the South Vietnamese. After this, as many as 900 000 migrants fled South East Asia by boat as refugees to try and gain a better life for themselves and their family (Davis, 2000). I was one of those people.

Growing up as a Vietnamese migrant in Australia has allowed me to understand both cultures and acknowledge their differences as well as similarities. Now working as a psychologist counselling Vietnamese clients I am intrigued by how these migrants, like myself, have assimilated or not to the Australian culture and the cultural beliefs that they continue to hold. Through my counselling work I am confronted by the differences that exist between the Vietnamese and Australian cultures regarding beliefs about health and disease.

The Vietnamese culture uses folk treatment either concurrently or before seeking Western medical treatment. These beliefs include the focus on ying and yang or hot and cold. For example, certain diseases are said to result from an excess of the 'cold' element such as diarrhoea which is associated with a 'cold' stomach. An excess in the 'hot' element is associated with skin rashes or pimples with the 'hot' element erupting through the skin. Therefore, an excess in either hot or cold elements will lead to health problems (Nguyen, 1985). One particular treatment is known as Cao Gio (coin rubbing), which involves rubbing a coin on the individual's back, chest and neck with hot balm oil to produce ecchymotic marks, which looks unsightly, but it is believed to alleviate cold and flu symptoms (Nguyen, 1985).

Through my own experiences as a Vietnamese migrant and work as a psychologist, I am interested in further understanding the beliefs and attitudes of people across both the Vietnamese and Australian cultures and in particular whether this has an impact on their health, especially their sleep. There is a lack of research in the literature which focuses on these two cultures together and I was unable to locate any publications that focused on sleep attitudes and beliefs between these two ethnic groups.

Therefore, this thesis investigates the sleep beliefs and attitudes, sleep hygiene knowledge as well as perception of sleep across both the Vietnamese and Australian ethnic groups. It is hoped that this research will be able to add to the limited research that has been conducted comparing these two populations.

Chapter 1: Literature Review

1.1 Introduction

Sleep is a necessary and significant part of human living and there may be an association between poor sleep and poor social, occupational and educational functioning (Hiller et. al., 2015). Insomnia is the most common sleep difficulty and involves problems in initiating and/or maintaining sleep or waking up too early, which in turn has an impact on normal functioning (DSM 5, 2013). Not only does insomnia cause day time drowsiness and/or attentional difficulties, it may also impair quality of life with poorer sleepers having been found to receive fewer promotions, have increased absenteeism, demonstrate poor productivity and be at higher risk of motor vehicle accidences as a result of fatigue (Rajput & Bromley, 1999). Between 17% and 40% of adults frequently experience at least one insomnia symptom (Arslan, Kocoglu & Durmus, 2015). Comorbidity of insomnia with other psychiatric disorders such as anxiety and depression is common and can have important implications for the treatment of insomnia (Yu et. al., 2016). Therefore, understanding the factors that may contribute to and maintain insomnia is of high clinical importance.

1.2 Normal sleep and changes with age

Sleep patterns change significantly throughout the life span, from infancy to childhood and also into adulthood. Sleep pattern changes continue in the elderly, sometimes causing distress, mood changes and an overall decline in the quality of life (Robillard et. al., 2014). Aging is associated with significant changes in sleep patterns, which are usually negative in nature (Fetveit, 2009). Common findings in the elderly consist of problems with frequent awakenings during night time sleep as well as a reduction in deeper states of being asleep (Ohayon, 2004). The prevalence of specific sleep disorders also increase in the elderly and

include restless legs syndrome, obstructive sleep apnoea as well as disruption to the circadian sleep cycle (Fetveit, 2009; Lack & Wright, 2007). These problems are significantly associated with general health concerns such as cardiovascular disease, cerebrovascular disease as well as cognitive impairments (Winkelman, Shahar, Sharief & Gottlieb, 2008; Fetveit, 2009).

Normal sleeping patterns consists of two states known as rapid eye movement (REM) and non-rapid eye movement (NREM). There are five stages of sleep, stages 1, 2, 3, 4 and REM sleep. Each of the NREM stages progressively involve deeper levels of sleep (Snowden, 2008). Relative to non-REM sleep, REM sleep is associated with brain activity that resembles wakefulness and is more linked to recallable dreams. The stages of sleep occur cyclically and can be repeated. Stage 1 is a transitional "drowsy" phase that precedes deeper, more restorative stages. In stage 2, brain waves become slower with only an occasional burst of rapid brain waves. When a person enters stages 3 and 4, delta sleep is achieved and is the deepest kind of sleep and is associated with the occurrence of extremely slow brain waves. In deep sleep, there is no eye movement or muscle activity and it may be very difficult to wake an individual from their sleep (Pilcher, 2015). Slow wave sleep comes mostly in the first half of the night, REM in the second half. Waking is more likely to occur just after REM (Pilcher, 2015). If the waking period is long enough, the person may remember it the next morning. In the REM period, breathing becomes more rapid, irregular and shallow. This is the time when most dreams occur, and if awoken during REM sleep, an individual is more likely to report a dream, compared to being awoken from NREM sleep (Snowden, 2008). Most people experience three to five intervals of REM sleep each night. The total amount and composition of sleep changes throughout the life span. With aging the total amount of sleep decreases (Ohayon et. al., 2004). Delta sleep diminishes markedly with age. In contrast, early Stage 1

sleep which is the lightest sleep increases with age. There is little decline in REM sleep through out a person's adult lifetime (Robillard et. al., 2014). Please refer to Figure 1.1 for an example of a sleep cycle.

Figure 1.1 Sleep Cycle (Mastin, 2013)
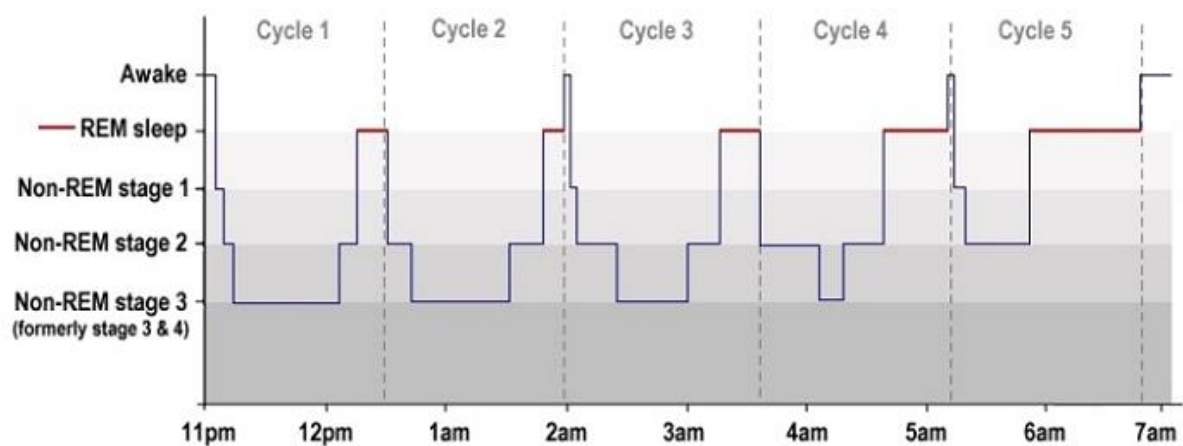
Older adults with insomnia more often display symptoms of poor sleep maintenance rather than problems with sleep initiation (Floyd, Ager & Janisse, 2000). By better understanding the aging process, we may have a better understanding of its impact on sleep and the occurrence of sleep disturbances in older adults.

The neuronal activity of the suprachiasmatic nucleus decreases during the aging process and as a result disruption to the circadian clock may result in impaired sleep (Costa, Carvalho & Fernandes, 2013). Older adults tend to wake up earlier and frequently because of a phase advance of their normal circadian rhythms and sleep disturbances (Germain & Kuper, 2008, Yoon et. al., 2003). Hyperarousal, which has been implicated in sleep disturbances, may

reflect interactions between the circadian system and the hypothalamic-pituitary-adrenal (HPA) axis. Aging can increase the HPA activity and inhibits slow-wave sleep and consequently promote nocturnal awakenings (Bonet & Arand, 2010).

Sleep in older adults can also be affected by a range of factors such as prescription or over the counter medications or medical conditions. Insomnia may also be a prodromal indication of psychiatric illnesses such as depression and anxiety disorders (Belanger et. al., 2016). It may also be related to sleep-breathing disorders (e.g. obstructive sleep apnea), restless legs syndrome or circadian rhythm disorder (Yu et. al., 2016).

A range of medications can also affect the sleep-wake cycle and contribute to the development of insomnia. Some of these medications include corticosteroids, selective serotonin reuptake inhibitors, monoamine oxidase inhibitors, chemotherapeutic agents, beta-adrenergic blockers and thyroid preparations (Kamel & Gammack, 2006). Alcohol, nicotine and caffeine may also affect sleep quality (Garcia & Salloum, 2015). Certain medical conditions such as gastroesophageal reflux disease, menopause, chronic obstructive pulmonary disease, heart failure, enuresis as well as chronic pain all affect sleep quality and can result in insomnia (Kamel & Gammack, 2006). The effects of chronic psychiatric illness such as anxiety, panic disorder, mania and depression often lead to insomnia (Belanger et. al., 2016; Cox & Olatunji, 2016).

1.3 Insomnia causes, consequences and classifications

1.3.1. Causes and consequences of insomnia

Chronic insomnia may be associated with a wide range of health problems such as psychiatric disorders and physical illnesses (Belanger et. al., 2016; Kamel & Gammack, 2006). Depression has been viewed as a cause of insomnia, however recently the causality of the insomnia-depression relationship has been considerably debated (Baglioni et. al., 2011; Fetveit, 2009).

Bao et al., (2017) conducted a meta-analysis of studies that assessed the prevalence and co-occurrence of sleep disturbances and depression and their bidirectional predictive relationship in older adults. They found a high prevalence of sleep disturbances and depressive symptoms as well as a high co-occurrence of both among older adults in community-dwellings and primary care settings. Longitudinal studies supported the bidirectional predictive relationship between self-reported sleep disturbances and depression in older adults. Sleep disturbances were found to be positively correlated with a higher risk of developing depression. They concluded that older adults with persistent sleep disturbances had significantly higher risks of developing, maintaining and/or a recurrence of depression compared with those older adults without sleep disturbances.

Bao et. al., (2017) also reported on the concurrent and sequential comorbidity model between sleep disturbances and depression in older adults. They concluded that there was a high co-occurrence between sleep disturbances and depression in older adults. With a high co-occurrence and bidirectional predictive relationship between sleep disturbances and depression in older adults, early interventions for sleep disturbances are necessary, which in

turn may protect older adults from developing depression and improve their quality of life. Treatment strategies should account for these reciprocal relationships by assessing and treating both problems (Smagula et. al., 2016; Perlis et. al., 2006).

Insomnia has also been found to be related to anxiety and in some cases this is through adverse changes to sleep architecture (Belanger, 2016; Cox & Olatunji, 2015). Yu et. al., (2015) investigated sleep related correlates of depression and anxiety in an older adult Asian population. They found that both depression and anxiety were associated with a number of sleep related issues. However, it was found that anxiety symptoms were uniquely associated with increased sleep latency and decreased sleep quality. Depressive symptoms were found to be exclusively associated with higher levels of daytime dysfunction. This research highlights the importance of the different profiles of sleep problems in the older adult Asian population.

1.3.2 Classifications

According to The International Classification of Diseases (ICD-10, 2014) insomnia is classified as part of the behavioural syndromes associated with physiological disturbances and physical factors. Insomnia is characterised as a sleep disorder with difficulty initiating or maintaining sleep. This difficulty does not occur in the context of another sleep disorder and is not etiologically linked to a mental disorder, substance use, or a general medical condition.

Sharma and Andrade (2012) categorised insomnia into primary and secondary insomnia. Primary insomnia is seen as a problem that exists independently. Secondary insomnia is seen as a problem that coexists with a medical or psychiatric condition such as depression and

anxiety. This classification is no longer used to diagnose insomnia according to the International Classification of Sleep Disorders-Third Edition (ICSD-3) (2014). The ICSD-3 (2014) identifies seven main categories for sleep disorders which includes; insomnia disorders, sleep-related breathing disorders, central disorders of hypersomnolence, circadian rhythm sleep-wake disorders, sleep-related movement disorders, parasomnias and other sleep disorders. The ICSD-3 stipulates that the person must display poor sleep despite adequate opportunity and circumstances to sleep. The ICSD-3 also specifies that the symptoms must occur at least three times per week and exist for more than three months.

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM 5, 2013), insomnia is classified under Sleep-Wake Disorders. Sleep-Wake Disorders encompass 10 disorders or disorder groups: insomnia disorder, hypersomnolence disorder, narcolepsy, breathing-related sleep disorders, circadian rhythm sleep-wake disorders, non-rapid eye movement (NREM) sleep arousal disorders, nightmare disorder, rapid eye movement (REM) sleep behaviour disorder, restless legs syndrome, and substance/medication-induced sleep disorder. Insomnia disorder is classified as a complaint of dissatisfaction with sleep quantity or quality which can include difficulty initiating sleep, maintaining sleep or early morning awakenings.

1.4 Some theories of insomnia

There are some competing theories of insomnia that have emerged. Perspectives taken have included physiological (Bonnet & Arand, 1997), behavioural (Bootzin, 1972; Spielman, Saskin, & Thorpy, 1987), cognitive (Harvey, 2002; Tang & Harvey, 2004), cognitive behavioural (Morin, 1993), and chronobiological (Campbell et. al., 1999). Due to the volume

of research on the different models of insomnia, only some of the theories proposed to conceptualise insomnia are described below, including those concerned with behavioural, arousal and cognitive factors.

One theory, developed by Monroe (1967), assumes that physiological arousal delays sleep onset. This theory proposes that heightened sympathetic arousal occurs in "poor" sleepers compared to "good" sleepers. Therefore, poor sleepers are more prone to subscribe to symptomatic complaints. This somatic theory has led to insomnia treatments that focus on trying to induce physiological calmness. Behavioural issues related to insomnia were discussed by Bootzin (1972) and Speilman (1987). Bootzin's theory of conditioned insomnia notes that cues associated with falling asleep are separated from activities that are incompatible with sleeping. Booztin believed that an individual with insomnia begins to associate their bedroom with negative feelings and being awake rather than asleep. Therefore, the bed becomes a discriminative stimulus for falling asleep.

Speilman and Glovinsky (1991) proposed an overarching framework to describe the development and maintenance of chronic insomnia. They described the 3-P model which addresses the predisposing conditions, precipitating circumstances and perpetuating factors. The theory proposes that each of the three factors are involved at different points during the course of insomnia. Predisposing factors increase vulnerability to sleep difficulties and can be psychological (hyperarousal, anxiety) or biological (sex, person's traits). The precipitating factors are life events such as medical, environmental or psychological factors that trigger insomnia. These may include death, illness, divorce, medications, familial or occupational stress. Finally, the perpetuating factors are the elements that maintain or exacerbate insomnia.

These are behaviours (naps, being in bed longer) or beliefs and thoughts (fear of sleeplessness, excessive worry about consequences of not being able to sleep) that an individual adopts in order to manage their insomnia. Although these behaviours may have short term benefits, they perpetuate insomnia in the long term. Therefore, according to this theory of insomnia, everyone presents with some vulnerability to developing insomnia which is dependent on predisposing factors. Different types of precipitating factors may trigger insomnia. Therefore, once the precipitating trigger declines, most people return to normal sleep. However, for others, sleep difficulties persist and insomnia develops and these difficulties are perpetuated by psychological and behavioural factors.

Another theory of insomnia addresses the concept of arousal as an important factor in the explanation and understanding of insomnia and how it is maintained (Tang & Harvey, 2004). There are three forms of arousal which seems to contribute to insomnia. These include cortical, cognitive and somatic arousal. Cortical arousal was demonstrated by Perlis and his colleagues who found that individuals who had insomnia exhibited increased high-frequency electroencephalographic activity at or around sleep onset, indicating that cortical arousal may lead to distorted perception (Perlis, Meric, Smith & Giles; 2001). A distorted perception of sleep is one of the core maintaining processes of chronic insomnia. The perception of insufficient sleep (cognitive arousal) increases an individual's worry about sleep, which in turn worsens sleep due to the hyperarousal. Therefore, distorted perception of sleep may be prodromal to the development of insomnia. The presence of cognitive arousal during the presleep period is highly correlated with objective insomnia. Lastly, somatic arousal may be at higher levels in those with insomnia. These individuals may exhibit higher body temperature, higher whole body oxygen consumption and other changes in the body (Tang and Harvey, 2004).

The cognitive model of insomnia was developed by Harvey (2002) and proposes that by worrying, the individual activates the sympathetic nervous system and consequently triggers physiological arousal and distress (also known as the fight or flight response). Therefore, this combination of worry, arousal as well as distress heightens the person's anxiety which is not conducive to falling or staying asleep. This anxious state then leads people with insomnia to narrow their attention and selectively attend to or monitor for sleep-related threats such as bodily sensations or noises that prevent sleep onset. Consequently, this can provide cause for further worry and hence, a vicious cycle is established. The theory also proposes that individuals with insomnia also experience misperceptions of how long it takes them to fall asleep with them over estimating the time frame. Also, people with insomnia tend to perceive that they have not slept adequately and therefore, further escalate their worry. Finally, it is proposed that there are two additional exacerbating processes. One is the unhelpful beliefs about sleep which are likely to fuel worry. An example of this includes the belief that you need to get eight hours of unbroken sleep each night to function adequately during the day (because most people find this very difficult to achieve). Secondly, in an attempt to cope with the escalating anxiety people with insomnia often engage in safety behaviours such as drinking alcohol to reduce anxiety and promote sleep onset.

The cognitive model of insomnia proposes that the main etiological role is cognitions, implying that excessive rumination may impede sleep onset. According to the cognitive model of insomnia, insomnia is maintained by a cascade of cognitive processes that operate at night and during the day. There are five main cognitive processes that occur which includes worry (accompanied by distress and arousal), selective attention and monitoring, misperception of sleep and daytime deficits, dysfunctional beliefs and finally counterproductive safety behaviours (Harvey, 2005).

1.4.1 The role of cognitions and behaviours on sleep

Some cognitive-behavioural conceptualizations of insomnia propose that rigidly held self-defeating beliefs and attitudes about sleep are important in the maintenance of sleep difficulties (Carney and Edinger, 2005). Unrealistic sleep expectations or beliefs such as the notion that there is little that can be done about poor sleep, may heighten sleep-related anxiety and led to difficulties going to sleep. Likewise, the belief that there is a need to catch up on sleep that has been lost could lead to sleep compensatory practices, such as napping during the day, which may led to sleep difficulties at night (Morin, Vallieres & Ivers, 2007). Because of their putative roles in increasing sleep-related distress and behavioural practices that perpetuate insomnia, maladaptive beliefs and attitudes about sleep play an important role in the maintenance and management of insomnia. Those individuals with insomnia show more rigidly held or self-defeating sleep-related beliefs compared to those individuals without sleep difficulties (Carney & Edinger, 2006). Morin (1993) suggested that there are a variety of faulty beliefs, expectations and attributions which are instrumental in heightening emotional arousal and exacerbate sleep disturbances. Therefore, expectations such as having eight hours of sleep is essential to adequate functioning the next day, can produce anxiety if this expectation is not met. Consequently, cognitive distortions can trigger emotional arousal which can then feed into the insomnia problem.

The content of cognitions such as beliefs, expectations and attributions rather than excessive cognitive activity is an important mediating factor of insomnia (Morin, 1993). The thoughts of those with insomnia are more negative compared to those of good sleepers. Thoughts that are negative and sleep related such as; fear of the consequences of loss of sleep, reflect an anxious and worrisome cognitive style which in turn heightens their affective response to

poor sleep and lead to more sleep difficulties (Morin, Vallieres & Ivers, 2007). Morin and

his colleagues recognised the importance of understanding the role of distorted beliefs about

sleep and consequently developed the Dysfunctional Beliefs and Attitudes about Sleep Scale

(DBAS) (Morin, Vallieres & Ivers, 2007). The DBAS will be described fully in a later part of

this thesis.

1.5 Definitions of culture and ethnicity

Before the literature comparing sleep differences across various cultures or ethnic groups is

presented, it is important to first distinguish the difference between culture and ethnicity.

Culture is defined as the shared values, norms, and codes that collectively shape a group's

beliefs, attitudes and behaviour through their interactions with their environments

(Airhihenbuwa et. al., 2016). Whereas; ethnicity refers to a self-identified social or cultural

group who have shared physical features and are from a common descent, rather than to the

genetic make-up of the individual (Mezick, 2008). Their relationship to sleep will be further

discussed below.

1.5.1 Ethnicity and sleep

Within the purview of culture, which is inextricably linked to an individual's ethnicity, there

is growing evidence to suggest that sleep profiles might differ between individuals from

different countries or ethnic backgrounds (Jean-Luise et. al., 2008). Epidemiological studies

have investigated experiences of sleep as a function of ethnicity in New Zealand (Paine,

Gander, Harris & Reid, 2005), China (Xiang et. al., 2008), America (Ruiter, DeCosta, Jacobs

& Lichstein, 2010), Europe (Gindin et. al., 2014; Morin & Jarrin, 2013) and Australia (Clever

& Bruck, 2013). However, the majority of research has consisted of comparisons between

black and white Americans (Stepnowsky et. al., 2003; Profant, Ancoli-Israel & Dimsdale, 2002; Jean-Louise et. al., 2001, Nunes et. al., 2008).

The majority of research on sleep and "Vietnam" has been conducted with Vietnam veterans concerning issues related to Post Traumatic Stress Disorder and the impact of their experience in the Vietnam War on their sleep (Neylan et. al., 1998; Gehrman et. al., 2015; Alderman & Gilbert, 2009). To the author's knowledge, no research has been conducted investigating the sleep attitudes and beliefs of Vietnamese people, including those living in Australia.

Gindin et. al., (2014) investigated the sleep patterns of older adults across eight countries consisting of Czech Republic, France, Finland, Germany, England, Netherlands, Italy and Israel. They assessed over 4000 participants across measures of insomnia, age, sex, activities of daily living, cognition, depression, major stressful life events, physical activity, fatigue, pain and sleep medication. The investigation revealed that the level of insomnia differed across countries with England reporting the least insomnia and the Netherlands with the highest reported insomnia. They also found that depression, as well as the use of hypnosedative medications were the biggest predictors of insomnia beyond cultural differences.

Xiang et. al., (2008) investigated the prevalence of insomnia and treatment patterns of 5,926 participants from urban and rural regions in China. The participants were 15 years or older and there were 2,735 males. They found that 9.2% of the sample reported some type of insomnia which may include difficulty initiating sleep, difficulty maintaining sleep or early

morning awakening. They also found that increased age, being female, having a major medical condition and suffering from a psychiatric disorder were risk factors for developing insomnia in both rural and urban regions.

Nunes et. al., (2008) compared the sleep duration in a sample of black and white participants in the National Health Interview Survey. Data was gathered from 29,818 participants in America and they ranged in age from 18 to 85 years. They found that blacks were significantly less likely than whites to report sleeping seven hours each night. They found that by adjusting for sociodemographic factors, blacks were significantly more likely to report extreme sleep duration, either less than five hours or more than nine hours of sleep each night.

Ruiter, DeCosta, Jacobs & Lichstein (2010) conducted a meta-analysis to determine the magnitude of ethnic differences between African Americans and Caucasian Americans with respect to insomnia symptoms and sleep-disordered breathing. They analysed 13 studies measuring insomnia and 10 studies measuring sleep-disordered breathing. They found that African Americans had a higher prevalence rate and more severe presentations of sleep-disordered breathing, however Caucasian Americans reported more sleep complaints. The results add to the literature that there are ethnic health disparities and that there is a need for a multi-ethnic approach to the assessment and treatment of sleep disorders.

The above studies show that there are differences regarding the perception and experiences of sleep across different countries and ethnicity. They also revealed that insomnia is influenced

by age, gender and health problems. Therefore, ethnicity may have an importat impact on sleep and insomnia.

1.6 Socioeconomic status (SES) and sleep

Sociodemographic factors such as income, education, employment and housing are often used individually to assess any possible association between insomnia and socioeconomic status. There are consistent findings to indicate that lower educational and lower socioeconomic status are associated with increased risk of reported sleep disturbance (Kutner, Bliwise & Zhang, 2004, Paine et. al., 2004)).

Gellis et. al., (2005) investigated the relationship between SES and insomnia in a sample of 575 participants comprising of 286 men and 289 women where the ethnic distribution included 71% Caucasian participants, 28% African American participants and 1% Asian and Hispanic participants. The average age was 56.2 years. They found that education status is a risk factor for insomnia and insomnia decreased with each increase in education level. Education level was related to insomnia even after ethnicity, sex, and age were controlled for. They also found that ethnicity was unrelated to insomnia, and concluded that disparities between white and black Americans were more likely to due to their SES.

Paine et. al., (2004) investigated the prevalence of insomnia symptoms among Maori (indigenous) and non-Maori (non-indigenous) adults within the general New Zealand population. A sample of 2,670 participants responded and their investigation revealed that Maori were more likely to report sleeping problems and longer lasting problems compared to non-Maori participants. They found that socioeconomic factors and age, but not ethnicity or

sex were significant independent predictors of reporting chronic sleep problems. They also found that increasing age and being unemployed were independent risk factors for reporting multiple awakenings, difficulty getting back to sleep, waking up too early in the morning and difficulty falling asleep. The study also found that the negative consequences of having an insomnia complaint include poor or fair perceived general health and quality of life, impaired memory and concentration, decreased ability to cope with minor problems, decreased ability to accomplish daily tasks as well as difficulties with interpersonal relationships.

Clever and Bruck (2013) compared sleep quality, day time sleepiness and cognitions of Australians with those of Zimbabwean and Ghanaian black immigrants. Their investigation consisted of 176 participants who completed measures on sleep, beliefs and attitudes about sleep as well as a health survey. The study found that there were no significant differences for sleep quality, self-reported day time sleepiness or physical health between the Australians, Zimbabwean and Ghanaian samples and, importantly, that there were no differences in the socioeconomic status between the different ethnic groups. Differences in cognitions were found and are discussed below. They also found sex differences in sleep quality, with females reporting more sleeping difficulties.

Research has found conflicting results with respect to the relationship between SES and sleeping problems. Some research has found that lower SES such as poorer education and being unemployed resulted in increased sleep problems. However, Clever and Bruck's research controlled for SES variables and they found no differences in sleep quality between two different ethnic groups.

1.7 Cultural beliefs about sleep

Sleep and sleep-related problems are related to the interactive outcome of biological and socio-cultural factors (Kaneita et. al., 2006). They can also help to compare and delineate the interaction among various social, cultural, economic, lifestyle as well as biological variations (Wing & Chen, 2008). Therefore, it is important to have a better understanding of the cultural influences, if any, on sleep and sleep-related problems.

Worthman and Melby (2002) found that there were commonalities and diversities in the conditions in which people sleep with social, cultural and physical factors influencing sleep patterns. They reported that in non-Western societies, sleep settings were social and solitary sleep was rare. Bedtimes were fluid and napping was a common occurrence. They also reported that extensive co-sleeping was observed in non-Western cultures which began in infancy and could last through to adulthood.

There are several cultural beliefs and values that may affect the experience of insomnia within the Asian culture. According to Asian cultures, harmony and balance is crucial to everyday living and people are required to keep a diet and exercise plan that helps them to keep a balance (Yung et. al., 2016). However, such beliefs may lead individuals to misattribute their sleep problem to whatever they deem disruptive to the balance, resulting in maladaptive coping. In Asian cultures there is a belief in superstition, religion and feng-shui in explaining life events and illnesses (Chen & Swartzman, 2001). Therefore, people with insomnia may misattribute their sleep problems to external factors. Consequently, some individuals may interpret their mental and physical illnesses as punishment for evil done in their previous or present life, resulting in shame. Another cultural phenomenon is that Asian

cultures place a lot of emphasis on saving "face" and therefore individuals tend to keep their problems to themselves in order to maintain dignity and prestige (Yung et. al., 2016). Also, Asian cultures tend to discourage expression of emotions and feelings (Tseng, 2003), which may exacerbate insomnia as negative emotions keep piling up and are kept to themselves instead of being expressed, shared and then resolved.

Relative to Caucasians, Asians tend to somatise psychological distress (Leung, 2010). This may be due to the stigma associated with mental health in Asia (Wynaden et. al., 2005). Reporting of somatic symptomology is perceived as a more acceptable way of communicating distress than reporting psychological symptoms. There is also evidence to suggest that some clinicians are also more receptive to somatic complaints when attending to patients of Asian ethnicities (Yu et. al., 2015).

Hollan (2013) compared the cultural ideas about sleep and dreaming among rural Toraja Indonesians and those from middle class people seeking psychotherapy in America. He compared their beliefs about the implications of sleep and dreaming on their health and suggested that there are substantial cultural differences in these beliefs. Hollan observed that people never slept alone in the rural Toraja community. He concluded that these people slept together for warmth and for a sense of comfort, safety and security.

Musharbash (2013) described the sleep experience among the Warlpiri people (Indigenous Australians), as akin to hunter-gatherers, where sleep is not dictated by labour demands and can occur anytime over the 24 hour cycle. Among the Warlpiri people, night time is reserved for various cultural activities and therefore, they can catch up on sleep loss during the day,

with napping prevalent throughout the culture. Musharbash reported that sleep was often conducted outside, with loud noises surrounding them, however the people reported that their sleep was deeply gratifying.

Loman (2013) described the sleeping behaviours of the Asabano people, a small group in Papua New Guinea. He observed that the practice of sleeping with others of the same sex or family members for protection and companionship was highly valued. According to the Asabano people, sleeping is interwoven with the rest of life. Bedtime was also seen as a social activity with people staying up and talking long after dark. Loman reported that it was common for visitors to arrive in the evening with their hosts putting on a dusk to dawn performance of singing, drumming and dancing. This highlights how sleep behaviour is enmeshed with social activities among the Asabano people.

Worthman and Brown (2007) explored sleep in the context of everyday living among Egyptian families in Cairo. They concluded that there were strong preferences for co-sleeping within the culture, which the participants described as protective, comforting and integral to relationships and family life. They concluded that the sleeping arrangements were largely determined by age and sex, culturally patterned and co-sleeping directly influenced sleep quality.

The above four studies highlight the importance of culture on sleep. Sleep is enmeshed in social activities and co sleeping is common in non-Western cultures. Sleep also serves several purposes not just to replenish our bodies, but also for warmth, comfort and security. The

above studies also highlight that sleeping can occur during different parts of the day with napping being a common occurrence in some cultures.

The context of how sleep is experienced from culture to culture, as defined by how, where, how much and with whom one slept with, is important in understanding how sleep problems and sleep disorders occur. Another important influence of culture in understanding sleep requires a deeper appreciation for the role of family in health. Family systems provide a key to understanding sleep behaviour such as how sleep practices such as co-sleeping have benefits in certain cultures such as providing warmth, comfort, safety and security (Airhihebuwa et. al., 2016). To address the cultural basis of sleep, there is also a need to understand certain positive aspects of sleep not just the negative consequences. The notion of having a power nap as conceived in Western countries, is different from the siesta observed in certain cultures. The use of fire, which is replenished throughout the night, or drum and dance celebrations from dusk to dawn, or sleeping with others is vastly different from accepted normal behaviours in Western cultures which promotes sleep to entail a solitary activity, in a dark room, without noise and to occur at night time (Airhihebuwa et. al., 2016). Previous research studies have highlighted the importance of culture to existing research in sleep. They illustrate that sleep, like waking life, is a cultural phenomenon. These cultural practices and beliefs about sleep hold great relevance for understanding the context in which sleep occurs and the quality of sleep across different cultures.

1.8 Cultural model and health

The PEN-3 cultural model draws attention to the influence of culture on health that may be helpful for behavioural sleep research, particularly for developing culturally tailored

interventions for minority populations. The PEN-3 model was developed by Airhihenbuwa (1989) and centralises culture in the study of health beliefs, behaviours and health outcomes (Airhihenbuwa et. al., 2016). The PEN-3 cultural model consists of three primary domains:

1. Relationships and Expectations – focus on perceptions, enablers and nurturers

2. Cultural Empowerment – includes positive, existential and negative health practices

3. Cultural identity – focus on person, extended family and neighbourhood

Within the Relationships and Expectations domain, perceptions and attitudes about health problems (e.g. sleep disorders), societal influences and health seeking practices are examined. Within the Cultural Empowerment domain, health problems are explored first by identifying beliefs and practices that are positive, existential as well as identifying negative health practices that serve as barriers. Therefore, cultural beliefs and practices that influence health are examined and solutions to health problems that are beneficial are encouraged and those that are harmful are acknowledged, before finally dealing with practices that are harmful or have negative consequences. The Cultural Identity domain highlights the intervention entry points and these may occur at the level of the person, extended family members or neighbourhoods. Together these domains offer a framework to centralise culture when defining and exploring health problems and in designing treatment protocols (Airhihenbuwa et. al., 2016).

Figure 1.2 The PEN-3 cultural model (BeLue et. al., 2009)
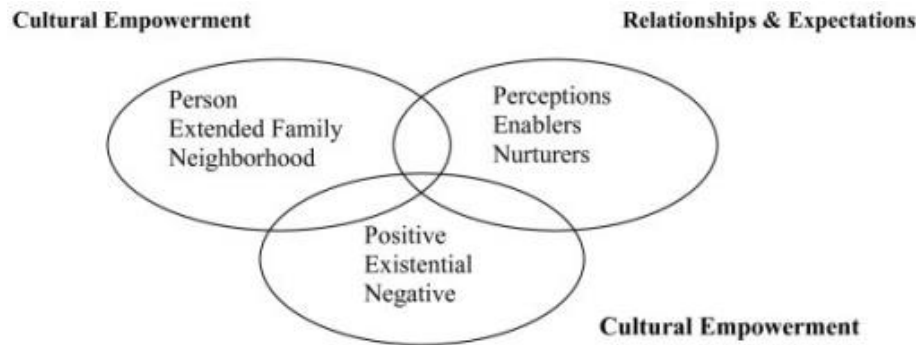
The PEN-3 model has been widely adopted in cross cultural research across a range of areas including cardiovascular risk (BeLue et. al., 2009), tobacco use (Hiratsuka, Robinson & Trinidad, 2016), breast cancer research (Seyed Abolhassan et. al., 2015), diabetes (Melancon, Oomen-Early & Rincon, 2009) and health research (Iwelunmor, Newsome & Airhihenbuwa, 2014). It is speculated that this model could also be applied to research about sleep.

1.9 Sex differences and insomnia

Hale et al., (2009) conducted a meta-analysis of 31 studies on sex differences and prevalence of insomnia and found that women suffer from insomnia more than men by around 40%, but understanding these differences still remains limited (Chen et. al., 2005). Sex differences in insomnia are explained according to biological, prior psychiatric illness and sociological perspectives. From a biological perspective, the internal physiological differences between men and women are responsible for the sex differences seen in sleep initiation, maintenance and quality. Sleep disturbance is one of the most common complaints among menopausal women such as experiencing hot flushes during the night and excessive sweating (Jones & Czajkowski, 2000). Hormones such as progesterone, estrogen, and testosterone have all been

implicated in explaining differences in men's and women's sleep patterns (Vitiello, Larsen & Moe, 2004; Moline, Broch, Zak & Gross, 2003). Other biological differences that may affect sleep include differences in slow wave sleep (nonREM sleep), sleep spindles and menstrual cycle related body temperature changes (Chen et. al., 2005). Psychiatric explanations focus on the differences in prevalence of mental health disorders between men and women and that the sex disparity varies by type of disorder. In particular, women are more likely to suffer from affective and neurotic disorders such as depression and anxiety, whereas men are more likely to suffer from personality disorders (Taylor et. al., 2007). Because affective disorders are closely linked to insomnia, differences in type and prevalence of psychiatric illness may explain the higher prevalence of insomnia symptoms among women. Sociological explanations focus on gender inequality in trying to balance competing obligations between work and family (Hale et. al., 2009). For example, women typically have a greater share of the household responsibilities, especially related to activities such as child-rearing, food preparation, cleaning and general domestic duties. These activities are time consuming and may lead to increased trouble falling or staying asleep and consequently lead to insomnia.

Chen et. al., (2005) investigated sleep disturbances among 39,500 Taiwanese citizens who participated in the 2001 social trend survey. Their results showed that women reported higher prevalence of insomnia compared to men. The difference in insomnia between men and women were higher among the unemployed and divorced/separated participants. They also found that having a higher educational level was associated with better night time sleep quality among women. Interestingly, by contrast, men with a higher level of education attainment were more likely to have night time sleep disturbances.

Kim et. al., (2016) investigated the prevalence and clinical features of insomnia among a population of older adult Koreans. They examined 881 participants aged over 60 years old. They found that overall, insomnia was more prevalent in women (37.9%) compared to men (25.2%). These results were also consistent with those reported by Su, Huang and Chou (2004) who investigated the prevalence and risk factors for sleep complaints in Chinese older adults. They also found that women had greater insomnia, reported more sleep disturbance symptoms and were more likely to use hypnotic medications compared to men. However, they found that daytime sleepiness was much more common in males with insomnia compared to females with insomnia.

Quan et. al., (2016) investigated the sleep quality of 382 older adults from Korea aged 45 years and older. The mean ages of men and women were 73.5 years and 71.4 years, respectively. They found that a higher percentage of the men felt that they had good quality sleep compared to women (61.4% vs. 46.3%). In females, the lack of exercise was a risk factor of poor sleep as well as reported increased experiences of stress.

Cao et. al., (2017) conducted a meta-analysis on prevalence of insomnia in the general population of China. They analysed a total of 17 studies and found that the pooled prevalence of insomnia in China was 15%, which was lower than that compared to Western countries. They also found no significant differences in the prevalence of insomnia according to sex, which they acknowledged was inconsistent with other studies.

Thus studies have revealed that women tend to report more sleep problems compared to men, with women reporting poorer sleep quality and sleep difficulties. This is consistent across

different cultures. However, a meta-analysis conducted by Cao et. al (2017) revealed different results which they also acknowledged were inconsistent with other research.

1.10 Psychological interventions in sleep

Early psychological treatments for insomnia focused on behavioural therapeutic approaches with interventions such as systematic desensitization, relaxation techniques, hypnosis, biofeedback and paradoxical intention which aimed to target hyperarousal associated with insomnia. During the 1970s, stimulus control therapy for insomnia was introduced. In the late 1980s, a new behavioural intervention, sleep restriction, was introduced followed by the implementation of cognitive restructuring for dysfunctional beliefs related to insomnia and subsequently formalized and integrated together into several multi-component treatments of insomnia called Cognitive Behavioural Therapy – Insomnia (CBT-I) (Sharma & Andrade, 2012; King et al 2001).

The American Academy of Sleep Medicine (Morgenthaler et. al., 2006) established a task force to review the scientific literature from 1999 to 2006 regarding evidence on non-pharmacological treatments of insomnia. They found the different therapies which were effective in the treatment of insomnia included both behavioural and psychological interventions. Stimulus control therapy, relaxation training, sleep restriction therapy and cognitive therapy were all seen as beneficial forms of interventions to be used in the treatment of insomnia. There was insufficient research to suggest that sleep hygiene was an effective single therapy in the treatment of sleeping problems. The recommendation was for sleep hygiene education to be incorporated with other forms of behavioural interventions.

1.10.1 Stimulus Control Therapy

Stimulus control therapy is psychoeducational in nature and is designed to help individuals establish a consistent sleep-wake rhythm, enhance the bed and bedroom cues for sleep as well as weakening them as cues for other activities that may interfere with sleep (Bootzin, 1972; Sharma & Andrade, 2012). The main rationale behind this therapy is that the individual has established poor sleeping habits which has resulted in a learned association between the bed or bedroom as a stimuli which results in arousal rather than sleep (King et. al., 2001). The goals of this intervention are to help individuals reassociate the bedroom environment and night-time routines and rituals with rapid sleep onset. According to Ebben and Spielman (2009) the struggle to fall asleep or go back to sleep during the night are unpleasant and often associated with disturbing thoughts which are in themselves arousing. The individual is often tossing and turning in bed, worried about the effects of not being able to sleep. They are worried about the impact of lack of sleep on their mood and performance the next day. These experiences are often recurrent and influence learning in that an association is established that certain bedtime environments and rituals lead to sleeplessness. Therefore, stimulus control therapy was developed to break the maladaptive association between the bedroom environment and bed time routines as being associated with being awake and struggling to go to sleep.

Stimulus control therapy involves five main instructions (Harsora & Kessmann, 2009) which are:

1. Not to go to bed unless sleepy
2. The bed is only used for sleeping and sex

3. If after 10 to 20minutes of lying in bed and being unable to fall asleep, get up and go to another room

4. Wake up at the same time each morning

5. No napping during the day

Stimulus control therapy therefore, promote the retraining of sleep by establishing conditions that lead to the experience of rapid sleep onset after getting into bed.

1.10.2 Relaxation Therapy

Relaxation therapy is based on the premise that those individuals with insomnia often display high levels of physiological, cognitive and/or emotional arousal, both at night and during the day. A number of formal relaxation therapies have been developed and applied to insomnia since such therapies reduce the sleep-related performance anxiety and bedtime arousal common to this condition. These interventions may be most suitable for individuals who characterize their insomnia as an "inability to relax" and/or for individuals who present with multiple somatic complaints. Progressive muscle relaxation, autogenic training, and biofeedback are aimed at reducing somatic arousal (e.g., muscle tension). Attention-focusing procedures such as imagery training or meditation seek to lower pre-sleep cognitive arousal (e.g., intrusive thoughts, racing mind). Relaxation therapy is useful for both sleep onset and sleep maintenance in insomnia (Edinger & Means, 2005).

1.10.3 Sleep Restriction Therapy

Spielman, Saskin and Thorpy (1987) developed sleep restriction therapy based on the assumption that the longer a person stays awake, the less likely it is that they will be able to

remain awake, and the more likely the individual is to start to feel sleepy. This behavioural technique aims to regulate the sleep-wake cycle by tailoring the time spent in bed to the individual's true sleep need. The process involves calculating an individual's average total sleep time, which is accomplished by completing sleep logs that record the duration of time in bed and the total duration of time spent sleeping. The total time in bed is increased or decreased by 20-30 minutes weekly to achieve the optimal total sleep time for the individual. Sleep restriction therapy aims to consolidate sleep such that the time passed in bed is spent sleeping rather than awake. The consistent bedtime and wake time required by this procedure helps to retrain and strengthen circadian rhythms which may be dysregulated with the irregular sleep schedules common to people with insomnia. Sleep restriction therapy is generally combined with stimulus control therapy or other forms of therapy.

1.10.4 Sleep Hygiene Education

Sleep hygiene is a behavioural intervention which involves educating the individual with insomnia about health practices and environmental factors that can influence sleep quality by promoting or inhibiting sleep (Li et. al., 2016). These include behaviours such as diet, exercise, and substance use, and environmental factors such as light, noise, temperature, and bedding (Jefferson, 2005). It is primarily psychoeducational in nature, where individuals are provided with information about healthy sleep habits. Although poor sleep hygiene may not be the cause of insomnia, it can perpetuate insomnia. Therefore, sleep hygiene knowledge is necessary in addition to other beneficial treatments (Perlis, 2005).

1.10.5 Paradoxical Intention Therapy

Paradoxical intention therapy involves increasing the frequency of responses that already occur too often in insomnia such as anxiety about falling asleep, sleep loss and its consequences. It is based on the concept that performance anxiety prevents proper sleep. Paradoxical intention reduces performance anxiety about falling asleep by instructing individuals with insomnia to do the opposite; that is to go to bed and stay awake (Ringdahl, Pereira & Delzell, 2004). When the individual with insomnia engages in the most feared behaviour, which is staying awake, performance anxiety related to trying to fall asleep slowly diminishes (Broomfield & Espie, 2003).

1.10.6 Cognitive Therapy

Cognitive therapy in the treatment of sleeping problems targets unrealistic and maladaptive beliefs that exacerbate the sleep disturbance and also contributes to anxiety provoking thoughts regarding sleep (Harvey et. al., 2007). Identifying irrational beliefs and counter-productive thinking is the first step in cognitive therapy for individuals with insomnia. These cognitions often involve the attribution of transient sleeping difficulties as a chronic problem, believing that most daytime problems are the result of poor sleep, having unrealistic expectations about their sleep needs, overgeneralisation, ruminations and catastrophising of thoughts as well as having high anxiety regarding sleep which is associated with going to bed (Ebben & Spielman, 2009). Once these irrational beliefs are identified, cognitive restructuring is employed which aims to address the dysfunctional beliefs and attitudes and replacing them with more appropriate ones. This is achieved by providing the individual with accurate information and having them identify and rehearse alternative belief statements which are more realistic (Harvey et. al., 2007). Cognitive restructuring is done through the

use of a thought record worksheet in which the individual records their dysfunctional belief, questioning the individual about the evidence to support their belief, using Socratic questioning to identify evidence that does not support their belief and then specifying an alternative belief that is more adaptive (Belanger, Savard & Charles, 2006). McManus, Doorn and Yiend (2012) examined the effects of thought records and behavioural experiments in instigating change to belief. They found that both thought records and behavioural experiments have a beneficial therapeutic impact on changing beliefs of individuals about their sleep.

1.10.7 Cognitive Behavioural Therapy for Insomnia

Cognitive behaviour therapy for insomnia (CBT-I) refers to combinations of cognitive restructuring as well as behavioural techniques and has evolved as a multi-component treatment approach. CBT-I involves the combination of stimulus control, sleep restriction, sleep hygiene education, cognitive therapy and relaxation therapy (Davidson, Dawson & Krsmanovic, 2017). The benefit of the multicomponent approach is that it permits the clinician to target several different pathways thought to contribute to insomnia and as such is more effective in the treatment of insomnia (Smith & Neubauer, 2003).

Lovato, Lack, Wright & Kennaway (2014) evaluated the effectiveness of a group-administered four week treatment program of cognitive behavior therapy for insomnia (CBT-I) for older adults with sleep maintenance insomnia in Australia. They randomly assigned a sample of 118 older adults (mean age = 63.76 years) into either a CBT-I group or waitlist control group. They reported that there were no significant differences between the two groups on any variable at pretreatment except for insomnia severity, with the CBT-I group

reporting higher levels of insomnia than the controls. Immediately following the four week treatment program, the perceived insomnia severity for the CBT-I group was significantly reduced and was maintained at follow-up three months later. They also found that those participants in the treatment group signficantly reported larger reductions in fatigue, daytime sleepiness, and impaired daily feelings and functioning immediately following treatment. The results also showed that three months later, those in the CBT-I group continued to report a significant reduction in impaired daily feelings and functioning compared to the waitlist controls.

The effectiveness of CBT-I treatment for insomnia is further consolidated by other studies as reported by Van Straten et. al., (2017) who conducted a meta-analysis on the effects of educational, behavioural and cognitive therapies for insomnia by comparing randomised control trials. They compared 87 papers in which (a component of) CBT-I was examined in comparison to a non-treatment control group. They found that face-to-face interventions perform better than self-help interventions (on Sleep Efficiency and Insomnia Severity Index but not on Sleep Onset Latency). Overall, the findings indicated that CBT-I treatments for insomnia are effective and that treatment is mostly effective for improving sleep continuity/efficiency and sleep quality, with some evidence of improved daytime functioning as well.

1.10.8 Mindfulness for Insomnia

Mindfulness meditation originated from Buddhism and the aim is to foster awareness of the present moment by noticing the impermanent nature of things (Ong & Sholts, 2010). It is believed that by awakening to impermanence, individuals can notice that rigid attachment to

desired outcomes is a cause of stress. Hence, by adopting this awareness to each moment cultivates the ability to respond to stressors in a non-judgemental way and therefore, allows the individual to navigate life in a way that does not involve attachment to particular beliefs, thoughts and emotions (Ludwig & Kabar-Zinn, 2008). This form of self-compassion serves, therefore as a mechanism for reducing negative emotional reactions and enhancing resilience.

Mindfulness for Insomnia (MBT-I) is designed to help individuals increase awareness of the mental and physical states that develop with chronic insomnia and to develop adaptive ways of working with these unwanted states. The meditation exercises, discussions and daily monitoring of sleep and wakeful activities aim to foster this awareness. Attention is brought to the mental and physical states of sleepiness and fatigue. Individuals are taught to recognise these two states. MBT-I involves reducing unwanted wakefulness at night and effectively managing the emotional reactions to disturbance and daytime fatigue. Individuals are taught to respond rather than react automatically to sleep disturbance by increasing an effort to rest. An increased awareness of the internal cues, along with recognition of reactive behaviours, are used to make changes in both the relationship with sleep and behaviours that are likely to promote sleep (Ong & Sholts, 2010).

Behavioural changes are implemented through sleep restriction and stimulus control. Therefore, by combining these sleep-related behaviours with mindfulness meditation, individuals learn new approaches in how they approach sleeping and waking stress and are better able to bring mindfulness to their daily lives.

Gong et. al., (2016) conducted a meta-analysis on the effect of mindfulness meditation on the treatment of insomnia comparing randomized controlled trials. They evaluated six randomized controlled trials consisting of 330 participants. They concluded that mindfulness meditation contributed to improving sleep in participants with insomnia compared to waiting-list control. They reported that the overall effect revealed that mindfulness meditation significantly improved total wake time and sleep quality, but had no significant effects on sleep onset latency, total sleep time, wake after sleep onset, sleep efficiency and total wake time.

1.11 Past research on dysfunctional beliefs and attitudes about sleep

Most research on dysfunctional beliefs and attitudes about sleep has compared good and poor sleepers. They have found that those with poor sleep tend to report more dysfunctional beliefs and attitudes about sleep than good sleepers (Joshi, Mishra, Dubey & Gupta, 2015; Ellis, Hampson & Cropley, 2007; Morin, Vallieres & Ivers, 2007).

Joshi, Mishra, Dubey and Gupta (2015) investigated the sleep patterns, prevalence of clinical insomnia and dysfunctional beliefs and attitudes about sleep among a group of medical students in India. The participants consisted of 200 medical students with a mean age of 19.8 years. The results revealed that 86.6% of the sample had dysfunctional beliefs and attitudes about sleep. They found that there were no sex differences in the dysfunctional beliefs and attitudes about sleep between males and females. Even though a large number of students reported dysfunctional beliefs and attitudes about sleep only 5% suffered from clinical insomnia.

Ellis, Hampson and Cropley (2007) investigated the dysfunctional beliefs and attitudes about sleep among 382 participants aged 50 years and over in England. They found that those with insomnia reported more dysfunctional beliefs and attitudes about sleep overall than those without. However unexpectedly, knowing that eight hours of sleep is not necessarily needed to function properly and that one poor night does not impact on the rest of the week's sleep were reported more in those with insomnia than without. They also found a significant difference in gender between those with insomnia and good sleepers, with women more likely to report insomnia than men.

Yang, Chou and Hsiao (2011) investigated the association between dysfunctional sleep beliefs and attitudes to stress-related transient sleep disturbance in 439 participants in Taiwan. The participants were classified as good and poor sleepers according to their scores on the Pittsburgh Sleep Quality Index. Their mean ages were 20.4 years for the good sleepers and 19.5 years for the poor sleepers. They found that poor sleepers showed more dysfunctional beliefs and attitudes than good sleepers.

Carney and Edinger (2006) compared two groups, treatment-seeking people with insomnia and good sleepers on their dysfunctional beliefs and attitudes about sleep. The participants were aged between 20 and 79 years old. They found that those with insomnia had more dysfunctional beliefs about sleep compared to good sleepers. They also found that those with insomnia held stronger beliefs about the consequences of poor sleep and losing control of their sleep compared to good sleepers. This is consistent with the notion that those with insomnia show greater feelings of hopelessness and helplessness about their sleep problems.

Morin, Vallieres and Ivers (2007) investigated the dysfunctional beliefs and attitudes about sleep among 283 participants ranging in age from 20 to 71 years old. They found that those with lower education levels tended to endorse the idea that insomnia was caused by physical factors. They also found that those with depression and anxiety symptoms had stronger endorsements of beliefs about insomnia consequences and worry about sleep medication. They also found that higher scores on the Insomnia Severity Index was also associated with higher scores on the DBAS indicating that those with insomnia had more dysfunctional beliefs and attitudes about sleep.

Carney et. al., (2010) evaluated whether levels of unheapful cognitive beliefs, as measured by the Dysfunctional Beliefs and Attitudes about Sleep Scale, differed across insomnia groups and whether there were particular beliefs that differed for different insomnia subtypes. The samples were divided into the following groups: Good Sleepers (n = 335), Primary Insomnia Only (n = 329), Insomnia with Comorbid Medical Conditions (n = 114), Hypnosis-Dependent Insomnia (n = 76), and Outpatients Presenting at Community Sleep Clinics (n = 530). They found that community sleep clinic patients reported more dysfunctional beliefs and attitudes about sleep compared to all of the other groups. Those in the Hypnosis-Dependent group also had high levels of overall dysfunctional beliefs and attitudes about sleep. They however, had comparable scores to those in the Primary Insomnia group and Insomnia with Comorbid Medical Conditions group regarding "beliefs about the consequences/effects of insomnia" and "expectations about sleep needs". The Hypnosis-Dependent and Outpatients Presenting at Community Sleep Clinics groups reported the highest level of maladaptive beliefs about "medications".

Clever and Bruck (2013) compared cognitions of Australians with those of Zimbabwean and Ghanaian black immigrants using the Dysfunctional Beliefs and Attitudes Sleep Scale 28 (DBAS28). Their investigation consisted of 176 participants (58 Australians, 59 Zimbabweans and 59 Ghanaians) ranging in age from 18 to 60 years. They found that the two black immigrant groups were significantly more likely to express dysfunctional views on the *misconceptions about causes of insomnia* theme compared to the Australian Caucasian group. In general, the immigrant groups were less likely to acknowledge a possible non-physical (psychological) role in sleep difficulties. They also found no significant differences between males and females on the total scores of the DBAS 28. However, significant differences were found between males and females when analysed according to different ethnic groups with regard to the *misattributions of consequences of insomnia* theme. They concluded that black Ghanaian males appeared to hold more dysfunctional beliefs about *misattributions of consequences of insomnia* compared to Caucasian Australians and black Zimbabwean males. Furthermore, Zimbabwean females rated higher on the *misattributions of consequences of insomnia* theme compared to both Caucasian Australians and black Ghanaian females, suggesting that they held more dysfunctional cognitions about sleep.

The research studies reviewed above all show consistently that those individuals who are poor sleepers tend to have more dysfunctional beliefs and attitudes about their sleep. These dysfunctional beliefs and attitudes about sleep comprise of distorted views about the consequences of sleep, misconceptions about insomnia, a sense of losing control, feelings of helplessness and hopelessness about their sleep and insomnia to be related to physical factors. These findings were consistent across different ethnic groups and cultures.

1.12 Research on sleep hygiene knowledge

Sleep hygiene knowledge has been assessed using the Sleep Beliefs Scale (Adan et. al., 2006). The first study, by Adan et. al. (2006), investigated sleep hygiene knowledge among 510 psychology students ranging in age from 18 to 33 years old from Italy and Spain through the use of the Sleep Beliefs Scale. They found that more than 50% of participants believed that doing intense physical exercise before going to bed, smoking before falling asleep, going to bed 2 hours later than habitual hour and recovering lost sleep by sleeping for a long time did not have a negative effect on sleep. However, they reported that the participants had good knowledge about the negative effect on sleep such as drinking coffee or other substances with caffeine after dinner and taking a long nap during the day, as well as the positive effect of diverting one's attention and relaxing before bedtime and of sleeping in a quiet and dark room. They found that students from Spain had a greater percentage of correct beliefs compared to Italian students according to sleep hygiene knowledge. They also found that men had more incorrect beliefs, especially related to sleep-incompatible behaviours compared to females (e.g. going to bed and waking up always at the same time, recovering from lost sleep by sleeping longer).

Škvorc and Bjelajac (2016) evaluated the sleep beliefs of students in helping professions using 563 students ranging in age from 18 to 32 years in Croatia. The Sleep Beliefs Scale and The Composite Scale of Morningness were used in the study. The results revealed that students of helping professions did not have very accurate beliefs about sleep. They found that most of the participants correctly reported the belief that sleeping in a dark room and relaxing before bedtime had positive effect on sleep, while drinking coffee and other caffeine drinks after dinner had negative effects on sleep. Additionally, they found that only a low percentage of students believed that getting up when it was difficult to fall asleep, recovering

lost sleep by sleeping for a long time and trying to fall asleep without having a sleep sensation had negative effect on sleep.

Voinescu, Coogan and Orasan (2010) investigated relationships between sleep hygiene knowledge, circadian typology and self-reported sleep quality and insomnia among 207 subjects, aged over 18 from Romania. The participants were classified into two groups, healthy and depressed. The participants completed the Romanian translated Sleep Beliefs Scale, The Sleep Disturbance Questionnaire (used to determine insomnia status) and The Pittsburgh Sleep Quality Index (used to define good and poor sleepers). The results indicated that good sleepers had significantly better sleep hygiene knowledge compared to poor sleepers for the healthy group. However, in the depressed group no significant differences were observed between good and poor sleepers on sleep hygiene knowledge. They also found no sex differences according to the Sleep Beliefs Scales scores, indicating no differences between males and females on sleep hygiene knowledge.

Voinescu & Szentagotai-Tatar (2015) assessed the sleep hygiene awareness and the self-reported quality of sleep among three age groups (young adults, adults and middle-aged adults). They recruited 652 participants who were divided into three aged groups: young (aged between 18–25 years), adult (aged between 26–45 years) and middle-aged (between 46–65 years). They found that young adults had significantly poorer sleep hygiene knowledge compared to adults and the middle aged groups. They also found that women reported significantly better sleep hygiene knowledge compared to their male counterparts.

Hicks, Lucero-Gorman, Bautista & Hicks (1999) measured the association between ethnicity and both sleep hygiene knowledge and sleep hygiene practices. They investigated 963 university undergraduates from four ethnic groups: African Americans, Asians, Euro-Americans, and Hispanics. They found that for sleep hygiene knowledge, the main effect for ethnicity was significant. They reported that this significant difference was mainly due to the Euro-American group scoring higher than each of the other ethnic groups, whereby they had better sleep hygiene knowledge.

Review of the above studies revealed interesting results regarding sleep hygiene knowledge. Sleep hygiene knowledge was seen to differ across different age groups, gender, ethnicity, mental health and poor and good sleepers. It was found that poorer sleepers reported poorer sleep hygiene knowledge.

1.13 Past research on sleep plots

Lack (2007) developed an assessment tool known as the Sleep Plot which was designed to measure people's conceptions of sleeping patterns. Lack investigated people's perception of a typical night's sleep among a sample of 250 adults. The participants were asked to plot the sleep pattern across a typical night of sleep for a healthy, young adult from going to bed at night to getting up in the morning (horizontal axis), as a function of different depths of sleep (vertical axis). Lack found that 70% of the participants believed that a typical night's sleep for a healthy young adult is unbroken and deep without any awakenings during the night. These findings are in contrast to the normal sleep pattern of approximately 90 minute cycles of deep sleep alternating with light sleep phases and brief awakenings. These experiences of

awakenings which occur during normal sleep could then produce anxiety and lead to insomnia.

Bruck, Dolan and Lack (2015) investigated the perception of sleep according to Sleep Plots between two adults groups consisting of 113 young adults ranging in age from 18 to 25 years with 110 older adults aged 60 years and older. Each participants' perception of a normal night of sleep was assessed for a healthy 18 year old as well as a healthy 65 year old. Like Lack (2007), they found 70% of the sample provided a U Shaped Sleep Plot (incorrect) showing uninterrupted and deep sleep across the night. This was reported in both the young adult and older adult groups. However, the results revealed that for the 65 year old Sleep Plots, the sleep was lighter but also uninterrupted and this was reported by both the younger adult as well as older adult groups. They found that only 5% of the younger adults and 23% of older adults thought that the sleep of a healthy person included one or more episodes of wake (correct answer). They also found that there were no sex differences between males and females in terms of how they completed the Sleep Plots. Neither study investigated possible differences in sleep shape perceptions between those with or without insomnia.

The above two research studies examining sleep plots revealed that most individuals, regardless of age, perceived a typical night of healthy sleep to be unbroken and without any awakenings during the night. It was also found that older adults experienced lighter sleep compared to young adults. This is in contrast to the normal sleep architecture which has multiple alternating cycles of deep and lighter sleep with brief awakenings during the night.

1.14 The current study, conclusions and rationale

There has been no previous research, to the author's knowledge, comparing the 'sleep attitudes and beliefs' between Vietnamese and Australian participants. Research on dysfunctional beliefs and attitudes about sleep, sleep hygiene and sleep plots have revealed interesting results among other cultures. From the research reviewed it can be concluded that those individuals who reported more dysfunctional beliefs and attitudes about sleep tended to report poor sleep. These findings were consistent across different ethnic groups and cultures. They also showed that generally, females tended to report higher prevalence of insomnia or poorer sleep compared to men. Research also revealed that good sleepers had better sleep hygiene knowledge compared to poor sleepers. The results were different across cultures regarding sleep hygiene knowledge with Euro-Americans having better sleep hygiene knowledge compared to Blacks, Asians and Hispanics. Limited research had been conducted regarding the perception of sleep according to Sleep Plots, however results showed that most participants perceived their own sleep as well as normal 'healthy' sleep to be uninterrupted deep sleep (U Shaped Sleep Plot), rather that the true, normal sleep pattern of light and deep sleep cycles (Non U Wake Shape).

The current study aims to compare 'sleep attitudes and beliefs', which includes dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and sleep perceptions, between Vietnamese and Australian older adults. Firstly, the psychometric properties of each of the newly Vietnamese translated questionnaires are analysed and the results presented. Secondly, the three sleep attitudes and beliefs variables are analysed according to insomnia and

ethnicity status. Finally, sex differences are explored with respect to insomnia status and sleep attitudes and beliefs.

The current study will take a conservative approach regarding the formulation of the different hypotheses (DeShea & Toothaker; 2015). As there has been no previous research conducted regarding the insomnia status, beliefs and attitudes about sleep, sleep hygiene and Sleep Plots with Vietnamese and Australian older adult participants, it is difficult to propose a direction for the hypotheses and therefore they will be presented as Null Hypotheses. Questionnaires used in this current study had to be translated, as Vietnamese versions of the ISI, DBAS 16, SBS, Athens Insomnia Scale and Sleep Plots were not found despite a thorough research of the literature. There is clearly a gap in the literature regarding the investigation of insomnia with the Vietnamese older adults. Hence the conservative approach, of stating hypotheses in the null form is considered most appropriate.

1.14.1 Aims, design and statistical considerations

As outlined above, the primary aim of this study was to investigate sleep attitudes and beliefs as a function of ethnic group (Vietnamese versus Australians). This is presented in Phase 2. Phase 1 analyses the psychometric characteristics of the Vietnamese questionnaires which have been translated from English for this study. As it is clear from the literature that some aspects of sleep beliefs and attitudes are significantly influenced by *insomnia status* where, for example, those with insomnia have more dysfunctional beliefs (see section 1.11 above) than good sleepers, consideration of this issue within the two ethnic groups was required. The simplest way to accomplish this would be to conduct a 2x2 ANOVA where the two main effects being examined are insomnia status (yes/no) and ethnicity (Vietnamese/Australian)

and the dependent variables are various measures of sleep attitudes and beliefs. Analysis of variance assumptions require normality for the dependent variables. As will be detailed in the Results section, the dependent variables did not meet the assumptions of normality and thus non-parametric analyses were required. The aims and hypotheses below are thus written assuming group comparisons cannot be made using a 2x2 ANOVA and are also based on an assumption of NO insomnia level differences being found between the two ethnic groups. A finding of such a difference for insomnia status would mean more specific group analyses would need to be undertaken, taking into account insomnia status within each ethnic group, and the details of such an approach, if required, will be presented in the Data Analysis section.

While the level of dysfunctional beliefs has been repeatedly documented to vary as a function of insomnia (see section 1.11), possible differences in sleep hygiene knowledge have been minimally documented in relation to insomnia status. Understandings about how sleep progresses across the night (the 'shape' of sleep using Sleep Plots) have not been previously documented in relation to insomnia status and are also important questions.

An additional aim of the study (Phase 3) was to determine whether sex differences exist in sleep attitudes and beliefs in the populations under study. As the prevalence of insomnia is known to be different across the two sexes, with more females reporting insomnia than males (see section 1.9 above), it was important to first conduct a comparative analysis of possible differences in insomnia level between males and females, to assist in interpreting any sex difference findings in sleep attitudes and beliefs.

1.15 Aims and hypothesis

Phase 1 – Internal Reliability and Validity of Vietnamese Translated Questionnaires (Including Factor Analysis)

(Note: Data was collected from both ethnic groups for the Insomnia Severity Index, Dysfunctional Beliefs and Attitudes about Sleep Scale16 and Sleep Beliefs Scale and only the data for the Vietnamese sample was collected for the Athens Insomnia Scale).

Aim 1a   To consider the psychometric properties of all the scales (English and Vietnamese) separately for each ethnic group.

Aim 1b   To compare these psychometric properties across the Vietnamese and Australian samples and with external data where available.

Aim 1c   To examine convergent validity for the translated scales of the Insomnia Severity Index and Athens Insomnia Scale.

Note: In the hypotheses below (both Phase 2 and 3) 'sleep attitudes and beliefs' will be measured in the following ways

- Dysfunctional Beliefs and Attitudes about Sleep Scale16
- Sleep Beliefs Scale
- Sleep Plots describing the sleep of a <u>healthy 60 year old</u> and their <u>own sleep</u>

Phase 2 – Comparison of Vietnamese and Australian older adult participants with respect to insomnia, and sleep attitudes and beliefs

Aim 2a: To consider insomnia status as a function of ethnicity in Vietnamese and Australian older adults.

Null hypothesis 2a: There will be no significant difference in the insomnia status of Vietnamese versus Australian older adult participants (as measured by the Insomnia Severity Index). [1]

Aim 2b: To compare the Vietnamese and Australian older adults in terms of their sleep attitudes and beliefs.

Null hypothesis 2b: There will be no significant differences in the sleep attitudes and beliefs of Vietnamese and Australian older adults.

Phase 3 – Comparison of Vietnamese and Australian older adult participants with respect to insomnia and sleep attitudes and belief as a function of sex

Aim 3a: To consider insomnia status as a function of sex in the total sample of (Vietnamese and Australian) older adults.

Null hypothesis 3a: There will be no significant difference in the insomnia status of male versus female older adult participants (as measured by the Insomnia Severity Index). [2]

Aim 3b: To compare male and female older adults in terms of their sleep attitudes and beliefs.

Null hypothesis 3b: There will be no significant differences in the sleep attitudes and beliefs of male and female older adults.

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[1] If null hypothesis 2a is rejected further analyses involving those with and without insomnia will need to be conducted for the two ethnic groups and this is detailed in the Data Analysis section.

[2] If null hypothesis 3a is rejected further analyses involving those with and without insomnia will need to be conducted for the males and females and this is detailed in the Data Analysis section.

Chapter 2: Methodology

2.1 Participants

Participants consisted of 100 Vietnamese older migrants and 107 older Australians. The mean ages were 65.50 years (SD = 5.62) for the Vietnamese participants and 68.82 years (SD = 7.32) for the Australian participants. Of the 100 Vietnamese sample, 36 were males and of the 107 Australian older adults, 50 were males. A chi square analysis found no significant differences between the observed and expected frequencies of males and females across the Vietnamese and Australian groups ($X^2 = 2.40$, $df = 2$, $p = 0.12$). The participants were recruited from nursing homes, from community centres for the aged, by word of mouth and from Vietnamese community centres. Participants in the Australian sample were required to have been born in an English speaking country, lived in Australia since the age of at least 15, and did not identify as an Aboriginal or Torres Strait Islander. For the Vietnamese participants, all were post-war migrants and their years of living in Australia ranged from 2 to 40 years with a mean of 25.80 years (SD = 8.75). Aside from the latter data on immigration from Vietnam, age and sex were the only demographic data that was collected from the participants.

2.2 Materials

A questionnaire package was handed out to potential participants which included the Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS16), the Insomnia Severity Index (ISI), the Sleep Beliefs Scale (SBS), the Athens Insomnia Scale (AIS) and Sleep Plots. A plain language statement (refer to Appendix A for Information to Participants Involved in Research letter) was also provided and informed consent was implied by completion and

return of the questionnaires. All the materials were distributed in English and Vietnamese as appropriate. The AIS was not given to the Australian sample as its inclusion was for the validation of the translated ISI (convergent validity). All Vietnamese translated questionnaires had the original English text included as some of the participants may have been more familiar with some words in English than Vietnamese, especially if they have been living in Australia for an extended period of time. A total of 300 questionnaires were handed out for the Australian participants and 107 were returned with a response rate of 35.6%. A total of 250 questionnaires were handed out for the Vietnamese participants and 100 were returned with a response rate of 40.0%. It can only be speculated why people did not participate in this study and these reasons may include that they did not have time, forgot to send back the questionnaires, or were not interested in participating.

2.2.1 Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS16)

The Dysfunctional Beliefs and Attitudes about Sleep Scale 16 (Morin, Vallieres and Ivers, 2007) is a brief version derived from the original Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS) initially developed by in Morin (1993) to evaluate sleep related cognitions on visual analogue scales. The original DBAS scale consisted of 30 items. The total score was determined based on the total scores of all the items. The scale measured misconceptions about the causes of insomnia, misattributions or amplification of its consequences, unrealistic sleep expectations, diminished perception of control and predictability of sleep and faulty beliefs about sleep-promoting practices. The DBAS 30 showed good internal consistency ($\alpha = 0.80$) as well as moderate item-total correlations (means r = 0.37) (Morin, Vallieres & Ivers, 2007). [3]

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[3] Cronbach alpha results for the current sample for all scales are presented in the Results.

The DBAS 16 consists of 16 items that were rated according to a Likert-type scale which required the participants to circle a number from 0 *(strongly disagree)* to 10 *(strongly agree)*. The total score was also determined based on the average scores of all the items. The DBAS 16 showed good internal consistency for the clinical sample ($\alpha = 0.77$) and for the research sample ($\alpha = 0.79$). Factor analysis revealed that the DBAS 16 measured four item types which included consequences of insomnia (items 7, 8, 9, 12, 16), worry about sleep (items 3, 4, 5, 10, 11, 14), sleep expectations (items 1, 2) and medication (items 6, 13, 15) (Morin, Vallieres & Ivers, 2007). Please refer to Appendix B for a copy of the DBAS16.

2.2.2 Insomnia Severity Index (ISI)

The Insomnia Severity Index is designed to measure a person's perception of the severity of their insomnia (Bastien, Vallieres & Morin, 2001). The ISI focuses on the subjective symptoms and consequences of insomnia in addition to the person's concerns or distress caused by those difficulties. The ISI consists of seven items which assess the severity of sleep onset and sleep maintenance difficulties, both nocturnal and early morning awakenings. It also assesses satisfaction with the person's current sleep pattern, interference with daily functioning, noticeability of impairment attributed to the sleep problem and the degree of distress caused by the sleep problem. The items are rated on a five point Likert scale with $0 = $ not at all and $4 = $ extremely. The total scores range from 0 to 28, with higher scores indicating greater insomnia severity. The psychometric properties of the ISI were good with an internal consistency (α) of 0.74 (Bastien, Vallieres & Morin, 2001).

Insomnia status was determined using scores on the ISI. The published total score categories (Bastien, Vallieres & Morin, 2001) on the ISI were:

0-7 = No clinically significant insomnia

8-14 = Subthreshold insomnia

15-21 = Clinical insomnia (moderate severity)

22-28 = Clinical insomnia (severe)

Based on the categories of the ISI, it was determined that those participants who scored 15 or above were classified as Insomnia and those who scored below 15 were classified as No Insomnia. Please refer to Appendix C for a copy of the ISI.

2.2.3 Sleep Beliefs Scale (SBS)

The Sleep Belief Scale (Adan et. al., 2006) is a 20 item scale which is a revised version of the Sleep Hygiene Awareness Scale that was developed by Lack and Rotert (1986). The SBS seeks to understand the level of sleep hygiene knowledge that may influence the quality and/or quantity of sleep. The participants must indicate whether they believe a behaviour produces a positive, negative or neither effect on sleep. The SBS explores the participant's knowledge in relation to the influence of drug consumption (caffeine, alcohol, nicotine, sleep medication) on sleep, diurnal behaviours (physical exercise and naps) on sleep and activities as well as thoughts previous to sleep (eating, studying, relaxing, worries). Participants' answers are related to their belief in general and not to their own behaviours. The SBS was scored on a Likert scale with a positive score = 1, neither score = 0 and negative score = -1 with higher scores indicating better knowledge about sleep hygiene behaviours.

According to Adan et. al., (2006) the psychometric properties of the SBS suggest that it is an effective and reliable instrument. The internal consistency was α = 0.714. Factor analysis revealed three factors which are labelled '*Sleep-incompatible behaviours'* (items 1, 2, 7, 8,

11, 12, 14, 17), *'Sleep-wake cycle behaviours'* (items 3, 4, 5, 10, 16, 19, 20) and *'Thoughts and attitudes to slee*p' (items 6, 9, 13, 15, 18). Please refer to Appendix D for a copy of the SBS.

2.2.4 Athens Insomnia Scale (AIS)

The Athens Insomnia Scale was developed as a scale for the assessment of insomnia according to ICD-10 (ICD-10, 2014) principles (Soldatas, Dikeos & Paparrigopoulos, 2000). The scale aimed to measure the importance of subjective sleep difficulty and to specify a time-frame as well as a minimum frequency for various sleep related problems. The AIS consists of eight items with the first five items (assessing difficulty with sleep induction, awakenings during the night, total sleep time, early morning awakening and overall quality of sleep) corresponding to criterion A for the diagnosis of insomnia according to ICD-10. The requirements of criterion B of the ICD-10 corresponded to items that addressed the frequency and duration of any of the complaints. The ICD-10 requirement (according to Criterion C) for marked distress caused by the sleep problem and/or interference with activities of daily living were covered through the strictly subjective nature of the response options for each of the items on the scale, in addition to the content of the last three items which examines the next day consequences of insomnia (problems with sense of well-being, functioning and sleepiness during the day).

Each item is rated 0-3 with 0 representing "no problem at all" to 3 representing "very serious problem". A total score ranging from 0 (denoting an absence of any sleep related problem) to 24 (representing the most severe degree of insomnia). The psychometric properties of the AIS showed that it has good internal consistency, reliability and validity. The internal consistency

of the AIS is α = 0.89. Factor analysis revealed that the whole scale emerged as only one component which is evidence for the homogeneity of the AIS. Please refer to Appendix E for a copy of the AIS.

Jeong et. al., (2015) evaluated the psychometric properties of the Athens Insomnia Scale (AIS) among 221 (207 men) South Korean firefighters and rescue workers. The mean age was about 40 years old. The participants completed the Athens Insomnia Scale and Insomnia Severity Index, which were used to assess insomnia symptoms. The individuals also participated in a Structured Clinical Interview which was used to determine insomnia status according to the Diagnostic and Statistical Manuel of Mental Disorders-IV. They reported an internal consistency for the AIS of α = 0.88 and the mean item-total correlation coefficient of 0.73. The convergent validity between the AIS and ISI was r = 0.85, p < 0.001. They concluded that the AIS was a reliable and valid measure to evaluate insomnia symptoms in this population group.

2.2.5 Sleep Plots

The Sleep Plot was developed by Lack (Lack, 2007; Bruck, Dolan & Lack, 2015) and was designed to measure the sleeping patterns of individuals. Participants are asked to plot what they perceived a normal sleep cycle would look like for a normal healthy 60 year old person (with a line from X to X). Please see Figure 2.1 which shows a blank Sleep Plot as provided to the participants. They were then asked to plot their own sleep cycle. Participants were asked to draw a continuous line from the beginning of the night's sleep to the awakening time which was considered to represent a total of 7.5 hours. Scoring was completed in two ways: (1) Participant scores were recorded at half-hour intervals (a total of 15 scores) according to

the level of sleep. The vertical axis of the graph measured level of sleep ranging from 0= awake, 1 = light sleep, 2 = deep sleep, and 3 = very deep sleep, top to bottom respectively; (2) The Sleep Plots were classified into 3 categories with the first category representing a 'U shape', the second category representing a 'Non U shape with no wake periods' and the third category representing a 'Non U shape with wake periods' (as reported by Bruck, Dolan & Lack, 2015). Please refer to Appendix F for a copy of the Sleep Plots.

Figure 2.1 Blank Sleep Plot (Bruck, Dolan & Lack, 2015)

2.3 Procedure

Prior to commencing the research, approval was obtained from the Victoria University Human Research Ethics Committee (see Appendix G). The Australian sample was recruited by another student as part of his Honours' project which compared the beliefs and attitudes about sleep in Australians with and without insomnia. Data from the Vietnamese sample was

collected about one year later as part of the current study. To test the convergent validity of the translated Insomnia Severity Index, a translated Athens Insomnia Scale was used with the Vietnamese sample and therefore was not completed by the Australian sample.

A questionnaire package was handed out to potential participants and a plain language statement was also provided. Informed consent was implied by completion and return of the questionnaires. All the materials were distributed in English and Vietnamese as appropriate, except for the AIS which was only distributed to the Vietnamese sample.

2.4 Translation process

Following approval from the Victoria University Human Research Ethics Committee, all five questionnaires, Information Involved in Research letter and Letter to Organisations were independently forward translated from English into Vietnamese by the Victorian Interpreting and Translating Service. The Back Translation Method was used (Brislin, 1970) and is described below. This method has been widely implemented and recommended by researchers from various countries (Suleiman & Yates, 2011; Dhyani, Rajput & Gupta, 2013; Okajima, Shun, Mina & Yuichi, 2013). Once the information was professionally translated into Vietnamese, it was presented to a panel of four bilingual individuals who were tertiary educated and were proficient in both English and Vietnamese. The information was checked for accuracy and meaning. There were minor changes that were noted which included a typing error of time to complete the questionnaires. Two word changes were also identified in order to make the wording more appropriate to lay people rather than using technical language, however the meaning of the words remained the same. Once the information was checked by the panel members the Vietnamese version was then back translated into English

by a different translator from the Victorian Interpreting and Translating Service. Once the information was back translated, it was once again reviewed by the bilingual panel members and compared to the original English versions of the questionnaires, Information Involved in Research letter and Letter to Organisations. The panel members identified minor wording issues which were then rechecked with the Vietnamese Translated versions. It was identified that the Vietnamese Translated Versions were correct and therefore retained. Overall, it was agreed that the backward translation accurately represented the original versions of the English versions of the questionnaires and information provided to the participants and organisations. The final, amended Vietnamese versions of the questionnaires, Information Involved in Research letter and Letter to Organisations were used in the current study. Please refer to Appendix M to Q for Vietnamese versions of the questionnaires.

2.5 Data analysis

To analyse the data obtained the IBM SPSS Statistic 20.0 program for Microsoft Windows were used. Prior to analysis, the data was screened for missing data. Frequency analyses were used for demographic and categorical data. When missing data was found, it was replaced using the Estimated Means Method. Alpha was set at 0.05 for significance. In order to perform factor analyses consideration was given to sample size and a minimum number of 100 per group was chosen, consistent with published recommendations (Gorsuch, 1983; MacCallum, Widaman, Zhang & Hong, 1999). In the presentation of testing for differences between groups on the questionnaires (ISI, DBAS16 and SBS), differences between groups will only be considered to be significant if the *total scores* on a questionnaire yield $p < 0.05$. While differences between the groups on individual items for all questionnaires will be assessed and presented in tables for completeness, where the *total scores are not significantly different*, little or no importance will be attached to findings of $p < 0.05$ on comparisons

between the groups on *individual* questionnaire items. This conservative approach has been

adopted because of the large number of comparisons being undertaken to address the

hypotheses developed and helps minimise the possibility of alpha inflation.[4]

As is clear from the literature review and hypotheses, insomnia status is a potentially

confounding variable in considering both ethnic and sex differences in sleep attitudes and

beliefs. In Phase 2, if analyses show that the Vietnamese and Australian groups *do differ* in

terms of insomnia status (i.e. rejecting null hypothesis 2a) then these findings need to be

taken into account in subsequent comparisons across ethnicity for each dependent sleep

attitudes and beliefs variable. Table 2.1 illustrates possible comparisons between groups for

Phase 2. If null hypothesis 2a is rejected, then for *each questionnaire and Sleep Plot*

comparison, group comparisons will be first completed within each ethnic group, comparing

those with and without insomnia on their scores, that is, group comparisons between cells a &

b and c & d. If a significant difference is found within one or both ethnic groups on these

comparisons then group comparisons will be made across ethnicity while controlling for

insomnia status, that is, between scores in cells a & c and b & d in Table 2.1. However, if

neither ethnic group has significant differences when comparing those with and without

insomnia (as above a & b and c & d), then testing of hypothesis 2b simply involves

comparing the Vietnamese and Australian groups on their scores (i.e. group comparisons

between e and f).

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[4] Differences between *factors* on the different questionnaires were not considered because factor analyses of the different ethnic groups yielded different factors, which in turn were different to published factors (where available).

Table 2.1 *Illustrative group comparisons for Phase 2*

	Insomnia	No Insomnia	Total
Australian	a	b	e
Vietnamese	c	d	f

In Phase 3, the first hypothesis (3a) relates to whether there is a significant difference in insomnia status between males and females. If a *significant* difference is found between the insomnia status of males and females, then the same sequence of comparisons (for each dependent variable) as discussed above for Phase 2 applies. To illustrate these comparisons in a table, Table 2.1 would need some relabelling; new row cells entitled Male and Female would need to be substituted for the Australian and Vietnamese row cells. If *no such significant* difference is found for male and female insomnia status and null hypothesis 3a is accepted, then hypothesis 3b simply involves comparing males and females on their scores for the questionnaires and Sleep Plots (cells e & f in the table).

Chapter 3: Results

This chapter presents the results for the three phases of the study. Phase One investigated the psychometric properties and validity of the translated Vietnamese questionnaires. These included the Insomnia Severity Index (ISI), Athens Insomnia Scale (AIS), Dysfunctional Beliefs and Attitudes about Sleep Scale 16 (DBAS16), Sleep Beliefs Scale (SBS) and Sleep Plots. The ISI and AIS were compared as they both aimed to measure the level of insomnia, if any. This was done through factor analysis, reliability analyses and correlations. The results of reliability analyses for the DBAS16 and SBS will also be presented, however these scales were not compared with one another as they sought to measure different aspects of sleep beliefs. Phase Two investigated the insomnia status and sleep attitudes and beliefs as a function of ethnicity, and also included the investigation of the perception of the "shape" of sleep (Sleep Plots) across ethnicity with respect to their <u>own sleep</u> as well as the sleep of a <u>healthy 60 year old</u>. Phase Three investigated if there were sex differences for the DBAS16, SBS, and Sleep Plots, as well as considering insomnia status.

3.1 Phase One: Psychometric properties of scales

3.1.1   Internal reliability of the scales

Cronbach's method and correlated item to total correlation coefficients were calculated to determine the internal consistency of all the scales, Vietnamese or English. The criterion of α > 0.70 was established as a satisfactory internal reliability threshold (Brace, Kemp and Snelgar, 2009). As for corrected item to total corrections, items with a coefficient of 0.30 or above were regarded as homogenous to the overall scales (Brace, Kemp & Snelgar, 2009). Please refer to Table 3.1 which shows the reliability coefficients for each of the scales for

both the Vietnamese and Australian samples. The results indicate that all the scales have good internal reliability across both the Vietnamese and Australian samples.

Table 3.1

Reliability coefficients for both the Vietnamese and Australian samples across the different scales.

Scales	Vietnamese Sample n = 100	Australian Sample n = 107
Insomnia Severity Index	α = 0.939	α = 0.919
Athens Insomnia Scale	α = 0.927	Not administered
Dysfunctional Beliefs and Attitudes about Sleep Scale 16	α = 0.869	α = 0.887
Sleep Beliefs Scale	α = 0.786	α = 0.726

3.1.2 Factor Analysis of the Insomnia Severity Index-Vietnamese (ISI-V) and Insomnia Severity Index-Australian (ISI-A)

In the current study, an exploratory factor analysis was conducted for the ISI-V with principal component analysis as the extraction method. In order to clarify the underlying structure of the data set, a varimax rotation method was used. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.87, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant ($x^2 = 646.64$, $df = 21$, $p = 0.00$) indicating that the correlation matrix was not an identity matrix, and it was appropriate to proceed with

the analysis. Using a minimum eigenvalue of 1.0 (5.141), one global factor was extracted which explained 73.45% of the variance.

For the Australian sample an exploratory factor analysis was conducted for the ISI-A with principal component analysis as the extraction method. A varimax rotation method was used in order to clarify the underlying structure of the data set. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.88, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant ($x^2 = 503.58$, df = 21, p = 0.00) indicating that the correlation matrix was not an identity matrix, and it was appropriate to proceed with the analysis. Using a minimum eigenvalue of 1.0 (4.734), one global factor was extracted which explained 67.63% of the variance. Please refer to Table 3.2 for the ISI-V and ISI-A factor loadings for the current study. The results show that all the items load on one factor and hence measure a single dimension of insomnia level.

Table 3.2

Factor loadings for each question of the ISI-V and ISI-A

ISI Items	ISI-V		ISI-A	
	Factor Loadings	Communality	Factor Loadings	Communality
1. Difficulty falling asleep	0.871	0.758	0.832	0.692
2. Difficulty staying asleep	0.878	0.771	0.842	0.708
3. Problems waking up too early	0.813	0.662	0.796	0.634
4. How satisfied/dissatisfied are you with your current sleep pattern?	0.887	0.787	0.850	0.722
5. How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?	0.813	0.661	0.718	0.516
6. How worried/distressed are you about your current sleep problem?	0.872	0.761	0.870	0.756
7. To what extent do you consider your sleep problem to interfere with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) currently?	0.861	0.742	0.840	0.705

The reliability that each item adds to the total of all items (when one item is deleted) was good for both the ISI-V ($\alpha = 0.939$) and for the ISI-A ($\alpha = 0.919$) and this information is presented in Table 3.3. The results show that each item is contributing to an overall measure of insomnia level as all are above 0.70 (Brace, Kemp & Snelgar, 2009). The results indicate that all the items are reliable and are closely related to each other.

A correlation was performed to further explore how the individual items were related to one another. The results show that each of the items were positively correlated with each other, r > 0.30. Table 3.4 and 3.5 shows how each of the items were correlated with one another for both the ISI-V and ISI-A, respectively.

Table 3.3

ISI-V and ISI-A reliability (Cronbach's α) for the seven items when one item is deleted

ISI Items	ISI-V (α)	ISI-A (α)
1. Difficulty falling asleep	0.928	0.906
2. Difficulty staying asleep	0.927	0.905
3. Problems waking up too early	0.934	0.910
4. How satisfied/dissatisfied are you with your current sleep pattern?	0.926	0.904
5. How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?	0.934	0.918
6. How worried/distressed are you about your current sleep problem?	0.927	0.901
7. To what extent do you consider your sleep problem to interfere with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) currently?	0.928	0.905

Table 3.4

ISI-V Correlations between the items

	ISI1-V	ISI2-V	ISI3-V	ISI4-V	ISI5-V	ISI6-V	ISI7-V
ISI1-V	1.000	0.884	0.773	0.712	0.553	0.652	0.639
ISI2-V		1.000	0.753	0.688	0.592	0.678	0.663
ISI3-V			1.000	0.639	0.588	0.530	0.613
ISI4-V				1.000	0.681	0.833	0.755
ISI5-V					1.000	0.757	0.724
ISI6-V						1.000	0.769
ISI7-V							0.639

Table 3.5

ISI-A Correlations between the items

	ISI1-A	ISI2-A	ISI3-A	ISI4-A	ISI5-A	ISI6-A	ISI7-A
ISI1-A	1.000	0.673	0.604	0.677	0.506	0.679	0.631
ISI2-A		1.000	0.640	0.763	0.516	0.670	0.562
ISI3-A			1.000	0.597	0.577	0.598	0.584
ISI4-A				1.000	0.449	0.744	0.622
ISI5-A					1.000	0.501	0.655
ISI6-A						1.000	0.774
ISI7-A							1.000

3.1.3 Factor Analysis of the Athens Insomnia Scale-Vietnamese (AIS-V)

In the current study, an exploratoryfactor analysis was conducted with principal component analysis as the extraction method for the AIS-V. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.89, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant ($x^2 = 640.163$, $df = 28$, $p = 0.00$) indicating that the correlation matrix was not an identity matrix, and it was appropriate to proceed with the analysis. Using a minimum eigenvalue of 1.0 (Eigen = 5.355), one global factor was extracted which explained 66.93% of the variance. Please refer to Table 3.6 for the AIS-V factor loadings for the current study. The results show that the items loaded onto one factor indicating that the items have a strong relationship with each other. The internal reliability of the AIS-V was estimated with a Cronbach's coefficient alpha to be $\alpha = 0.89$.

Table 3.6

Factor loadings for each item of the AIS-V

AIS-V Items	Factor Loadings	Communality
1. Sleep induction (time it takes you to fall asleep after turning-off the lights)	0.784	0.615
2. Awakenings during the night	0.785	0.617
3. Final awakening earlier than desired	0.803	0.645
4. Total sleep duration	0.850	0.723
5. Overall quality of sleep (no matter how long you slept)	0.913	0.833
6. Sense of well-being during the day	0.883	0.780
7. Functioning (physical and mental) during the day	0.884	0.781
8. Sleepiness during the day	0.601	0.362

When the reliability of all the items were examined, using Cronbach's α coefficient, the internal reliability of the eight items was good ($\alpha = 0.927$). Table 3.7 lists the reliability that each item adds to the total of all items (when one item is deleted), showing that each item is contributing to an overall measure of insomnia level. Table 3.8 shows how each of the ASI-V items are correlated with one another and that each of the items are positively correlated with each other, $r > 0.30$.

Table 3.7

AIS-V reliability (Cronbach's α) for the seven items when one item is deleted

AIS-V Items	α
1. Sleep induction (time it takes you to fall asleep after turning-off the lights)	0.922
2. Awakenings during the night	0.920
3. Final awakening earlier than desired	0.919
4. Total sleep duration	0.915
5. Overall quality of sleep (no matter how long you slept)	0.908
6. Sense of well-being during the day	0.911
7. Functioning (physical and mental) during the day	0.911
8. Sleepiness during the day	0.934

Table 3.8

ASI-V correlations between the items

	Athens1	Athens2	Athens3	Athens4	Athens5	Athens6	Athens7	Athens8
Athens1	1.000	0.625	0.602	0.701	0.691	0.582	0.580	0.309
Athens2		1.000	0.601	0.609	0.708	0.562	0.575	0.464
Athens3			1.000	0.619	0.712	0.641	0.667	0.369
Athens4				1.000	0.794	0.684	0.691	0.395
Athens5					1.000	0.766	0.755	0.474
Athens6						1.000	0.766	0.755
Athens7							1.000	0.519
Athens8								1.000

3.1.4 Convergent validity between the ISI-V and AIS-V

The present study aimed to also measure the correlation between the ISI-V and AIS-V as both questionnaires sought to measure the level of insomnia, if any. A Pearson correlation was conducted to test the convergent validity between the two scales. The correlation

between the ISI-V and the AIS-V was r = 0.89, (n=99, p < 0.001 (two-tailed)), indicating a high level of convergent validity.

3.1.5 Factor Analysis of the Dysfunctional Beliefs and Attitudes about Sleep Scale 16-Vietnamese (DBAS16-V) and Dysfunctional Beliefs and Attitudes about Sleep Scale 16-Australian (DBAS16-A)

An exploratory factor analysis was conducted for the DBAS16-V with principal component analysis as the extraction method. In order to clarify the underlying structure of the data set, a varimax rotation method was used. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.81, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant ($x^2 = 649.444$, $df = 120$, $p = 0.00$) indicating that the correlation matrix was not an identity matrix, and it was appropriate to proceed with the analysis. Using a minimum Eigenvalue of 1.0, four global factors were extracted. Factor one (Eigenvalue = 5.628) explained 35.18% of the variance, factor two (1.806) explained 11.29% of the variance, factor three (1.462) explained for 9.14% of the variance and factor four (1.129) explained for 7.06% of the variance. Criterion for significant correlation was set as 0.30 prior to the analysis. This is a moderate loading and pure variables are considered to have loadings of 0.30 or greater on one factor (Brace, Kemp & Snelgar, 2009). Analysis initially revealed seven items with two or more moderate loadings (i.e. complex factors). A higher criterion for significant correlation was therefore set as 0.45 (20% variance overlap between variable and factor). With use of this principle three items were found to be complex. When complex items were found the item was adapted to the factor of the highest loading. Please refer to Table 3.9 for the DBAS16-V factor loadings for the current study.

For the Australian sample an exploratory factor analysis was conducted for the DBAS16-A with principal component analysis as the extraction method. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.84, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant (x^2 = 873.58, df = 120, p = 0.00) indicating that the correlation matrix was not an identity matrix, and it was appropriate to proceed with the analysis. Using a minimum eigenvalue of 1.0, four global factors were extracted. Factor one (Eigenvalue = 6.653) explained 41.59% of the variance, factor two (1.482) explained 9.26% of the variance, factor three (1.158) explained for 7.24% of the variance and factor four (1.007) explained for 6.30% of the variance. Criterion for significant correlation was set as 0.30 prior to the analysis. This is a moderate loading and pure item are considered to have loadings of 0.30 or greater on one factor (Coakes and Steed, 2007). Analysis initially revealed five items with two or more moderate loadings (i.e. complex factors). A higher criterion for significant correlation was therefore set as 0.45 (20% variance overlap between item and factor). With use of this principle two items were found to be complex (items 2, 10). When complex items were found the item was adapted to the factor of the highest loading. Please refer to Table 3.9 for the DBAS16-A factor loadings for the current study.

Although four factors were found for both the DBAS16-V and DBAS16-A, which is consistent with past research conducted by Morin, Vallieres & Ivers (2007). The individual items that load on each of the four factors were different to those reported by Morin, Vallieres & Ivers (2007) and also different between the Australian and Vietnamese versions. This will be further explored in the Discussion section. Please refer to Appendix J for comparison of items on the DBAS 16 across factors between Morin, Vallieres & Ivers (2007), the Vietnamese and Australian samples.

Table 3.9

Factor loadings for each item of the DBAS16-V and DBAS16-A

DBAS16 Items	DBAS16-V		DBAS16-A	
	Factor Loadings	Communality	Factor Loadings	Communality
1. I need 8 hours of sleep to feel refreshed and function well during the day.	0.593 (F3)	0.572	0.639 (F2)	0.628
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.	0.506 (F3)	0.540	0.549 (F2)	0.700
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	0.540 (F2)	0.746	0.476 (F3)	0.535
4. I am worried that I may lose control over my abilities to sleep.	0.719 (F1)	0.596	0.735 (F1)	0.631
5. After a poor night's sleep, I know it will interfere with my activities the next day.	0.729 (F2)	0.834	0.734 (F1)	0.649
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.	0.473 (F4)	0.764	0.554 (F1)	0.692
7. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	0.685 (F1)	0.528	0.691 (F1)	0.707
8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	0.674 (F1)	0.636	0.589 (F1)	0.602
9. Without an adequate night's sleep, I can hardly function the next day.	0.615 (F1)	0.541	0.765 (F1)	0.646
10. I can't ever predict whether I'll have a good or poor night's sleep.	0.576 (F1)	0.542	0.573 (F3)	0.589
11. I have little ability to manage the negative consequences of disturbed sleep.	0.696 (F1)	0.558	0.690 (F1)	0.620
12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	0.343 (F2)	0.634	0.711 (F1)	0.633
13. I believe insomnia is essentially the result of a chemical imbalance.	0.320 (F3)	0.540	0.337 (F4)	0.598
14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	0.565 (F1)	0.644	0.723 (F1)	0.556
15. Medication is probably the only solution to sleeplessness.	0.431 (F4)	0.763	0.344 (F4)	0.774
16. I avoid or cancel obligations (social, family) after a poor night's sleep.	0.584 (F1)	0.588	0.968 (F1)	0.940

Note: F = factor

When the reliability of all the items were examined, using Cronbach's α coefficient, the internal reliability of the 16 items were good (α = 0.869 for the DBAS16-V, α = 0.887 for the DBAS16-A). Table 3.10 lists the reliability that each item adds to the total of all items (when one item is deleted). The results show that each item is contributing to an overall measure of dysfunctional beliefs and attitudes as all are above 0.70 (Brace, Kemp & Snelgar, 2009). These results indicate that all the items are reliable and are closely related to each other.

Table 3.10

DBAS16-V and DBAS16-A reliability (Cronbach's α) for the 16 items when one item is deleted

DBAS 16 Items	DBAS16-V (α)	DBAS16-A (α)
1. I need 8 hours of sleep to feel refreshed and function well during the day.	0.867	0.889
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.	0.872	0.888
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	0.865	0.885
4. I am worried that I may lose control over my abilities to sleep.	0.856	0.875
5. After a poor night's sleep, I know it will interfere with my activities the next day.	0.865	0.874
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.	0.859	0.883
7. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	0.856	0.877
8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	0.856	0.881
9. Without an adequate night's sleep, I can hardly function the next day.	0.860	0.874
10. I can't ever predict whether I'll have a good or poor night's sleep.	0.863	0.886
11. I have little ability to manage the negative consequences of disturbed sleep.	0.857	0.877
12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	0.863	0.876
13. I believe insomnia is essentially the result of a chemical imbalance.	0.867	0.883
14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	0.863	0.876
15. Medication is probably the only solution to sleeplessness.	0.855	0.881
16. I avoid or cancel obligations (social, family) after a poor night's sleep.	0.862	0.874

3.1.6 Factor Analysis of the Sleep Beliefs Scale-Vietnamese (SBS-V) and Sleep Beliefs Scale-Australian (SBS-A)

For the Vietnamese sample, an exploratory factor analysis was conducted for the SBS-V with principal component analysis as the extraction method. A varimax rotation method was used to examine the underlying structure of the data set. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.69, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant (x^2 = 650.407, df = 190, p = 0.00) indicating that the correlation matrix was not an identity matrix, and it was appropriate to proceed with the analysis. Using a minimum eigenvalue of 1.0, four global factors were extracted. Factor one (4.944) explained 24.72% of the variance, factor two (2.578) explained 12.89% of the variance, factor three (1.631) explained for 8.16% of the variance and factor four (1.543) explained for 7.71% of the variance. Criterion for significant correlation was set as 0.30 prior to the analysis. This is a moderate loading and pure variables are considered to have loadings of 0.30 or greater on one factor (Brace, Kemp & Snelgar, 2009). Analysis revealed eight items with two or more moderate loadings (i.e. complex factors). A higher criterion for significant correlation was therefore set as 0.45 (20% variance overlap between variable and factor). With use of this principle three items were found to be complex. When complex items were found the item was adapted to the factor of the highest loading.

For the Australian sample, an exploratory - factor analysis was conducted for the SBS-A with principal component analysis as the extraction method. Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.91, indicating that the factor analysis should yield distinct and reliable factors. Bartlett's test of sphericity was significant (x^2 = 950.004, *df* = 190, *p* = 0.00) indicating that the correlation matrix was not an identity matrix, and it was appropriate to

proceed with the analysis. Using a minimum eigenvalue of 1.0, four global factors were extracted. Factor one (7.633) explained 38.16% of the variance, factor two (1.587) explained 7.93% of the variance, factor three (1.272) explained for 6.36% of the variance and factor four (1.121) explained for 5.61% of the variance. Criterion for significant correlation was set as 0.30 prior to the analysis. This is a moderate loading and pure variables are considered to have loadings of 0.30 or greater on one factor (Brace, Kemp & Snelgar, 2009). Analysis revealed four items with two or more moderate loadings (i.e. complex factors). A higher criterion for significant correlation was therefore set as 0.45 (20% variance overlap between variable and factor). With use of this principle only one item was found to be complex and it was adapted to the factor of the highest loading.

Although the results revealed four factors as compared to Adan et al.'s (2006) three factors, this was found in both the Vietnamese and Australian samples, however the individual items load on different factors for both sample groups and this will be further explored in the Discussion section. Please refer to Table 3.11 for the SBS-V and SBS-A factor loadings for the current study. Please refer to Appendix L for comparison of items on the SBS across factors between Adan et. al., (2006), the Vietnamese and Australian samples.

Table 3.11

Factor loadings for each variable of the SBS-V and SBS-A

SBS Items	SBS-V		SBS-A	
	Factor Loadings	Communality	Factor Loadings	Communality
1. Drinking alcohol in the evening	0.597 (F1)	0.557	0.557 (F2)	0.696
2. Drinking coffee or other substances with caffeine after dinner	0.775 (F1)	0.796	0.778 (F1)	0.674
3. Doing intense physical exercise before going to bed	0.558 (F3)	0.750	0.588 (F2)	0.581
4. Taking a long nap during the day	0.607 (F1)	0.644	0.721 (F1)	0.572
5. Going to bed and waking up always at the same hour	0.434 (F1)	0.708	0.570 (F1)	0.572
6. Thinking about one's engagements for the next day before falling asleep	0.543 (F1)	0.772	0.761 (F1)	0.621
7. Using sleep medication regularly	0.495 (F1)	0.601	0.575 (F1)	0.411
8. Smoking before falling asleep	0.462 (F3)	0.588	0.614 (F1)	0.493
9. Diverting one's attention and relaxing before bedtime	0.480 (F2)	0.455	0.800 (F1)	0.780
10. Going to bed 2 hours later than the habitual hour	0.475 (F3)	0.720	0.480 (F2)	0.646
11. Going to bed with an empty stomach	0.487 (F1)	0.563	0.567 (F1)	0.514
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	0.658 (F1)	0.668	0.844 (F1)	0.714
13. Trying to fall asleep without feeling tired	0.594 (F1)	0.652	0.692 (F3)	0.578
14. Studying or working intensely until late at night	0.523 (F1)	0.613	0.300 (F1)	0.715
15. Getting up when it is difficult to fall asleep	0.568 (F2)	0.517	0.651 (F3)	0.669
16. Going to bed 2 hours earlier than the habitual hour	0.437 (F4)	0.551	0.598 (F4)	0.649
17. Going to bed immediately after eating	0.683 (F1)	0.696	0.768 (F1)	0.596
18. Being worried about the impossibility of getting enough sleep	0.636 (F1)	0.679	0.902 (F1)	0.820
19. Sleeping in a quiet and dark room	0.666 (F2)	0.793	0.803 (F1)	0.719
20. Recovering lost sleep by sleeping for a long time	0.320 (F4)	0.665	0.506 (F4)	0.701

Note: F = factor

When the reliability of all the items were examined, using Cronbach's α coefficient, the internal reliability of the 20 items was good (α = 0.786 for the SBS-V, α = 0.881for the SBS-A). Table 3.12 lists the reliability that each item adds to the total of all items (when one item is deleted). The results show that each item is contributing to an overall measure of sleep beliefs and attitudes as all are above 0.70 (Brace, Kemp & Snelgar, 2009). The results indicate that all the items are reliable and are closely related to each other.

Table 3.12

SBS-V and SBS-A reliability (Cronbach's α) for the seven items when one item is deleted

SBS Items	SBS-V (α)	SBS-A (α)
1. Drinking alcohol in the evening	0.765	0.883
2. Drinking coffee or other substances with caffeine after dinner	0.748	0.868
3. Doing intense physical exercise before going to bed	0.786	0.884
4. Taking a long nap during the day	0.763	0.869
5. Going to bed and waking up always at the same hour	0.776	0.880
6. Thinking about one's engagements for the next day before falling asleep	0.774	0.869
7. Using sleep medication regularly	0.774	0.874
8. Smoking before falling asleep	0.775	0.873
9. Diverting one's attention and relaxing before bedtime	0.782	0.868
10. Going to bed 2 hours later than the habitual hour	0.790	0.882
11. Going to bed with an empty stomach	0.774	0.876
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	0.766	0.865
13. Trying to fall asleep without feeling tired	0.768	0.872
14. Studying or working intensely until late at night	0.774	0.890
15. Getting up when it is difficult to fall asleep	0.809	0.879
16. Going to bed 2 hours earlier than the habitual hour	0.778	0.873
17. Going to bed immediately after eating	0.762	0.868
18. Being worried about the impossibility of getting enough sleep	0.766	0.863
19. Sleeping in a quiet and dark room	0.785	0.868
20. Recovering lost sleep by sleeping for a long time	0.804	0.896

3.1.7 Summary of significant findings for Phase 1

Psychometric properties of the different scales

- The internal consistency of all the scales were good for both the Vietnamese and Australian samples.

ISI:

- An exploratory confirmatory factor analysis on the ISI-V and ISI-A resulted in one factor for both scales. A correlation was performed to further explore how the individual items were related to one another and the results showed that each of the items were positively correlated with each other.

- An exploratory factor analysis on the AIS-V resulted in one factor. The results showed good internal reliability and the items were positively correlated with one another.

- Results from a Pearson correlation suggested good convergent validity between the ISI-V and AIS-V.

- Both the published validity of the ISI (Bastien, Vallieres & Morin, 2001) and the above results together confirmed that the ISI-V and ISI-A scales were measuring level of insomnia.

DBAS:

- An exploratory factor analysis on the DBAS16-V and DBAS16-A resulted in four factors for both scales which is consistent with past research conducted by Morin, Vallieres & Ivers (2007). However, the items that load on each of the four factors were different to those reported by Morin, Vallieres & Ivers (2007). This finding is further explored in the Discussion section. A correlation was performed to further explore how the individual items were related to one another. The results showed that

each item is contributing to an overall measure of dysfunctional beliefs and attitudes. The results indicate that all the items were reliable and closely related to each other.

SBS:

- An exploraotry factor analysis on the SBS-V and SBS-A resulted in four factors for both scales which is not consistent with past research conducted by Adan et al., (2006) who found only three factors. This difference in findings is further explored in the Discussion section. A correlation was performed to further explore how the individual items were related to one another. The results showed that each of the items were contributing to the same overall measure. The results indicated that all the items were reliable and closely related to each other.

3.2 Phase Two: Comparison of Vietnamese and Australian older adult participants with respect to their sleep attitudes and beliefs.

Phase two of the study examined possible differences between older Vietnamese and Australians on their sleep attitudes and beliefs according to the DBAS16, SBS and Sleep Plots. Due to the non-normality of the data (which will be described later for each of the scales), a MANOVA could not be conducted and therefore Mann-Whitney U tests were conducted on both the Vietnamese and Australian samples for both the DBAS16 and SBS. The original intention of the study was to conduct a series of MANOVAs on the Sleep Plot data (across the 15 time segments of the plot as in Lack, 2007), but given the skewness of the data this was not possible. The use of non-parametric tests such as the Mann-Whitney U Test, was deemed unsuitable for analysis of the Sleep Plot because conceptually it was important to consider the group of dependent variables together for the Sleep Plot (i.e. the 15 time blocks across the night). Therefore, frequencies of the data were analysed instead and the data was categorised as in Bruck, Dolan and Lack (2015). Fisher's Exact Tests and Chi Square Tests were used to compare the results between the Vietnamese and Australian samples on the Sleep Plot categorisations.

The following two sections address hypothesis 2a – whether the two ethnic groups differed in terms of their insomnia status, as measured by the ISI.

3.2.1 Data screening for ISI

Prior to analysis, data screening revealed that the individual ISI scores (which varied from 0-4) ranged in skewness and distribution. Based on the differences in distribution (which in some cases indicated non-normality, Sheskin D.J. (2003), with skewness of 0.20 (SE = 0.05) and kurtosis of -0.85, a non-parametric test was chosen, the Mann-Whitney U Test, to compare the ISI scores across the Vietnamese and Australian samples.

3.2.2 Descriptive statistics and analysis of Vietnamese and Australian samples on the ISI

Results from the Mann-Whitney found that the Vietnamese and Australian samples were significantly different with respect to their total scores on the ISI. A closer examination of all the items revealed that this difference was significant across all seven items with the Vietnamese sample reporting more insomnia compared to the Australian sample. Please refer to Table 3.13 for a summary of the findings of the Mann-Whitney U Test.

Table 3.13

Descriptive statistics and summary of analyses of the Mann-Whitney for each ISI item as a

function of ethnicity group. (* indicates significant difference between ethnic groups)

ISI Items	Australian Mean (SD)	Vietnamese Mean (SD)	U	Z	P
1. *Difficulty falling asleep	1.23 (1.19)	2.01 (1.15)	3420.5	-4.521	< 0.001
2. *Difficulty staying asleep	1.60 (1.10)	2.10 (1.41)	4081.5	-2.94	< 0.001
3. *Problems waking up too early	1.51 (1.21)	2.01 (1.06)	4059	-2.990	< 0.001
4. *How satisfied/dissatisfied are you with your current sleep pattern?	1.88 (1.08)	2.30 (1.11)	4177	-2.719	< 0.001
5. *How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?	0.94 (1.05)	2.13 (1.24)	2517.5	-6.703	< 0.001
6. *How worried/distressed are you about your current sleep problem?	1.06 (1.13)	2.23 (1.26)	2648.5	-6.361	< 0.001
7. *To what extent do you consider your sleep problem to interfere with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) currently?	1.24 (1.18)	2.27 (1.25)	2928	-5.688	< 0.001
8. *Total scores	9.46 (6.52)	15.05 (7.03)	3000.5	-5.384	< 0.001

Note: Items on the ISI were scored on a 4-point Likert-type scale with 0 = low severity to
4 = high severity, SD = Standard Deviation

The above findings of a significant difference in overall ISI scores as a function of ethnicity

led to an analysis of the number of participants in each ethnic group that had clinical levels of

insomnia (ISI total >14). Such an analysis would allow categorisation of groups according to

insomnia status (yes/no) for subsequent analyses. Please refer to Table 3.14 which shows the

frequencies for Insomnia or No Insomnia of the different ethnic groups. These frequencies

were analysed using the Chi Square Test (2X2) which revealed significant differences

between those in the Insomnia and No Insomnia groups according to their ethnicity (X^2 =

9.557, df = 1, p < 0.05). Inspection of the differences between the expected and observed

counts showed more Vietnamese participants than expected reported insomnia, while less Australian participants than expected reported insomnia. In some of the subsequent analyses each ethnic group will be divided into Insomnia and No Insomnia groups, as shown in the 'count' cells in Table 3.14.

Table 3.14

Frequencies of Insomnia and No Insomnia for Vietnamese and Australian samples

		No Insomnia	Insomnia	Total
Australian	Count	73	34	107
	Expected Count	62	45	
Vietnamese	Count	47	53	100
	Expected Count	58	42	
Total	Count	120	87	207

As the above analyses indicated differences on insomnia status as a function of ethnicity, the null hypothesis 2a was rejected. Thus, for each of the sleep attitudes and belief analyses required in hypothesis 2b (DBAS, SBS and Sleep Plots analysed as a function of ethnicity) the series of group analyses as set out in Table 2.1 in the Data Analysis section were followed.

3.2.3 Data screening for DBAS16

Prior to analysis data screening revealed that the individual DBAS16 scores (which varied from 1-10) ranged in skewness and distribution. Based on the differences in distribution

(which in some cases indicated non-normality, Sheskin D.J. (2003), with skewness of -0.19 (SE = 0.17) and kurtosis of -0.87, a non-parametric test was chosen, the Mann-Whitney U Test, to compare the DBAS16 for both the Vietnamese and Australian sample, taking into account the confound of their insomnia level. The DBAS16 data was thus analysed with a series of Mann-Whitney U tests.

3.2.4 DBAS 16 as a function of insomnia status for the Australian sample

Results from the Mann-Whitney test revealed that in the Australian sample significant differences were found on the DBAS16 between those in the Insomnia group compared to those in the No Insomnia group. A closer examination of the individual items revealed that the significance difference between the two groups occurred across most of the items (items 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15 and 16), but not items 3 and 13. The results suggest that those in the Insomnia group had more dysfunctional beliefs and attitudes about their sleep compared to those in the No Insomnia group for the Australian sample. Please refer to Table 3.15 for a summary of the significance findings of the Mann-Whitney and descriptive statistics for each of the DBAS 16 items.

Table 3.15

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of their insomnia status (Insomnia or No Insomnia)

for the Australian sample (* indicates significant difference between insomnia status groups at p < 0.05).

DBAS 16 Items	Insomnia Mean (SD)	No Insomnia Mean (SD)	U	Z	P
1. *I need 8 hours of sleep to feel refreshed and function well during the day.	7.15 (2.01)	5.99 (2.76)	953	-1.94	0.04
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.	6.85 (2.57)	5.19 (3.32)	893	-2.34	0.02
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	6.09 (3.30)	5.41 (3.25)	1053	-1.04	0.30
4. *I am worried that I may lose control over my abilities to sleep.	4.79 (3.27)	2.40 (2.49)	688	-3.74	< 0.00
5. *After a poor night's sleep, I know it will interfere with my activities the next day.	6.32 (2.83)	5.12 (2.85)	948	-1.97	0.04
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.	4.70 (3.23)	2.44 (2.99)	745.5	-3.36	< 0.00
7. *When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	5.20 (2.95)	3.49 (2.71)	832.5	-2.75	< 0.00
8. *When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	3.85 (2.81)	1.49 (1.39)	639.5	-4.10	< 0.00
9. *Without an adequate night's sleep, I can hardly function the next day.	5.14 (2.85)	3.16 (2.61)	746	-3.33	< 0.00
10. *I can't ever predict whether I'll have a good or poor night's sleep.	6.47 (2.76)	4.88 (3.20)	893.5	-2.34	0.02
11. *I have little ability to manage the negative consequences of disturbed sleep.	5.41 (2.75)	3.62 (2.56)	787.5	-3.05	< 0.00
12. *When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	6.58 (2.27)	4.05 (2.85)	633	-4.09	< 0.00
13. I believe insomnia is essentially the result of a chemical imbalance.	4.41 (2.77)	3.70 (2.51)	1051	-1.30	0.19
14. *I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	4.32 (2.37)	2.04 (2.01)	577.5	-4.49	< 0.00
15. *Medication is probably the only solution to sleeplessness.	3.88 (2.97)	2.11 (2.50)	798	-3.01	< 0.00
16. *I avoid or cancel obligations (social, family) after a poor night's sleep.	4.93 (1.18)	3.44 (1.26)	484.5	-5.06	< 0.00
*Total Scores	88.27 (26.56)	58.54 (22.81)	513.5	-4.71	< 0.00

Note: Items on the DBAS 16 were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

3.2.5 DBAS 16 as a function of insomnia status for the Vietnamese sample

Result from the Mann-Whitney test revealed that in the Vietnamese sample significant differences were found between those in the Insomnia group and in the No Insomnia group. A closer examination of the individual items revealed that the significance difference between the two groups occurred across the majority of the items (items 4, 5, 6, 7, 10, 11, 14, 15, 16) except for items (1, 2, 3, 8, 9, 12, 13). The results suggest that those Vietnamese participants in the Insomnia group had more dysfunctional beliefs and attitudes about their sleep compared to those in the No Insomnia group. Please refer to Table 3.16 for a summary of the significance findings of the Mann-Whitney and descriptive statistics for each of the DBAS16 items.

Table 3.16

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of their insomnia status (Insomnia or No Insomnia) for the Vietnamese sample (* indicates significant difference between insomnia status groups at p < 0.05).

DBAS 16 Items	Insomnia Mean (SD)	No Insomnia Mean (SD)	U	Z	P
1. I need 8 hours of sleep to feel refreshed and function well during the day.	8.64 (1.90)	8.51 (1.74)	1109	-0.99	0.32
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.	7.49 (3.11)	7.87 (2.07)	1200	-0.32	0.75
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	9.36 (1.09)	8.70 (2.26)	1027	-1.73	0.08
4. *I am worried that I may lose control over my abilities to sleep.	8.56 (1.78)	7.46 (2.61)	931.5	-2.24	0.02
5. *After a poor night's sleep, I know it will interfere with my activities the next day.	9.05 (1.43)	8.44 (1.95)	965.5	-2.06	0.03
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.	7.43 (2.93)	4.46 (3.43)	625.5	-4.32	< 0.001
7. *When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	8.58 (2.08)	6.87 (2.90)	741.5	-3.57	< 0.001
8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	7.22 (2.48)	6.17 (3.16)	1045	-1.40	0.16
9. Without an adequate night's sleep, I can hardly function the next day.	7.67 (2.43)	7.23 (2.19)	1058	-1.31	0.18
10. *I can't ever predict whether I'll have a good or poor night's sleep.	9.16 (1.52)	7.97 (2.48)	829	-3.11	< 0.001
11. *I have little ability to manage the negative consequences of disturbed sleep.	8.30 (2.17)	6.97 (2.65)	858	-2.75	< 0.001
12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	8.24 (1.97)	7.86 (2.05)	1060.5	-1.14	0.25
13. I believe insomnia is essentially the result of a chemical imbalance.	6.77 (2.92)	6.80 (2.66)	1194	-0.17	0.86
14. *I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	8.73 (1.45)	7.82 (2.06)	887	-2.40	0.01
15. *Medication is probably the only solution to sleeplessness.	7.60 (2.48)	4.86 (3.17)	614	-4.28	< 0.001
16. *I avoid or cancel obligations (social, family) after a poor night's sleep.	7.43 (2.57)	5.56 (2.80)	733.5	-3.44	< 0.001
*Total Scores	130.33 (18.36)	113.6 (24.68)	741	-3.35	< 0.001

Note: Items on the DBAS were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

3.2.6 Comparison of DBAS 16 for No Insomnia group across Vietnamese and Australian
samples

Results from the Mann-Whitney test revealed that in the No Insomnia groups significant
differences were found on the DBAS16 between Vietnamese and Australian samples. A
closer examination of the individual items revealed that the significance difference between
the two groups occurred across <u>all</u> of the items. The results suggest that of those in the No
Insomnia groups, the Vietnamese sample had more dysfunctional beliefs and attitudes about
their sleep compared to those in the Australian sample. Please refer to Table 3.17 for a
summary of the significance findings of the Mann-Whitney U Test and descriptive statistics
for each of the DBAS 16 items.

Table 3.17

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of their ethnicity (Vietnamese and Australian) for the No Insomnia group (* indicates significant difference between insomnia status groups at p < 0.05).

DBAS 16 Items	Australian Mean (SD)	Vietnamese Mean (SD)	U	Z	P
1. *I need 8 hours of sleep to feel refreshed and function well during the day.	5.99 (2.76)	8.51 (1.74)	760.5	-5.186	< 0.001
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.	5.19 (3.32)	7.87 (2.07)	921	-4.304	< 0.001
3. *I am concerned that chronic insomnia may have serious consequences on my physical health.	5.41 (3.25)	8.70 (2.26)	620	-5.978	< 0.001
4. *I am worried that I may lose control over my abilities to sleep.	2.40 (2.49)	7.46 (2.61)	356	-7.362	< 0.001
5. *After a poor night's sleep, I know it will interfere with my activities the next day.	5.12 (2.85)	8.44 (1.95)	522.5	-6.469	< 0.001
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.	2.44 (2.99)	4.46 (3.43)	1188	-2.880	< 0.001
7. *When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	3.49 (2.71)	6.87 (2.90)	696	-5.508	< 0.001
8. *When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	1.49 (1.39)	6.17 (3.16)	403.5	-7.137	< 0.001
9. *Without an adequate night's sleep, I can hardly function the next day.	3.16 (2.61)	7.23 (2.19)	445.5	-6.860	< 0.001
10. *I can't ever predict whether I'll have a good or poor night's sleep.	4.88 (3.20)	7.97 (2.48)	749.5	-5.232	< 0.001
11. *I have little ability to manage the negative consequences of disturbed sleep.	3.62 (2.56)	6.97 (2.65)	642	-5.802	< 0.001
12. *When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	4.05 (2.85)	7.86 (2.05)	482.5	-6.564	< 0.001
13. I believe insomnia is essentially the result of a chemical imbalance.	3.70 (2.51)	6.80 (2.66)	659.5	-5.654	< 0.001
14. *I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	2.04 (2.01)	7.82 (2.06)	152.5	-8.390	< 0.001
15. *Medication is probably the only solution to sleeplessness.	2.11 (2.50)	4.86 (3.17)	844.5	-4.611	< 0.001
16. *I avoid or cancel obligations (social, family) after a poor night's sleep.	3.44 (1.26)	5.56 (2.80)	864.5	-4.448	< 0.001
*Total Scores	58.54 (22.81)	113.6 (24.68)	150	-8.344	< 0.001

Note: Items on the DBAS 16 were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

3.2.7 Comparison of DBAS16 for Insomnia group across Vietnamese and Australian samples

Results from the Mann-Whitney test revealed that in the Insomnia group significant differences were found on the DBAS16 between the Vietnamese and Australian samples. A closer examination of the individual items revealed that the significance difference between the two groups occurred across most of the items (items 1, 3 to 16) except for item 2. The results suggest that of those in the Insomnia group, the Vietnamese sample had more dysfunctional beliefs and attitudes about their sleep compared to those in the Australian sample. Please refer to Table 3.18 for a summary of the significance findings of the Mann-Whitney U Test and descriptive statistics for each of the DBAS 16 items.

Table 3.18

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of their ethnicity (Vietnamese and Australian) for the Insomnia group (* indicates significant difference between insomnia status groups at p < 0.05).

DBAS 16 Items	Australian Mean (SD)	Vietnamese Mean (SD)	U	Z	P
1. *I need 8 hours of sleep to feel refreshed and function well during the day.	7.15 (2.01)	8.64 (1.90)	514.50	-3.494	< 0.001
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.	6.85 (2.57)	7.49 (3.11)	704.5	-1.742	0.08
3. *I am concerned that chronic insomnia may have serious consequences on my physical health.	6.09 (3.30)	9.36 (1.09)	316.5	-5.344	< 0.001
4. *I am worried that I may lose control over my abilities to sleep.	4.79 (3.27)	8.56 (1.78)	312	-5.259	< 0.001
5. *After a poor night's sleep, I know it will interfere with my activities the next day.	6.32 (2.83)	9.05 (1.43)	357.5	-4.937	< 0.001
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.	4.70 (3.23)	7.43 (2.93)	471.5	-3.784	< 0.001
7. *When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	5.20 (2.95)	8.58 (2.08)	310.5	-5.266	< 0.001
8. *When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	3.85 (2.81)	7.22 (2.48)	351.5	-4.855	< 0.001
9. *Without an adequate night's sleep, I can hardly function the next day.	5.14 (2.85)	7.67 (2.43)	443.5	-4.025	< 0.001
10. *I can't ever predict whether I'll have a good or poor night's sleep.	6.47 (2.76)	9.16 (1.52)	327	-5.270	< 0.001
11. *I have little ability to manage the negative consequences of disturbed sleep.	5.41 (2.75)	8.30 (2.17)	369	-4.732	< 0.001
12. *When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	6.58 (2.27)	8.24 (1.97)	537	-3.233	< 0.001
13. *I believe insomnia is essentially the result of a chemical imbalance.	4.41 (2.77)	6.77 (2.92)	484.5	-3.667	< 0.001
14. *I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	4.32 (2.37)	8.73 (1.45)	102.5	-7.063	< 0.001
15. *Medication is probably the only solution to sleeplessness.	3.88 (2.97)	7.60 (2.48)	314.5	-5.155	< 0.001
16. *I avoid or cancel obligations (social, family) after a poor night's sleep.	4.93 (1.18)	7.43 (2.57)	307	-5.192	< 0.001
*Total Scores	88.27 (26.56)	130.33 (18.36)	115	-6.391	< 0.001

Note: Items on the DBAS 16 were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

3.2.8 Data screening for Sleep Beliefs Scale (SBS)

Prior to analysis data screening revealed that the individual SBS scores (which ranged from -1, 0 and 1) ranged in skewness and distribution. Based on the differences in distribution (which in some cases indicated non-normality, Sheskin D.J. (2003), with skewness of -0.02 (SE = 0.17) and kurtosis of -1.11, a non-parametric test was chosen, the Mann-Whitney U Test, to analyse the individual SBS items for both the Vietnamese and Australian samples. The difference in insomnia levels of the two ethnic groups and the non-normality of the SBS data required a series of Mann-Whitney U tests.

3.2.9 SBS as a function of insomnia status for the Australian sample

Result from the Mann-Whitney U Test revealed that in the Australian sample no significant differences were found between those in the Insomnia and those in the No Insomnia groups on the SBS total score (p = 0.59). For the purpose of completeness the individual items are presented, with their mean values and analyses in Table 3.19.

Table 3.19

Descriptive statistics and summary of significance findings of the Mann-Whitney for each SBS item as a function of insomnia status with the Australian sample

SBS Items	Insomnia Mean (SD)	No Insomnia Mean (SD)	U	Z	P
1. Drinking alcohol in the evening	0.17 (0.83)	0.09 (0.74)	1160.5	-0.57	0.56
2. Drinking coffee or other substances with caffeine after dinner	0.23 (0.85)	0.17 (0.82)	1187.5	-0.38	0.70
3. Doing intense physical exercise before going to bed	0.11 (0.84)	-0.11 (0.75)	1049	-1.36	0.17
4. Taking a long nap during the day	0.14 (0.89)	0.24 (0.81)	1174	-0.48	0.62
5. Going to bed and waking up always at the same hour	0.20 (0.80)	0.07 (0.79)	1117	-0.88	0.37
6. Thinking about one's engagements for the next day before falling asleep	0.26 (0.86)	0.15 (0.77)	1126.5	-0.82	0.41
7. Using sleep medication regularly	0.08 (0.83)	0.16 (0.81)	1178	-0.45	0.65
8. Smoking before falling asleep	0.26 (0.66)	0.16 (0.68)	1146.5	-0.69	0.48
9. Diverting one's attention and relaxing before bedtime	0.23 (0.95)	0.39 (0.75)	1166	-0.56	0.57
10. Going to bed 2 hours later than the habitual hour	0.02 (0.71)	-0.01 (0.67)	1200	-0.30	0.76
11. Going to bed with an empty stomach	0.20 (0.76)	0.15 (0.75)	1190	-0.36	0.71
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	0.17 (0.83)	0.27 (0.83)	1156	-0.61	0.53
13. Trying to fall asleep without feeling tired	0.29 (0.76)	0.16 (0.71)	1109	-0.95	0.34
14. Studying or working intensely until late at night	0.41 (0.78)	0.38 (1.42)	1139	-0.75	0.45
15. Getting up when it is difficult to fall asleep	0.02 (0.86)	0.12 (0.76)	1170	-0.50	0.61
16. Going to bed 2 hours earlier than the habitual hour	0.32 (0.72)	0.17 (0.69)	1094	-1.07	0.28
17. Going to bed immediately after eating	0.29 (0.79)	0.24 (0.79)	1199	-0.30	0.76
18. Being worried about the impossibility of getting enough sleep	0.29 (0.83)	0.28 (0.80)	1229	-0.08	0.93
19. Sleeping in a quiet and dark room	0.26 (0.89)	0.30 (0.82)	1229	-0.89	0.92
20. Recovering lost sleep by sleeping for a long time	-0.02 (0.83)	0.00 (0.76)	1215	-0.18	0.85
Total Scores	4.02 (9.45)	3.45 (8.85)	1161.5	-0.53	0.59

Note: Items on the SBS were scored on a 3-point Likert Scale (-1 = 'negative effect', 0 = 'neither effect', 1 = positive effect'), SD = Standard Deviation.

3.2.10 SBS as a function of insomnia status for the Vietnamese sample

Result from the Mann-Whitney test revealed that in the Vietnamese sample there were no significant difference between those in the Insomnia and those in the No Insomnia groups on the SBS total score ($p = 0.60$). Again for completeness the individual items are presented, with their mean values and analyses in Table 3.20. The individual items revealed no significance difference between the two groups across the majority of the items except for items 4 and 9. Please refer to Table 3.20 for a summary of the significance findings of the Mann-Whitney U Test and descriptive statistics for each of the SBS items.

Table 3.20

Descriptive statistics and summary of analyses of the Mann-Whitney for each SBS item as a function of insomnia status for the Vietnamese sample (* indicates

significant difference between insomnia status groups).

SBS Items	Insomnia Mean (SD)	No Insomnia Mean (SD)	U	Z	P
1. Drinking alcohol in the evening	0.00 (0.76)	-0.02 (0.89)	1151.5	-0.14	0.88
2. Drinking coffee or other substances with caffeine after dinner	-2.45 (0.82)	0.11 (0.91)	936.5	-1.95	0.05
3. Doing intense physical exercise before going to bed	0.13 (0.82)	0.40 (0.78)	915	-1.68	0.09
4. *Taking a long nap during the day	-0.35 (0.91)	0.00 (0.86)	900	-2.08	0.03
5. Going to bed and waking up always at the same hour	-0.37 (0.76)	63.63 (246.88)	998	-1.84	0.06
6. Thinking about one's engagements for the next day before falling asleep	-0.07 (0.83)	0.04 (0.87)	1080	-0.69	0.48
7. Using sleep medication regularly	0.05 (0.87)	-0.20 (0.83)	930.5	-1.49	0.13
8. Smoking before falling asleep	-0.25 (0.83)	-0.16 (0.81)	1046.5	-0.57	0.56
9. *Diverting one's attention and relaxing before bedtime	18.28 (137.30)	63.51 (246.91)	965	-1.97	0.04
10. Going to bed 2 hours later than the habitual hour	1.77 (13.63)	-0.33 (0.73)	988.5	-1.74	0.08
11. Going to bed with an empty stomach	-0.30 (0.74)	-0.45 (0.76)	1022	-1.15	0.24
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	-0.26 (0.79)	-0.44 (0.72)	1033	-1.09	0.27
13. Trying to fall asleep without feeling tired	1.62 (13.65)	-0.40 (0.80)	1044	-1.16	0.24
14. Studying or working intensely until late at night	1.71 (13.64)	-0.26 (0.88)	1064	-0.98	0.32
15. Getting up when it is difficult to fall asleep	-0.05 (0.80)	63.70 (246.86)	1163	-0.60	0.54
16. Going to bed 2 hours earlier than the habitual hour	-0.30 (0.64)	-0.13 (0.84)	1055	-0.89	0.36
17. Going to bed immediately after eating	-0.40 (0.74)	-0.35 (0.82)	1154	-0.12	0.90
18. Being worried about the impossibility of getting enough sleep	-0.23 (0.89)	-0.17(0.88)	1128	-0.33	0.38
19. Sleeping in a quiet and dark room	18.39 (137.28)	63.44 (246.93)	1131	-0.88	0.37
20. Recovering lost sleep by sleeping for a long time	-0.05 (0.84)	0.15 (0.87)	1030.5	-1.23	0.21
Total Scores	-4.56 (7.02)	-3.53 (7.54)	959.5	-0.52	0.60

Note: Items on the SBS were scored on a 3-point Likert Scale (-1 = 'negative effect', 0 = 'neither effect', 1 = positive effect'), SD = Standard Deviation.

As the above analyses showed that there were no differences on the SBS within either ethnic group as a function of insomnia status, further comparison between each of the two total ethnic groups in terms of their scores on the SBS were made.

3.2.11 Descriptive statistics and analysis of Vietnamese and Australian samples on the SBS

Results from the Mann-Whitney U Test found that the Vietnamese and Australian samples were significantly different with respect to their total scores on the SBS, $p < 0.001$. A closer examination of the individual items revealed that the significant difference between the two ethnic groups occurred across most of the items (items 2, 3, 4, 5, 8 to 14, 16 to 19, but not items 1, 6, 7, 15, 20). The results showed that the Vietnamese sample had poorer knowledge about sleep hygiene compared to the Australian sample. Please refer to Table 3.21 for a summary of the significant findings of the Mann-Whitney U Test and descriptive statistics for each of the SBS items.

Table 3.21

Descriptive statistics and summary of significant findings of the Mann-Whitney for each SBS item as a function of ethnicity (* indicates significant difference between ethnic groups).

SBS Items	Australian Mean (SD)	Vietnamese Mean (SD)	U	Z	P
1. Drinking alcohol in the evening	0.12 (0.77)	-0.01 (0.82)	4733	-1.15	0.25
2. *Drinking coffee or other substances with caffeine after dinner	0.19 (0.82)	-0.08 (0.88)	4339	-2.27	0.02
3. *Doing intense physical exercise before going to bed	-.03 (0.78)	0.26 (0.81)	4036.5	-2.68	< 0.00
4. *Taking a long nap during the day	0.21 (0.83)	-0.19 (0.84)	3852.5	-3.38	< 0.00
5. *Going to bed and waking up always at the same hour	0.11 (0.78)	29.71 (171.3)	4182.5	-2.87	< 0.00
6. Thinking about one's engagements for the next day before falling asleep	0.18 (0.80)	-0.02 (0.85)	4498.5	-1.76	0.08
7. Using sleep medication regularly	0.14 (0.81)	-0.06 (0.86)	4421	-1.96	0.09
8. *Smoking before falling asleep	0.19 (0.67)	-0.21 (0.82)	3637	-3.71	< 0.00
9. *Diverting one's attention and relaxing before bedtime	0.34 (0.82)	39.5 (196.8)	3081	-5.60	< 0.00
10. *Going to bed 2 hours later than the habitual hour	0.00 (0.68)	0.80 (10.0)	4476.5	-1.95	0.04
11. *Going to bed with an empty stomach	0.16 (0.75)	-0.37 (0.75)	3272	-4.84	< 0.00
12. *Using the bed for eating, calling on the phone, studying and other non-sleeping activities	0.24 (0.83)	-0.35 (0.76)	3231	-4.95	< 0.00
13. *Trying to fall asleep without feeling tired	0.20 (0.72)	0.69 (10.1)	3437.5	-4.51	< 0.00
14. *Studying or working intensely until late at night	0.39 (1.24)	0.80 (10.1)	3622	-4.07	< 0.00
15. Getting up when it is difficult to fall asleep	0.09 (0.79)	29.9 (171.2)	4932.5	-1.02	0.31
16. *Going to bed 2 hours earlier than the habitual hour	0.22 (0.70)	-0.22 (0.74)	3515.5	-4.25	< 0.00
17. *Going to bed immediately after eating	0.26 (0.79)	-0.38 (0.78)	3047.5	-5.41	< 0.00
18. *Being worried about the impossibility of getting enough sleep	0.29 (0.81)	-0.20 (0.88)	3631	-3.97	< 0.00
19. *Sleeping in a quiet and dark room	0.29 (0.85)	39.57 (196.83)	3399.5	-4.84	< 0.00
20. Recovering lost sleep by sleeping for a long time	-.01 (0.78)	0.04 (0.86)	5063	-0.45	0.65
*Total Scores	3.36 (9.01)	-4.09 (7.23)	2468.5	-5.97	< 0.00

Note: Items on the SBS were scored on a 3-point Likert Scale (-1 = 'negative effect', 0 = 'neither effect', 1 = 'positive effect'), SD = Standard Deviation.

3.2.12 Sleep Plot

Scoring of the Sleep Plot was adapted from previous studies (Lack, 2007; Bruck, Dolan and Lack, 2015) (refer to Method Section for more information on scoring). The dependent variables for the following analyses were the individual ratings of depth of sleep for each of the 15 time points within each Sleep Plot. Prior to the analysis of data, assumption testing was conducted with respect to homogeneity. The results revealed that the data met the requirements for homogeneity. Further testing was conducted for normality of data which found that the data was not normally distributed but rather it was skewed, Sheskin D.J. (2003), with skewness ranging from -1.52 (SE = 0.19) and kurtosis of 1.74, to skewness of 11.61 (SE = 0.19) and kurtosis 142.97 across the 15 different scores for perception of sleep for a <u>healthy 60 year old</u>. The data was also skewed for perception of their <u>own sleep</u>, with skewness ranging from -0.54 (SE = 0.19) and kurtosis of -0.68, to skewness of 10.30 (SE = 0.19) and kurtosis of 123.58 across the 15 different scores. The use of non-parametric tests were deemed unsuitable because conceptually it was important to consider the group of dependent variables together for the Sleep Plot (ie. each score for each of the 15 time periods) in the same analysis. Transformation of the data was therefore conducted both using the log transformation method as well as the log normal method, however the data could not achieve normality. Therefore, a MANOVA could not be conducted as the normality assumption was violated. Thus other analyses, as below, were conducted.

The Sleep Plots were classified into 3 categories (as in Bruck, Dolan and Lack, 2015). Analysis of the data was first conducted to determine if the Sleep Plots differed as a function of insomnia status, as insomnia was considered to be a potential confounding factor affecting

the result. As with the other dependent variables, the sequencing of analyses followed the guidelines in Table 2.1 in the Data Analysis section.

3.2.12.1 Perception of sleep for a <u>healthy 60 year old</u> according to Insomnia or No Insomnia for the Australian sample

A Fisher's Exact Test (2X3) was conducted and the results revealed no significant difference between the frequencies reported between the Insomnia and No Insomnia groups of the Australian sample across the three different plot shape categories (p = 0.901; Fisher's Exact Test). The results also revealed that neither groups had many participants that chose the 'correct' answer (Non U Wake Shape), with only 3% of the total participants plotting this. The descriptive data clearly shows that most Australian participants thought that it was the U shape that was representative of a typical night's sleep for a <u>healthy 60 year old</u> with 76% representing this. Please refer to Table 3.22 which shows the frequencies for the three different categories between the Insomnia and No Insomnia groups for the Australian sample.

Table 3.22

Frequencies of different categories of sleep plots between the Insomnia and No Insomnia

groups for the Australian sample about perception of sleep for a <u>healthy 60 year old</u>

		U Shape	Non U No Wake	Non U Wake	Total
No Insomnia	Count	45	13	2	60
	Expected Count	45.7	12.3	2	
Insomnia	Count	22	5	1	28
	Expected Count	21.3	5.7	1	
Total	Count	67	15	3	88

3.2.12.2 Perception of sleep for a <u>healthy 60 year old</u> according to Insomnia or No insomnia

for the Vietnamese sample

A Fisher's Exact Test (2X3) was conducted and the results revealed a no significant

difference between the frequencies reported between the Insomnia and No Insomnia groups

across the three different plot shape categories (p = 0.098; Fisher's Exact Test). The results

also revealed that <u>no</u> participants from either group chose the 'correct' answer (Non U Wake

Shape). The descriptive data clearly shows that most people thought that it was the U shape

that was representative of a typical night's sleep for a <u>healthy 60 year old</u> with 91%

representing this. Please refer to Table 3.23 which shows the frequencies for the three

different categories between the Insomnia and No Insomnia groups for the Vietnamese

sample.

Table 3.23

Frequencies of different categories of sleep plots between the Insomnia and No Insomnia

groups for the Vietnamese sample about perception of sleep for a <u>healthy 60 year old</u>

		U Shape	Non U No Wake	Non U Wake	Total
No Insomnia	Count	30	5	0	35
	Expected Count	32.1	2.9	0	
Insomnia	Count	37	1	0	38
	Expected Count	34.9	3.7	0	
Total	Count	67	6	3	73

3.2.12.3 Plots of the perception of sleep for a <u>healthy 60 year old</u> for the Vietnamese and

Australian samples

A Fisher's Exact Test (2X3) was conducted and the results revealed a significant difference

between the frequencies reported between the Vietnamese and Australian samples across the

three different plot shape categories ($p = 0.018$; Fisher's Exact Test), with the main difference

being that more Vietnamese than expected drew a U Shape, while less Australians than

expected drew a U Shape. The results also revealed that neither ethnic group had many

participants who chose the 'correct' answer (Non U Wake Shape), with only three Australian

participants and no Vietnamese participants drawing this shape out of a total of 161

participants. The descriptive data clearly shows that most people thought that it was the U

Shape that was representative of a typical night's sleep for a <u>healthy 60 year</u> old with 83.2%

plotting this.

Results of the frequencies between the two ethnic groups revealed that both the Vietnamese and Australian samples perceived the sleep pattern for a <u>healthy 60 year old</u> to be a U Shape, followed by a Non U No Wake pattern and then finally a Non U Wake Shape (which is the correct answer). Please refer to Table 3.24 which shows the frequencies for the three different categories between the two ethnic groups.

Table 3.24

Frequencies of different categories of sleep plots between Vietnamese and Australian samples for a <u>healthy 60 year old</u>

		U Shape	Non U No Wake	Non U Wake	Total
Australian	Count	67	18	3	88
	Expected Count	73.2	13.1	1.6	
Vietnamese	Count	67	6	0	73
	Expected Count	60.8	10.9	1.4	
Total	Count	134	24	3	161

3.2.12.4 Perception of one's <u>own sleep</u> according to Insomnia or No insomnia for the

Australian sample

Investigation into the participants reporting of their <u>own sleep</u> was also conducted using the Chi Square Test (2X3) which revealed no significant differences were observed between those with Insomnia and those with No Insomnia according to their own perceived Sleep Plots ($X^2 = 2.22$, df = 2 , $p > 0.05$) for the Australian sample. The results also revealed that neither Insomnia or No Insomnia groups had many participants that chose the 'correct'

answer (Non U Wake Shape), with only 20% of the total participants plotting this. The descriptive data clearly shows that most people thought that it was the U shape that was representative of a typical night's sleep for themselves with 60% representing this. Please refer to Table 3.25 which shows the observed and expected frequencies for the three different categories for the Australian sample concerning their own perceived sleep.

Table 3.25

Frequencies of different categories of sleep plots between Insomnia and No Insomnia for the Australian sample about their <u>own sleep</u>

		U Shape	Non U No Wake	Non U Wake	Total
No Insomnia	Count	37	14	12	63
	Expected Count	37.7	11.6	13.7	
Insomnia	Count	18	3	8	29
	Expected Count	17.3	5.4	6.3	
Total	Count	55	17	20	92

3.2.12.5 Perception of one's <u>own sleep</u> according to Insomnia or No insomnia for the Vietnamese sample

A Fisher's Exact Test (2X3) was conducted and the results revealed a significant difference between the frequencies reported between the Insomnia and No Insomnia groups across the three different plot shape categories (p = 0.029; Fisher's Exact Test) for the Vietnamese sample. The results also revealed that neither Insomnia or No Insomnia groups had many

participants who chose the 'correct' answer (Non U Wake Shape), with only 20% of the participants drawing this shape. The descriptive data clearly shows that most people thought that it was the U Shape that was representative of a typical night's sleep for themselves with 60% plotting this. Please refer to Table 3.26 which shows the frequencies for the three different categories between the Insomnia and No Insomnia groups for the Vietnamese sample.

Table 3.26

Frequencies of different categories of sleep plots between the Insomnia and No Insomnia groups for the Vietnamese sample about one's <u>own sleep</u>

		U Shape	Non U No Wake	Non U Wake	Total
No Insomnia	Count	23	10	3	36
	Expected Count	21.6	7.2	7.2	
Insomnia	Count	22	5	12	39
	Expected Count	23.4	7.8	7.8	
Total	Count	45	15	15	75

3.2.12.6 Perception of one's <u>own sleep</u> for the No Insomnia group for the Vietnamese and Australian samples

A Fisher's Exact Test (2X3) was conducted and the results revealed no significant difference between the frequencies reported between the Vietnamese and Australian samples across the

three different plot shape categories (p = 0.368; Fisher's Exact Test) for the No Insomnia group. The results also revealed that neither ethnic group had many participants who chose the 'correct' answer (Non U Wake Shape), with only 15% of the participants drawing this shape. The descriptive data clearly shows that most people thought that it was the U Shape that was representative of a typical night's sleep for others with 60% plotting this. Please refer to Table 3.27 which shows the frequencies for the three different categories between the Vietnamese and Australian samples for the No Insomnia group.

Table 3.27

Frequencies of different categories of sleep plots for the No Insomnia group for the Australian and Vietnamese samples about one's <u>own sleep</u>

		U Shape	Non U No Wake	Non U Wake	Total
Australian	Count	37	14	12	63
	Expected Count	38.2	15.3	9.5	
Vietnamese	Count	23	10	3	36
	Expected Count	21.8	8.7	5.5	
Total	Count	60	24	15	99

3.2.12.7 Perception of one's <u>own sleep</u> for the Insomnia group for the Vietnamese and

Australian samples

A Fisher's Exact Test (2X3) was conducted and the results revealed no significant difference

between the frequencies reported between the Vietnamese and Australian samples across the

three different plot shape categories (p = 0.939; Fisher's Exact Test) for the Insomnia group.

The results also revealed that neither ethnic group had many participants who chose the

'correct' answer (Non U Wake Shape), with only 29% of the participants drawing this shape.

The descriptive data clearly shows that most people thought that it was the U Shape that was

representative of a typical night's sleep for others with 58.8% plotting this. Please refer to

Table 3.28 which shows the frequencies for the three different categories between the

Vietnamese and Australian samples for the Insomnia group.

Table 3.28

Frequencies of different categories of sleep plots for the Insomnia group for the Australian

and Vietnamese samples about one's <u>own sleep</u>

		U Shape	Non U No Wake	Non U Wake	Total
Australian	Count	18	3	8	29
	Expected Count	17.1	3.4	8.5	
Vietnamese	Count	22	5	12	39
	Expected Count	22.9	4.6	11.5	
Total	Count	40	8	20	68

3.2.13 Summary of significant findings for Phase Two

- The results revealed that Vietnamese and Australian samples were significantly different with respect to their total scores on the ISI. A closer examination revealed that this difference was significant across all seven items with the Vietnamese sample reporting more Insomnia compared to the Australian sample (thus null hypothesis 2a was rejected).

Differences between the Australian and Vietnamese samples on the DBAS16, SBS and Sleep Plots

DBAS16*:*

- For the Australian sample, significant differences were found on the DBAS16 between those in the Insomnia group and those in the No Insomnia group. A closer examination of the individual items revealed that the significance difference between the two groups occurred across most of the items. The results showed that those in the Insomnia group had more dysfunctional beliefs and attitudes about their sleep compared to those in the No Insomnia group.

- For the Vietnamese sample, significant differences were also found between those in the Insomnia and those in the No Insomnia groups. A closer examination of the individual items revealed that the significance difference between the two groups occurred across the majority of the items. The results suggest that those Vietnamese participants in the Insomnia groups had more dysfunctional beliefs and attitudes about their sleep compared to those in the No Insomnia groups.

- For those in the No Insomnia group significant differences were found between Australian and Vietnamese samples, with the Vietnamese group having more

dysfunctional beliefs and attitudes about their sleep compared to those in the

Australian sample.

- Analysis of the Insomnia group also found significant differences between the

    Australian and Vietnamese samples, with the Vietnamese group having more

    dysfunctional beliefs and attitudes about their sleep compared to those in the

    Australian sample.

- The presence of solid arrows in Table 3.29 below summarises where significant

    differences were found for the DBAS in group comparisons. It can be seen that for the

    DBAS16, null hypothesis 2b was rejected.

Table 3.29

Summary of significant differences between groups for the DBAS 16 where solid arrows

indicate significant differences and dashed arrows indicate non-significance. Absence of an

arrow indicates that comparison was not done (see discussion in Data Analysis).

	Insomnia	No Insomnia	Total
Australian	a	b	e
Vietnamese	c	d	f

SBS

- For the Australian sample no significant differences were found between those in theInsomnia and those in the No Insomnia groups on the SBS total scores.

- For the Vietnamese sample there were no significant differences between those in the Insomnia group and those in the No Insomnia group on the SBS total scores.

- It was found that the Vietnamese and Australian samples were significantly different with respect to their total scores on the SBS. The results showed that the Vietnamese sample had poorer sleep hygiene knowledge compared to the Australian sample and this occurred across most of the items.

- The presence of solid arrows in Table 3.30 below summarises where significant differences were found for the SBS in group comparisons. It can be seen that for the SBS, null hypothesis 2b was rejected.

Table 3.30

Summary of significant differences between groups for the SBS where solid arrows indicate significant differences and dashed arrows indicate non-significance. Absence of an arrow indicates that comparison was not done (see discussion in Data Analysis).

	Insomnia	No Insomnia	Total
Australian	a	b	e
		<------>	
Vietnamese	c	d	f
		<------>	

Sleep Plots

Sleep Plots – in relation to perception of sleep of a <u>healthy 60 year old</u>

- In relation to the perception of sleep for a <u>healthy 60 year old</u> for the Australian sample, no significant differences were found between the Insomnia and No Insomnia groups.

- For the Vietnamese sample, no significant differences were found between the Insomnia and No Insomnia groups in relation to the perception of sleep for a <u>healthy 60 year old</u> as well.

- A significant difference was found between the frequencies reported between the Vietnamese and Australian samples across the three different Sleep Plot shape categories. It was found that more Vietnamese than expected drew a U Shape, while less Australians than expected drew a U Shape. The results also revealed that neither ethnic group had many participants that chose the 'correct' answer (Non U Wake Shape). The results showed that most people thought that it was the U Shape that was representative of a typical night's sleep for a <u>healthy 60 year old</u>.

- The presence of solid arrows in Table 3.31 below summarises where significant differences were found for the Sleep Plot (sleep of a <u>healthy 60 year old</u>) in group comparisons. It can be seen that for this Sleep Plot dependent variable, null hypothesis 2b was rejected.

Table 3.31

Summary of significant differences between groups for perception of sleep for a <u>healthy 60</u>

<u>year old</u> where solid arrows indicate significant differences and dashed arrows indicate non-

significance. Absence of an arrow indicates that comparison was not done (see discussion in

Data Analysis).

	Insomnia	No Insomnia	Total
Australian	a	b	e
		<- --·-·->	
Vietnamese	c	d	f
		<-·--·--·->	

Sleep Plots - in relation to the perception of their <u>own sleep</u>

- For the Australian sample, no significant differences were found between the Insomnia and No Insomnia groups in relation to the perception of their <u>own sleep</u>.

- For the Vietnamese sample, significant differences were found between the Insomnia and No Insomnia groups in relation to the perception of their <u>own sleep</u>.

- For those with No Insomnia, no significant differences were found between Australian and Vietnamese samples in relation to the perception of their <u>own sleep</u>.

- Analysis of the Insomnia group also found no significant differences between the Australian and Vietnamese samples in relation to the perception of their <u>own sleep</u>.

- The results also revealed that neither ethnic group had many participants that chose the 'correct' answer (Non U Wake Shape). The results showed that most people

thought that it was the U Shape that was representative of a typical night's sleep for their <u>own sleep</u>.

- The presence of solid arrows in Table 3.32 below summarises where significant differences were found for the Sleep Plots in group comparisons. It can be seen that for the Sleep Plot for their <u>own sleep</u>, null hypothesis 2b was accepted.

Table 3.32

Summary of significant differences between groups for perception of their <u>own sleep</u> where solid arrows indicate significant differences and dashed arrows indicate non-significance. Absence of an arrow indicates that comparison was not done (see discussion in Data Analysis).

	Insomnia	No Insomnia	Total
Australian	a	b	e
Vietnamese	c	d	f

3.3 Phase Three: Comparison of sex differences between Vietnamese and Australian older adults on the ISI, DBAS16, SBS and Sleep Plots

Phase three of the study examined possible sex differences in the total sample (of older adult Vietnamese and Australians) on their sleep attitudes and beliefs as well as their level of insomnia. Due to the non-normality of the data (which were presented previously), a MANOVA could not be conducted and therefore, Mann-Whitney U tests were conducted for the ISI, DBAS16 and SBS. The use of non-parametric tests such as the Mann-Whitney U Test, was deemed unsuitable for analysis of the Sleep Plot because conceptually it is important to consider the group of dependent variables together for the Sleep Plot. Therefore, Fisher's Exact Tests and Chi Square Tests were used to compare males and females on the Sleep Plots. The aim is first to compare if there are any differences between males and females according to their scores on the Insomnia Severity Index (null hypothesis 3a).

3.3.1 Data screening for Insomnia Severity Index (ISI)

Prior to analysis, data screening revealed that the individual ISI scores were skewed and not normally distributed (results were previously presented above) therefore, a series of Mann-Whitney U tests were performed which are presented below.

3.3.2 Total males versus total females on ISI

The results indicated that there were no significant differences between males and females on ISI total scores. Please refer to Table 3.33 for the descriptive statistics and summary of analyses of the Mann-Whitney for each ISI item according to sex.

Table 3.33

Descriptive statistics and summary of analyses of the Mann-Whitney for each ISI item as a function of sex for both the Australian and

Vietnamese samples (entire sample) (indicates significant difference between insomnia status groups at p < 0.05).*

ISI Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1.* Difficulty falling asleep	1.31 (1.22)	1.81 (1.19)	3931.00	-2.99	0.01
2. Difficulty staying asleep	1.73 (1.11)	1.92 (1.16)	4683.50	-1.16	0.24
3. Problems waking up too early	1.69 (1.13)	1.80 (1.19)	4929.00	-0.56	0.57
4. How satisfied/dissatisfied are you with your current sleep pattern?	1.95 (1.07)	2.17 (1.12)	4628.50	-1.30	0.19
5. How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?	1.56 (1.26)	1.48 (1.30)	4951.50	-0.51	0.61
6. How worried/distressed are you about your current sleep problem?	1.51 (1.28)	1.70 (1.36)	4754.00	-0.99	0.32
7. To what extent do you consider your sleep problem to interfere with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) currently?	1.71 (1.26)	1.75 (1.35)	5101.00	-0.14	0.89
Total Scores	11.49 (7.17)	12.67 (7.41)	4698.00	-1.09	0.27

Note: Items on the ISI were scored on a 4-point Likert-type scale with 0 = low severity to 4 = high severity, SD = Standard Deviation

3.3.3 Data screening for DBAS16

Prior to analysis data screening revealed that the individual DBAS16 scores (which varied from 1-10) were not normally distributed (details above in phase 2) and therefore a Mann-Whitney U test was performed comparing males and females across the whole sample (Australian and Vietnamese).

3.3.4 Total males versus total females on DBAS16

The results indicated that there were no significant differences between males and females on DBAS16 total scores. Given this, the significant result for item 4 is not considered to be of importance. Please refer to Table 3.34 for the descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item according to sex.

Table 3.34

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of sex for both the Australian and Vietnamese

samples (entire sample)(* indicates significant difference between insomnia status groups at p < 0.05).

DBAS 16 Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1. I need 8 hours of sleep to feel refreshed and function well during the day.	7.25 (2.60)	7.55 (2.43)	4887.00	-0.75	0.45
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.	6.37 (3.16)	6.86 (3.04)	4742.00	-1.09	0.27
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	7.08 (3.19)	7.44 (3.13)	4681.00	-1.12	0.25
4. * I am worried that I may lose control over my abilities to sleep.	4.79 (3.64)	6.04 (3.50)	4223.00	-2.32	0.02
5. After a poor night's sleep, I know it will interfere with my activities the next day.	6.86 (2.95)	7.23 (2.85)	4820.00	-0.91	0.36
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.	4.43 (3.67)	4.63 (3.64)	5059.00	-0.34	0.73
7. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	5.94 (3.28)	5.77 (3.38)	5052.00	-0.35	0.72
8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	3.96 (3.18)	4.72 (3.52)	4594.00	-1.44	0.14
9. Without an adequate night's sleep, I can hardly function the next day.	5.12 (3.19)	5.88 (3.14)	4487.00	-1.69	0.09
10. I can't ever predict whether I'll have a good or poor night's sleep.	5.65 (3.25)	7.11 (3.05)	4895.00	-0.73	0.46
11. I have little ability to manage the negative consequences of disturbed sleep.	6.69 (3.15)	6.03 (3.14)	4841.00	-0.85	0.39
12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	6.22 (3.09)	6.52 (2.91)	4891.00	-0.60	0.55
13. I believe insomnia is essentially the result of a chemical imbalance.	5.29 (2.87)	5.30 (3.18)	5118.00	-0.05	0.95
14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	5.07 (3.51)	5.68 (3.47)	4672.00	-1.12	0.26
15. Medication is probably the only solution to sleeplessness.	4.28 (3.31)	4.53 (3.57)	4949.50	-0.46	0.64
16. I avoid or cancel obligations (social, family) after a poor night's sleep.	4.91 (2.48)	5.38 (2.62)	46.24.00	-1.23	0.22
Total Scores	89.88 (37.30)	96.76 (37.49)	4503.00	-1.38	0.16

Note: Items on the DBAS 16 were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

Post hoc analyses were also conducted, for completeness, examining possible sex differences on the DBAS 16 within each ethnic group and no significant differences were found (see Appendix H for further details).

3.3.5 Data screening for Sleep Beliefs Scale (SBS)

Prior to analysis data screening revealed that the individual SBS scores (which ranged from -1, 0 and 1) ranged in skewness and distribution. As before, the non-normality of the SBS data required a series of Mann-Whitney U tests.

3.3.6 Total males versus total females on SBS

The results indicated that there were no significant differences between males and females according to the SBS for the entire sample. Please refer to Table 3.35 for the descriptive statistics and summary of analyses of the Mann-Whitney for each SBS item according to sex.

Table 3.35

Descriptive statistics and summary of significance findings of the Mann-Whitney for each SBS item as a function of sex with the Australian and Vietnamese

samples (entire sample).

SBS Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1. Drinking alcohol in the evening	0.08 (0.85)	0.04 (0.760	4874.50	-0.42	0.67
2. Drinking coffee or other substances with caffeine after dinner	0.01 (0.87)	0.09 (0.86)	4805.00	-0.70	0.47
3. Doing intense physical exercise before going to bed	0.05 (0.79)	0.13 (0.82)	4688.50	-0.69	0.48
4. Taking a long nap during the day	-0.02 (0.89)	0.05 (0.88)	4808.00	-0.59	0.55
5. Going to bed and waking up always at the same hour	23.22 (151.45)	8.14 (90.83)	4790.00	-1.03	0.30
6. Thinking about one's engagements for the next day before falling asleep	-0.02 (0.79)	0.16 (0.85)	4385.00	-1.67	0.09
7. Using sleep medication regularly	-0.02 (0.83)	0.09 (0.85)	4546.50	-0.97	0.33
8. Smoking before falling asleep	-0.01 (0.74)	0.01 (0.80)	4837.00	-0.26	0.79
9. Diverting one's attention and relaxing before bedtime	23.27 (151.44)	16.43 (127.91)	4784.50	-1.04	0.29
10. Going to bed 2 hours later than the habitual hour	-0.17 (0.66)	0.77 (9.03)	4560.00	-1.35	0.17
11. Going to bed with an empty stomach	-0.01 (0.78)	-0.14 (0.81)	4582.50	-1.17	0.24
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	-0.03 (0.87)	-0.04 (0.84)	5025.00	-0.38	0.96
13. Trying to fall asleep without feeling tired	-0.07 (0.77)	0.79 (9.04)	4893.00	-0.48	0.63
14. Studying or working intensely until late at night	0.25 (1.37)	0.82 (9.04)	4680.00	-1.02	0.31
15. Getting up when it is difficult to fall asleep	23.18 (151.45)	8.31 (90.81)	4919.00	-0.71	0.47
16. Going to bed 2 hours earlier than the habitual hour	-0.11 (0.74)	0.09 (0.75)	4322.00	-1.85	0.06
17. Going to bed immediately after eating	-0.07 (0.81)	-0.02 (0.84)	4900.50	-0.36	0.72
18. Being worried about the impossibility of getting enough sleep	0.05 (0.87)	0.05 (0.89)	5003.00	-0.09	0.92
19. Sleeping in a quiet and dark room	23.17 (151.45)	16.48 (127.90)	5132.50	-0.17	0.89
20. Recovering lost sleep by sleeping for a long time	-0.02 (0.84)	0.04 (0.79)	4864.50	-0.55	0.58
Total Scores	-0.24 (8.62)	0.31 (9.43)	4582.50	-0.44	0.66

Note: Items on the SBS were scored on a 3-point Likert Scale (-1 = 'negative effect', 0 = 'neither effect', 1 = positive effect'), SD = Standard Deviation.

Again for completeness, post hoc analyses were conducted, examining possible sex differences on the SBS within each ethnic group and no significant differences were found (see Appendix I for further details).

3.3.7 Data screening for the Sleep Plots

As previously reported in the analyses of the Sleep Plots above, the data was not normally distributed but skewed. Therefore, a MANOVA could not be performed, but rather Chi Square and Fisher Exact Tests were conducted.

3.3.8 Perception of sleep for a <u>healthy 60 year old</u> *according to sex for Australian and Vietnamese samples (entire sample) on the Sleep Plots*

A Fisher's Exact Test (2X3) was conducted which revealed no significant difference were found between the frequencies reported across males and females with respect to the three different plot shape categories ($p = 0.58$; Fisher's Exact Test) for the sleep of a <u>healthy 60 year old</u>. The results also revealed that neither the male or female groups had many participants that chose the 'correct' answer (Non U Wake Shape), with only two male participants and one female participant drawing this shape out of a total of 161 participants. The descriptive data clearly shows that most people thought that it was the U Shape that was representative of a typical night's sleep for a <u>healthy 60 year old</u> with 83% representing this. Please refer to Table 3.36 which shows the frequencies for the three different categories between males and females concerning perceived sleep for a <u>healthy 60 year old</u>.

Table 3.36

Frequencies of different categories of sleep plots between males and females about

perception of sleep for a <u>healthy 60 year old</u> for the entire sample

		U Shape	Non U No Wake	Non U Wake	Total
Male	Count	53	11	2	66
	Expected Count	54.9	9.8	1.2	
Female	Count	81	13	1	95
	Expected Count	79.1	14.2	1.8	
Total	Count	134	24	3	161

3.3.9 Perception of one's <u>own sleep</u> according to sex for Australian and Vietnamese samples

(entire sample) on the Sleep Plots

Investigation into the participants reporting of their own sleep was also conducted using the

Chi Square Test (2X3) which revealed no significant differences were observed between

males and females according to their own perceived Sleep Plots ($X^2 = 2.53$, *df* = 2, *p* = 0.28*).*

The descriptive data continue to show that most people thought that it was the U Shape that

was representative of a typical night's sleep for themselves with 59.8% representing this.

Please refer to Table 3.37 which shows the frequencies for the three different categories

between males and females concerning their own perceived sleep.

Table 3.37

Frequencies of different categories of sleep plots between males and females about

perception of one's <u>own sleep</u> for the entire sample

		U Shape	Non U No Wake	Non U Wake	Total
Male	Count	38	17	13	68
	Expected Count	40.7	13.0	14.3	
Female	Count	62	15	22	99
	Expected Count	59.3	19	20.7	
Total	Count	100	32	35	167

Post hoc analyses were again conducted, for completeness, comparing males and females

within each ethnic group and are reported in Appendix J. No significant sex differences were

found within the Vietnamese and Australian samples for both the perception of sleep for a

<u>healthy 60 year old</u> and for their <u>own sleep</u>.

3.3.10 Summary of significant findings for Phase 3

Sex differences according to the Insomnia Severity Index

- Males and females did not differ on their ISI scores for the entire sample (null hypothesis 3a is accepted).

Sex differences according to sleep attitudes and beliefs

- There were no significant differences between males and females according to the DBAS16 for the entire sample (null hypothesis 3b accepted for DBAS 16). (Post hoc analyses, shown in Appendix H showed that there were also no significant differences within each of the Australian and the Vietnamese samples).

- There were also no significant differences between males and females according to the SBS for the entire sample (null hypothesis 3b accepted for SBS). Again post hoc analyses also showed no significant differences between sex for each of the different ethnic groups (Australian and Vietnamese) as shown in Appendix I.

- In relation the perception of sleep for a healthy 60 year old, no significant difference was found between the frequencies reported across males and females with respect to the three different plot shape categories for the entire sample (null hypothesis 3b accepted for Sleep Plot for a healthy 60 year old).

- No significant differences were found for males and females regarding the perception of their own sleep across the three different sleep plot categories for the whole sample (null hypothesis 3b accepted for the Sleep Plot for their own sleep).

- Appendix J shows post hoc analyses for the different ethnic groups as a function of sex and no significant differences were found for the perception of sleep for a <u>healthy 60 year old</u> as well as their <u>own sleep</u> between males and females.

- The results also revealed that neither the male or female groups had many participants that chose the 'correct' answer (Non U Wake Shape). The descriptive data clearly showed that most people thought that it was the U Shape that was representative of a typical night's sleep for a <u>healthy 60 year old</u> and also for their <u>own sleep</u>.

Chapter 4: Discussion

The discussion of Phase One, the development of the Vietnamese versions of the questionnaires used in this study is presented below in section 4.1. These included the Insomnia Severity Index (ISI), Athens Insomnia Scale (AIS), Dysfunctional Beliefs and Attitudes about Sleep Scale 16 (DBAS16), Sleep Beliefs Scale (SBS) and Sleep Plots. The Phase Two and Three discussion of hypotheses and findings are presented in sections 4.2 (ethnicity differences) and 4.3 (sex differences). These two parts each cover: (i) ISI (ii) DBAS16, (iii) SBS and (iv) Sleep Plots. Limitations and directions for future research and conclusions are discussed in sections 4.4 and 4.5, respectively.

4.1 Phase One: Translated Scales

4.1.1 Insomnia Severity Index (ISI-V and ISI-A)

The ISI-V is the Vietnamese version of the ISI and therefore sought to measure a person's level of insomnia. An exploratory factor analysis was performed which revealed one global factor indicating that the scale was measuring one issue with good internal consistency (α = 0.939). This was compared with the ISI-A (English version) which also found one global factor and also showed good internal consistency on the current Australian sample (α = 0.919). The results of the present study were consistent with previous research conducted by Bastien, Vallieres and Morin (2001) who also found one global factor and an internal consistency of α = 0.76. Bastien, Vallieres and Morin (2001) found one factor with item-total correlations ranging from r = 0.32 to r = 0.76. The correlation between the items for the ISI-V ranged from r = 0.53 to r = 0.88. The correlation between the items for the ISI-A ranged from

r = 0.51 to r = 0.77. The results revealed that the items were correlated with one another for both the ISI-V and ISI-A. Overall, the ISI-V and ISI-A showed good psychometric properties with overall higher reliability for the factors compared to that found by Bastien, Vallieres and Morin (2001).

4.1.2 Athens Insomnia Scale (AIS-V)

The AIS was only administered to the Vietnamese sample as it was used to validate the ISI-V in terms of its convergent validity, as the AIS also aims to measure an individual's insomnia status. An exploratory factor analysis was performed which revealed one global factor indicating that the scale was measuring one issue (level of insomnia) and had good internal consistency ($\alpha = 0.93$). The correlation between the items for the AIS-V ranged from r = 0.31 to r = 0.93. This was consistent with previous research conducted by Soldatos, Dimitris and Paqparrigopoulos (2000) who also found one global factor and an internal consistency of $\alpha = 0.89$ and their item-total correlations raged from r = 0.62 to r = 0.82. Overall, AIS-V showed good psychometric properties compared to those found by Soldatos, Dimitris and Paqparrigopoulos (2000).

To validate the ISI-V, the results were compared with that of the AIS-V through a Pearson correlation which revealed a strong correlation of r = 0.89, P < 0.001. This was consistent with previous research conducted by Jeong et. al., (2015), who evaluated the psychometric properties of the Athens Insomnia Scale (AIS) among 221 (207 men) South Korean firefighters and rescue workers. They reported a convergent validity between the AIS and ISI of r = 0.85, p < 0.001.

4.1.3 Dysfunctional Beliefs and Attitudes about Sleep Scale 16 (DBAS16-V and DBAS-A)

The DBAS16 is designed to test a participant's dysfunctional beliefs and attitudes about sleep. Results for both the Vietnamese and Australian samples showed good internal consistency and the items were reliable and closely related to each other. An exploratory factor analysis was performed which revealed four factors for both versions given to each of the Australian and Vietnamese groups and this was consistent with past research conducted by Morin, Vallieres and Ivers (2007) who also found four factors. However, closer examination revealed that the individual items in each of the four factors on both DBAS16-V and DBAS16-A were different to those found by Morin et al., (2007). Please refer to Appendix K for a comparison of the items on the DBAS 16 across the different factors between those reported by Morin, Vallieers and Ivers (2007) with those found in the Vietnamese and Australian samples.

The results indicated that both the Vietnamese and Australian samples' response patterns were different to those reported previously by Morin and his colleagues. The discrepancy in findings may be due to the different populations that were examined. Morin, Valliers and Ivers (2007) sampled a group of people ranging in age from 20 to 72 years with a mean age of 46.6 years. While the current study's sample group were older adults ranging in age from 60-89 years with a mean age of 65.50 years for the Vietnamese sample and 68.82 years for the Australian sample. Another reason for the different results may also be due to the participants recruited. The participants in the Morin et al., (2007) study all had a primary complaint of insomnia, whereas in the current study the participants were a community sample and not all were found to score in the insomnia range on the ISI.

4.1.4 Sleep Beliefs Scale (SBS-V and SBS-A)

The SBS is designed to test participants' sleep knowledge in terms of sleep hygiene behaviours and their influence on their quality and quantity of sleep. According to Adan et. al., (2006) the SBS comprised of three factors, item details of which are shown in Appendix L. While Adan et. al., (2006) found good item-total correlations and high internal reliability, they also found that the percentage of variance explained by their three factors was not high (35.33%), when tested on a sample of psychology university students.

In the present study, an exploratory factor analysis was performed on both the Vietnamese (SBS-V) and Australian (SBS-A) samples which revealed four factors for both samples but the results were not consistent with the research conducted by Adan et al., (2006). The results from the current study showed that both the SBS-V and SBS-A had good internal consistency for both samples and that the items were reliable and closely related to each other. Please refer to Appendix L for a comparison of the items on the SBS across the different factors between those reported by Adan et. al., (2006) with those found in the Vietnamese and Australian samples.

By examining both the Vietnamese and Australian samples, the response patterns of the participants were different to those reported by Adan et. al., (2006). There are possible reasons which may account for this discrepancy. Firstly, Adan et al., (2006) tested the scale on undergraduate psychology students who ranged in age from 18 to 33 years, whereas the current study administered the scales on a sample of older adults who ranged in age from 60 to 89 years. Secondly, Adan et al., (2006) found that the factors of the SBS only accounted

for 35.33% of the total sample variance, while the current study found that the factors on the SBS-V accounted for 53.48% of the total sample variance and the factors on the SBS-A accounted for 58.06% of the total sample variance. Finally, the issues and controversies of using exploratory factor analysis such as having an adequate sample size for a factor analysis, with larger sample sizes indicating more of a chance the results will be confirmed and reflect the true sample (Wilson VanVoorhis & Morgan, 2007; Garson, 2008). Adan et al., (2006) had 510 participants and the current study had 107 Australian and 100 Vietnamese participants.

4.2 Phase Two: Hypothesis Testing regarding Ethnicity

4.2.1 Difference between Vietnamese and Australian samples according to insomnia status on the Insomnia Severity Index (ISI)

The ISI is a measure of a person's perception of their insomnia. It focuses on subjective symptoms and consequences of insomnia in addition to the person's concerns or distress caused by those difficulties. It was hypothesised that there would be no significant difference in the insomnia status of Vietnamese and Australian older adult participants as measured by the Insomnia Status Index. The results indicated that the Vietnamese sample perceived their insomnia to be significantly higher compared to the Australian sample and therefore, the null hypothesis 2a was rejected. The Vietnamese sample reported more dissatisfaction with their sleep quality and they also reported that their poor sleep had a significant impact on their quality of life as well as their ability to perform their daily activities. The results also

indicated that the Vietnamese sample were significantly more worried about their sleep compared to the Australian sample.

It can be speculated that these differences in levels of insomnia may be due to cultural and/or ethnicity factors or socioeconomic (SES) factors/education level. With regard to the former possible future research could focus on collecting data from Vietnamese older adults living in Vietnam and comparing these to an Australian-Vietnamese sample to determine if these insomnia level differences are replicated. If insomnia differences with the Australian population are replicated for both these Vietnamese groups (with SES controlled) it might mean that the Vietnamese are more prone to insomnia. If they are not replicated for the group still living in Vietnam, then the current higher levels of insomnia in Vietnamese migrants may be a result of ongoing stresses of migration.

It is possible that the significant difference between the Vietnamese and Australian samples are due to SES factors and in particular educational level. As reported by Gellis et. al., (2005) and Paine et. al., (2004) SES factors and education levels are shown to have an impact on insomnia, with lower education levels associated with higher insomnia. As SES data was not collected in the current study, future research would need to include SES factors and education levels to further explore if these were discrepant between different ethnic groups and thus perhaps affected insomnia status between the two ethnic groups. Future research would need to replicate these findings between Vietnamese and Australian older adult participants with a larger sample size, and as far as possible control for SES status.

4.2.2 Difference between Insomnia and No Insomnia for the Australian sample on the

Dysfunctional Beliefs and Attitudes Scale 16 (DBAS16)

The DBAS16 was designed to measure misconceptions about the causes of insomnia, misattributions or amplification of its consequences, unrealistic sleep expectations, diminish perception of control and predictability of sleep as well as faulty beliefs about sleep-promoting practices.

Examination of the Australian sample in terms of their insomnia status revealed that significant differences were found on the DBAS16-A for those with Insomnia compared to those with No Insomnia. It was revealed that this difference occurred across the total score and on most of the items with those in the Insomnia group reporting more dysfunctional beliefs and attitudes about sleep compared to those with No Insomnia. It was found that those in the Insomnia group endorsed stronger beliefs about the negative consequences of insomnia, expressed more hopelessness about the fear of losing control of their sleep and more helplessness about its unpredictability. This is consistent with past research conducted by Morin et al., (1993). The results are similar to those reported by Morin, Vallieres and Ivers (2007) who investigated 283 participants who reported a primary complaint of insomnia. They reported that those participants who scored higher on the Insomnia Severity Index reported more dysfunctional beliefs and attitudes about sleep.

The findings of the study are also consistent with those reported by Ellis, Hampson and Cropley (2007) who investigated the dysfunctional beliefs and attitudes about sleep among

382 participants aged 50 years and over in England. They also found that those with insomnia reported more dysfunctional beliefs and attitudes about sleep overall than those without.

4.2.3 Difference between Insomnia and No Insomnia for the Vietnamese sample according on the DBAS16

The results for the Vietnamese sample in terms of their insomnia status also found significant differences between those in the Insomnia group compared to those in the No Insomnia group on the DBAS16-V for their total scores. Consistent with the above analysis, those in the Insomnia group reported more dysfunctional beliefs and attitudes about sleep compared to the No Insomnia group. The results indicated that for the Vietnamese sample, those in the Insomnia tended to endorse stronger beliefs related to 'Worry about sleep', 'Consequences of sleep' and 'Medications' compared to the No Insomnia group. There were also differences between these two groups in terms of their beliefs regarding 'Sleep expectations'.

The findings are supported by past research in English-speaking samples conducted by Morin et. al., (1993) and Ellis, Hampson and Cropley (2007) as mentioned above. The findings are also supported by those reported by Yang, Chou and Hsiao (2011) who investigated the association between dysfunctional sleep beliefs and attitudes to stress-related transient sleep disturbance in participants in Taiwan. They also found that poor sleepers showed more dysfunctional beliefs and attitudes compared to good sleepers in a non-English speaking sample.

4.2.4 Difference between Vietnamese and Australian samples according to the Insomnia and

No Insomnia groups on the Dysfunctional Beliefs and Attitudes Scale 16 (DBAS16)

Significant differences were found between the Vietnamese and Australian samples for both

the Insomnia and No Insomnia groups, therefore, the null hypothesis 2b was rejected. The

results indicated that for both groups, Vietnamese participants had more dysfunctional beliefs

and attitudes about their sleep compared to the Australian sample. The Vietnamese sample

reported more dysfunctional thoughts, misattributions of its consequences, unrealistic sleep

expectations, diminished perception of control and faulty beliefs about sleep practices

compared to the Australian sample for both the Insomnia and No Insomnia groups.

These differences between the Vietnamese and Australian samples in terms of their beliefs

and attitudes about sleep, *irrespective of their insomnia status*, should be considered as an

initial step for a more rigorous investigation of ethnic influences on beliefs about sleep in

Australia. Cross-ethnic variations in sleep belief profiles have potential implications for the

treatment of insomnia in individuals of different ethnic backgrounds (Clever & Bruck, 2013).

For example, Cognitive Behavioural Therapy treatment of insomnia includes a focus on

tackling dysfunctional beliefs about sleep and this aspect may need particular emphasis in

group or individual treatments of insomnia with relevant ethnic minorities.

It is possible that these significant findings between the Vietnamese and Australian samples

may be due to cultural or ethnicity factors or socioeconomic factors/education level. The

results showed that for both the Insomnia and No Insomnia groups significant differences

were reported between the two ethnic samples with the Vietnamese participants expressing

more dysfunctional beliefs and attitudes about sleep. The results are consistent with the idea that dysfunctional beliefs and attitudes about sleep could be culturally influenced. Some of the items on the DBAS 16 could be related to cultural beliefs and practices such as "I believe that insomnia is essentially the result of a chemical imbalance" and "medication is probably the only solution to sleeplessness".

It is also possible that SES factors and education levels may affect beliefs and attitudes about sleep. However, one study found some ethnic differences in beliefs and attitdes about sleep when SES was not a confounding factor. Clever and Bruck (2013) compared the cognitions of Australians with those of Zimbabwean and Ghanaian black immigrants using the DBAS 28, with no differences in SES factors between their participants. They found that the two black immigrant groups were significantly more likely to express dysfunctional views on the misconceptions about causes of insomnia theme compared to the Australian Caucasian group and concluded that this difference may arise from a lower awareness about possible causes of sleep problems in their country of origin.

It is suggested that future research would need to further explore this by controlling SES factors and educational level between the Vietnamese and Australian samples and see if these findings with regard to the DBAS16 can be replicated.

4.2.5 Difference between Insomnia and No Insomnia for the Australian sample according on the Sleep Beliefs Scale (SBS)

The SBS aims to evaluate knowledge about the behaviours that may influence the quality and/or quantity of sleep. The SBS explores an individual's knowledge in relation to the influence of drug consumption (caffeine, alcohol, nicotine, sleep medication) on sleep, diurnal behaviours (physical exercise and naps) on sleep as well as activities and thoughts previous to sleep (eating, studying, relaxing, worries). It is designed to assess an individual's sleep hygiene knowledge. It was hypothesised that there would be no significant differences among Vietnamese and Australian older adults according to their sleep hygiene knowledge as measured by the SBS-V and SBS-A.

Examination of the Australian sample in terms of their insomnia status revealed that there were no significant differences found on the SBS-A for those in the Insomnia group compared to those in the No Insomnia group. Therefore, those participants within the Australian Insomnia and No Insomnia groups had similar sleep hygiene knowledge.

4.2.6 Difference between Insomnia and No Insomnia for the Vietnamese sample according on the Sleep Beliefs Scale (SBS)

For the Vietnamese sample, the results also revealed no significant differences between those in the Insomnia group compared to those in the No Insomnia group according to their sleep hygiene knowledge.

The results for both the Australian and Vietnamese samples in terms of their sleep hygiene knowledge across both Insomnia and No Insomnia groups were consistent with one another and showed that sleep hygiene knowledge was not significantly different across insomnia status groups. These findings are similar to those reported by Voinescu, Coogan and Orasan (2010) who investigated the relationship between sleep hygiene knowledge, circadian typology and self-reported sleep quality and insomnia among 207 subjects, aged over 18 from Romania. The participants were classified into two groups, healthy and depressed. They found no statistically significant differences in sleep hygiene knowledge between those with Insomnia and those with No Insomnia in either the healthy or depressed groups.

4.2.7 Difference between Australian and Vietnamese samples on the Sleep Beliefs Scale (SBS)

The results indicated that there were significant differences between the Vietnamese and Australian samples according to their sleep hygiene knowledge (total SBS score) with the Vietnamese sample reporting poorer sleep hygiene knowledge, therefore the null hypothesis 2b is rejected for the SBS. It can be postulated that these differences could be due to, cultural factors and/or ethnicity or socioeconomic factors/educational level. Specific items on the SBS may be influenced by cultural factors and could affect sleep hygiene knowledge such as "taking a long nap during the day" and "using sleep medication regularly". For example, according to Nguyen (1985) self-medication is a popular medical behavior in Vietnam. Indiviuals do not need prescriptions to purchase medicines rather they are bought over the counter at pharmacies in Vietnam. Vietnamese people tend to use Western medicines as well as herbal medicines to treat their health problems.

It is speculated that the significant difference reported between the two ethnic groups are also possibly due to SES factors but more specifically educational level since most of the items on the SBS rely on knowledge of sleep hygiene practices. Voinescu & Szentagotai-Tatar (2015) assessed the sleep hygiene awareness and the self-reported quality of sleep among three age groups (young adults, adults and middle-aged adults). They found that young adults had significantly poorer sleep hygiene knowledge compared to adults and the middle-aged groups, which could be a consequence of sleep hygiene knowledge being learned as one gets older.

4.2.8 Difference as a function of both insomnia and ethnicity in the perception of sleep for a <u>*healthy 60 year old*</u>

Some differences were found between the Vietnamese and Australian samples according to the Sleep Plots. It was hypothesised that there would be no significant difference in the "shape" of sleep between Vietnamese and Australian older adults for both their perception of sleep for a <u>healthy 60 year old</u> and for their <u>own sleep</u>.

In relation to the perception of sleep for a <u>healthy 60 year old</u>, no significant differences were found between the Insomnia and No Insomnia groups for both the Australian and Vietnamese samples separately. However, significant differences were found between the frequencies reported by the Australian and Vietnamese samples across the three different sleep plot categories, irrespective of their insomnia groups, therefore the null hypothesis 2b was rejected for the perception of sleep for a <u>healthy 60 year old</u> as represented by the Sleep Plot. Interestingly, both ethnic groups perceived the shape of sleep to be a U Shape (83.2%

combined), followed by a Non U No Wake shape and then a Non U Wake Shape (correct answer). This is interesting given that a typical night's sleep consists of alternating stages of sleep with awakenings during the night (see section 1.2). These findings are higher than those reported by Bruck, Dolan and Lack (2015) who found that 70% of their participants plotted a U Shape sleep pattern indicating that the participants believed that the sleep of a healthy older adult is an unbroken deep sleep.

4.2.9 Difference as a function of both insomnia and ethnicity in the perception of their <u>own sleep</u>

The results regarding the perceptions about their <u>own sleep</u> pattern yielded no significant differences between the Insomnia and No Insomnia groups for the Australian sample. However, significant differences were found between the Insomnia and No Insomnia groups for the Vietnamese sample. Further analyses revealed no significant differences between the Vietnamese and Australian samples for both Insomnia comparisons (Australian versus Vietnamese) and No Insomnia ethnic group comparisons, therefore the null hypothesis 2b was accepted for the perception of their <u>own sleep</u> as represented on the Sleep Plot. The results show that in all of the above insomnia status or ethnic based groups most participants perceived their <u>own sleep</u> pattern to be a U Shape; that is their sleep is an unbroken deep sleep.

Interestingly, the significant difference reported by the Vietnamese sample between the Insomnia and No Insomnia groups indicated that more participants in the No Insomnia group than expected perceived their own sleep to be Non U No Wake shape, while more

participants than expected in the Insomnia group correctly perceived their own sleep to be Non U Wake shape. However, the results continue to show that most of the Vietnamese sample thought that it was the U Shape that was representative of a typical night's sleep for themselves with 60% plotting this.

This lack of understanding of the patterns of sleep may influence their own perceptions about their sleep quality. Therefore, they may attribute awakenings during the night to having insomnia rather than it being a normal part of the sleep cycle. Having limited knowledge about the normal stages of sleep, including phases of deeper and lighter sleep, and the normality of awakenings during the night may increase dysfunctional beliefs about sleep when these expectations are not met. Particularly, unrealistic expectations may increase an individual's vulnerability to developing distress about sleep patterns and this anxiety may lead to insomnia. Dysfunctional beliefs and attitudes about sleep are known to have an impact on insomnia and the findings in the current study highlights the need to target sleep education on what is 'normal' sleep and sleep expectations. Specifically, educating older adults on awakenings during the night, that is, that they are common and a normal occurrence during the night may be helpful. In addition, education about how a normal night of sleep consists of cycles of lighter and deeper sleep would also add to this knowledge and led to better understanding about sleep patterns.

4.3 Sex differences

Research has consistently shown that sex differences exist between males and females in terms of prevalence of insomnia, with females reporting higher rates of insomnia (Hale et. al.,

2009; Kim et. al., 2016). Sex differences in insomnia have been explained according to biological, psychological (such as depression and anxiety) and sociological perspectives (Jones & Czajkowski, 2000; Vitiello, Larsen & Moe, 2004; Taylor et. al., 2007 & Hale et. al., 2009). The current study explored if there were sex differences within the entire sample according to the ISI, DBAS 16, SBS and Sleep Plots. Post hoc analyses were also conducted between the Vietnamese and Australian samples regarding sex differences in these scales and are found in Appendix H, I and J. Post hoc analyses found no significant differences between the Vietnamese and Australian samples according to sex as measured by the ISI, DBAS 16, SBS and Sleep Plots.

4.3.1. Sex differences according to the ISI

There were no significant differences between the insomnia status of males and females found in the current study. Consequently, the null hypothsis 3a is accepted. This result is different to the majority of the literature where it is reported that females were more likely to describe higher insomnia and sleep disturbances compared to males (Kim et. al., 2016; Quan et. al., 2016; Chen et. al., 2005). The result is similar to the findings reported by Cao et. al., (2017) who conducted a meta analysis of the prevalence of insomnia in a Chinese population. They also reported no differences between males and females according to insomnia levels.

4.3.1 Sex differences according to the DBAS16

The results revealed that there were no sex difference between males and females according

to the DBAS16 for the entire sample and hence the null hypthosis 3b is accepted for the DBAS16.

The results are consistent with previous research from Joshi, Mishra, Dubey and Gupta (2015) who investigated the sleep patterns, prevalence of clinical insomnia and dysfunctional beliefs and attitudes about sleep among a group of medical students in India. They also found no sex differences between the dysfunctional beliefs and attitudes about sleep between males and females.

The finding is also similar to research conducted by Clever and Bruck (2013) who compared the cognitions of Australians with those of Zimbabwean and Ghanaian black immigrants using the DBAS 28. They also found no significant differences between males and females on the total scores of the DBAS 28. However, they did find significant differences between males and females when analysed according to different ethnic groups with regard to the *misattributions of consequences of insomnia* theme. They concluded that black Ghanaian males appeared to hold more dysfunctional beliefs on the *misattributions of consequences of insomnia* theme compared to Caucasian Australians and black Zimbabwean males. They reported that Zimbabwean females rated higher on the *misattributions of consequences of insomnia* theme compared to both Caucasian Australians and black Ghanaian females, suggesting that they held more dysfunctional cognitions about sleep.

The results of the current study are not consistent with research conducted by Ellis, Hampson and Cropley (2007) who investigated the dysfunctional beliefs and attitudes about sleep among 382 participants aged 50 years and over in England. They found that those with insomnia reported more dysfunctional beliefs and attitudes about sleep overall than good sleepers, with women more likely to report insomnia than men.

4.3.2 Sex differences according to the SBS

The results of the current study also revealed no significant sex differences between males and females on sleep hygiene knowledge, according to SBS total scores, therefore the null hypothesis 3b is accepted for the SBS.

The findings are similar to those reported by Voinescu, Coogan and Orasan (2010) who investigated the relationship between sleep hygiene knowledge, circadian typology and self-reported sleep quality and insomnia among 207 subjects, aged over 18 from Romania. They also found no sex differences according to the Sleep Beliefs Scales scores, indicating no differences between males and females on sleep hygiene knowledge.

This result is different from those reported by Adan et. al., (2006) who investigated that sleep hygiene knowledge of 510 psychology students ranging in age from 18 to 33 years old from Italy and Spain through the use of the Sleep Beliefs Scale. They found that men have more incorrect beliefs, especially related to "sleep-incompatible behaviours" (eg. going to bed and waking up always at the same time, recovering from lost sleep by sleeping longer) compared

to females. The differences in results may be due to the different ages of the samples investigated with Adan et al.'s age group being between 18 and 33 years, compared to participants in the current study being aged over 60 years.

The current findings are also different to those reported by Voinescu & Szentagotai-Tatar (2015) who assessed the sleep hygiene awareness and the self-reported quality of sleep among three age groups (young adults, adults and middle-aged adults) and to determine their relationship. They also found that women reported significantly better sleep hygiene knowledge compared to their male counterparts. This difference may be due to the smaller sample size and age differences reported in the current study compared to those reported by Voinescu & Szentagotai-Tatar (2015) who had 652 participants aged between 18 to 65 years. The current study had 207 particpants aged 60 to 89 years old.

4.3.3 Sex differences according to the Sleep Plots

In relation to the perception of sleep for a <u>healthy 60 year old</u> no significant differences were found between males and females concerning the frequencies reported with respect to the three different sleep plot shape categories (U Shape, Non U No Wake, Non U Wake) for the entire sample.

Similar results were found in relation to the perception of their <u>own sleep</u> with no significant differences being found between the frequencies reported by males and females for three

different sleep plot shape categories (U Shape, Non U No Wake, Non U Wake) with respect to the entire sample.

The results are consistent with previous research conducted by Bruck, Dolan and Lack (2015) who investigated the perception of sleep according to Sleep Plots between young adult and older adult groups. They also found that there were no sex differences between males and females according to the Sleep Plots for both age groups.

4.4 Limitations and directions for future research

One important strength of the current study is the translation and testing of psychometric properties of the Insomnia Severity Index, Athens Insomnia Scale, Dysfunctional Beliefs and Attitudes about Sleep Scale 16, Sleep Beliefs Scale and Sleep Plots into Vietnamese which has not been undertaken previously to the author's knowledge. However, cultural validity of questionnaire translations is an important issue which may have an impact of research findings and could be a limitation of any cross cultural investigation (Banville, Desrosiers & Genet-Volet, 2000). Cultural validity is the process of assessment development which considers the sociocultural context influences and the way in which the individual makes sense of questionnaire items. These sociocultural influences include the values, beliefs, experiences, communication patterns, teaching and learning styles, and epistemologies inherent in the individual's cultural backgrounds, as well as the socioeconomic conditions prevailing in their cultural groups (Solano-Flores & Nelson-Barber, 2001).

The present study relied on self-administration of questionnaires for volunteer participants to respond to. Questionnaire based studies have relatively low response rates, which may create bias. It can be argued that in a sleep survey, people who have sleep problems may be more likely to respond to a questionnaire about sleep. The current study had a relatively low response rate of 35.6% for the Australian sample and 40.0% for the Vietnamese sample. Considering that sleep problems are among the most frequent health complaints, the number of people with sleeping problems may have been over-represented in the current sample, leading to more respondents giving answers which are suggestive of more dysfunctional beliefs about sleep and higher levels of insomnia.

Another limitation of the study included the lack of questions related to socioeconomic status information which is a confounding factor affecting insomnia (Gellies et. al., 2005; Paine et. al., 2004). Also, details of medical conditions of the participants and medications that they may be taking could also have been collected. Considering the sample were older adults it would seem reasonable to postulate that these individuals may have comorbid medical conditions which may have had an effect on their emotional wellbeing and/or other forms of distress. Such distress may in turn have an impact on their sleep in diverse ways such as their experience of pain, worries about their health and use of medication which may promote or hinder sleep. Future research may consider comparing sleep beliefs between those with and without comorbid disorders.

The use of a different insomnia questionnaire which has less emphasis on subjective distress and concern about sleep patterns but focused more on the quantity and continuity of sleep

such as the Pittsburgh Sleep Quality Index (PSQI) (Buysee et. al., 1989) could have been used. The PSQI has been found to be related to Dysfunctional Beliefs and Attitudes about Sleep Scale (Yamadera et. al., 2013) and the Sleep Beliefs Scale (Waloszek et. al., 2015).

Overall, the current study provided new information about dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and perceptions of sleep comparing older adult Vietnamese and Australian samples. Given the lack of research comparing these two population groups, further research and replication of current findings are needed. This would add to a more comprehensive understanding of the unhelpful sleep attitudes and beliefs for different ethnic groups and aid in the understanding of cultural influences on sleep knowledge. By having such an understanding, it may help to prevent sleeping problems occurring through the development of appropriate education programs addressing factors known to impact on sleep – dysfunctional beliefs and attitudes, sleep perceptions and sleep hygiene knowledge. Additionally, such valuable information may assist health professionals in the treatment of sleep problems by addressing problematic cognitions related to sleep.

It may be of benefit or of interest for further research to examine the following issues:

- Investigate the dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and sleep perceptions of a younger population of Vietnamese migrants as the current study only investigated this for older adults of 60 years or older.
- Examine the sleep attitudes and beliefs of non-migrants living in Vietnam and comparing them to an Australian sample.

- Use of the Vietnamese translated questionnaires with clinical samples as the current study investigated a general community-based population.

- Investigate whether the differences found in this current study in terms of dysfunctional beliefs and attitudes between the Vietnamese and Australian samples may be confounded by socioeconomic factors.

- Longitudinally investigate the development of dysfunctional beliefs and attitudes about sleep among the Vietnamese migrants and their possible association with developing more severe sleeping problems.

- To compare first and second generation Vietnamese migrants in relation to their dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and sleep perceptions.

- Evaluation of education and prevention measures to address dysfunctional beliefs and attitudes about sleep among the Vietnamese and Australian older adult populations.

4.5 Summary and Conclusions

This is the first study, to the author's knowledge, conducted which examined the dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and sleep perceptions between older adult Vietnamese migrants and Australians. The questionnaires used in the study included the Insomnia Severity Index, Athens Insomnia Scale, Dysfunctional Beliefs and Attitudes about Sleep Scale 16, Sleep Beliefs Scale and Sleep Plots. All questionnaires were professionally translated into Vietnamese and the Back Translation Method (Brislin, 1970) was implemented which is a widely used process and recommended by researchers from various countries (Suleiman & Yates, 2011; Dhyani,

Rajput & Gupta, 2013). All questionnaires showed good psychometric properties with good internal reliability and correlations. The convergent validity of the Insomnia Severity Index was supported by the Athens Insomnia Scale. These translated questionnaires add to the research literature and can be used with Vietnamese populations in the future.

The current study found significant differences between the Vietnamese and Australian samples. Key findings included the Vietnamese sample reporting more insomnia, had more dysfunctional beliefs and attitudes about sleep, had poorer sleep hygiene knowledge and perceived the sleep pattern of a healthy 60 year old to be different to the Australian sample. As insomnia levels were controlled as far as possible, it is speculated that these differences may be related to cultural factors and/or ethnicity or SES factors. However, these findings need to be further explored with a larger sample size as well as identifying and controlling SES factors.

More specifically, the study adds to the currently very small research literature about the perceptions of sleep as described with the Sleep Plots. Once again, future research using this tool would benefit from using a larger sample size to increase the statistical power of the analyses as well as considering whether SES factors may be important in Sleep Plot responses.

Interestingly, the study found that the majority of participants irrespective of their ethnicity or insomnia status, perceived the sleep of a healthy 60 year old as well as their own sleep to be a

U shape with no awakenings during the night. This lack of understanding and unrealistic expectation could result in them wrongly attributing awakenings to being a poor sleeper when in fact awakenings during the night are a normal part of the sleep cycle (Pilcher, 2015). The finding highlights the need to educate older adults about the normal process of the sleep cycle as well as tailoring treatments for insomnia to include psychoeducation about the sleep cycle as well as correct sleep hygiene knowledge and practices.

The study also found no significant differences between males and females across the entire sample regarding their level of insomnia, dysfunctional beliefs and attitudes about sleep, sleep hygiene knowledge and perceptions of sleep. These findings are in contrast with previous research who found that females reported higher levels of insomnia and warrant replication.

Overall, the study adds to the research about sleep within the Vietnamese population group. The results suggest that education related to the impact of dysfunctional attitudes about sleep and sleep hygiene need to be implemented with Vietnamese older adults as they have distorted views about sleep. Psychoeducation with the Vietnamese population, compared to the Australian population, would need to place greater emphasis on the consequences of insomnia, worry about sleep, expectations of sleep and medication use, as the Vietnamese sample had higher scores on all of the individual items on the DBAS 16 compared to the Australian sample. For example, the psychologist could explore with the client their beliefs about medication use to improve sleep and if improved sleep could be achieved through other behaviours such as relaxation strategies (eg. imagery, progressive muscle relaxation) or

changing the individual's cognitions (eg. 'I need 8 hours of sleep to feel refreshed and fuction well the next day' could be reframed into 'I have functioned on less than 8 hours of sleep before' or 'I feel that insomnia is ruining my ability to enjoy life and prevents me from doing what I want' could be reframed into 'my ability to enjoy life is related to other factors, such as my relationships with my family and friends, and not just to insomnia'). Education targeted to this population may start to change widespread faulty beliefs about sleep and therefore may be helpful in the prevention and treatment of insomnia for Vietnamese older adults. Education would also need to target an individual's perceptions about the sleep cycle, indicating that there are wake periods during a normal night's sleep. Education may also need to consider the most culturally appropriate way of delivering the education with regard to venue (clinical/community), individual/group/family based and the role of the educator (doctor/ nurse/Vietnamese community member).

There is also literature about how counselling and mental health therapies across diverse cultures needs to be mindful of different values and beliefs that exist in these different cultures. Examples of these values and beliefs between Western and Asian cultures include *individualism* in Western cultures compared to *family centred* in Asian cultures. Western cultures also value verbal/emotional/behavioural expressiveness compared to restraint of feelings and lack of emotional expression in Asian cultures. Bidirectional communication between client and psychologist tends to occur more in Western cultures compared to a more directive approach from authority figures such as advice seeking in Asian cultures (Sue & Sue, 2013). For example, in Asian cultures it is considered that having dysfunctional values and belief systems (eg. not being able to cope with poor sleep) are handicaps that need to be

overcome and are a source of shame. These aspects could be futher explored in future research.

Through my work as a psychologist counselling predominantly Vietnamese clients and, being Vietnamese myself, has allowed me to understand the culture first hand. It can be speculated that the cultural factors which may have an influence on the higher DBAS scores reported by the Vietnamese sample could be that the Vietnamese culture focuses more on a medical model and Vietnamese people tend to somatise their psychological problems. They may attribute their psychological distress as a physical symptom (eg. poor sleep) and struggle to make connections about the possibility that their psychological distress may have resulted in their insomnia. This has been observed consistently through my own private practice working with Vietnamese clients.

Another cultural factor which can be speculated to have an impact on the higher DBAS scores is the belief in Vietnamese culture of harmony and balance to life. Therefore, any disruptions to these beliefs may lead the individual to misattribute their sleep problems to whatever they deem to have disrupted the balance. Alternatively, they may believe that once this balance is disrupted there will be a negative impact on their well-being or sleep the next day or for a few days.

The findings from the current study adds to the overall body of research on sleep suggesting that sleep education needs to target dysfunctional beliefs and attitudes about sleep, creating

realistic expectations and increasing sleep hygiene knowledge. Such education is likely to reduce the development of sleep problems. Clinicians have long understood that an important part of therapy for insomnia is addressing the dysfunctional cognitions about sleep. With accurate knowledge and realistic cognitions, this will help to reduce anxiety and distress about sleep disturbances and decrease the likelihood of people developing more severe sleep difficulties.

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Appendix A: Information to Participants

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INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate

You are invited to participate in a research project entitled: **Comparison of sleep attitudes and beliefs among Vietnamese-Australian migrants and Australians with and without insomnia**.

This project is being conducted by a student researcher Sandra Nguyen as part of a Doctorate in Psychology (Clinical Psychology) course and Paul Iannacone, as part of an Honours course in Psychology. Both are under the supervision of Professor Dorothy Bruck from the College of Arts, Victoria University.

Project explanation

Previous research suggests that a variety of faulty beliefs, expectations, and attributions about sleep are influential in causing or continuing poor sleep. The purpose of the study is to compare the perceptions of elderly Vietnamese-Australian migrants with Australians in their beliefs and attitudes about sleep.

What will I be asked to do?

If you agree to participate in this research you will be required to complete four anonymous questionnaires, a sleep plot task and demographic details. All tasks in total will take approximately 15 minutes of your time. The questionnaires will ask you to rate your agreement/disagreement with a list of sleep related statements and tick the response you think best describes the effect a behaviour has on sleep as well as your own sleep. The sleep plot will ask you to draw two graphs of normal sleep patterns, one for a healthy person and one for your own. If you decide to participate in this research you may complete the tasks when given to you or place them in the replied paid envelope and post them to the researcher.

Who can participate?

You are eligible to be part of this study if you are aged over 60 years and are in one of the following groups:

1. Born in Vietnam
   OR
2. Born in an English speaking country, and
   have lived in Australia since the age of at least 15, and
   do NOT identify as an Aboriginal or Torres Strait Islander.

What will I gain from participating?

While we do not anticipate that you, as an individual, will receive any benefits from your participation in this project, this research will help those working in the health professions understand more about people's beliefs about what constitutes 'good' sleep and how these may be affected by culture.

How will the information I give be used?

All surveys will remain confidential. **As a participant you are NOT required to disclose your name**. The information that participants provide will be used in this study and possibly future studies, which may be published. Participant data will be stored in line with ethical guidelines set out by Victoria University.

By completing and returning the questionnaires, it is implied that you have given consent for your data to be used and reported as a group.

What are the potential risks of participating in this project?

This research poses minimal risks, however if at any time while participating in this study you feel discomfort or anxiety please feel free to cease completing the questionnaires and withdraw your participation. Withdrawal from the study will have no negative consequences, as you only consent to participate upon returning the questionnaires to the researcher. If you feel any significant anxiety about your own sleep and/or wellbeing we encourage you to contact your local doctor.

How will this project be conducted?

The data will be collected, and using a statistical package, will be analysed and compared to other participants within the study.

Who is conducting the study?

This study is being conducted through Victoria University. If you have any queries regarding your participation in this study please feel free to contact the Principal Research or Student Researcher on the contact details provided below:

Principal Researcher:
Professor Dorothy Bruck
Email: Dorothy.bruck@vu.edu.au
Phone: 9919 2158

Student Researchers:
Sandra Nguyen
Email: sandra.nugyen1@students.vu.edu.au
Phone: 0408662990

Any queries about your participation in this project may be directed to the Principal Researcher listed above.
If you have any queries or complaints about the way you have been treated, you may contact the Secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001 phone (03) 9919 4781.

Appendix B: Dysfunctional Beliefs and Attitudes about Sleep Scale 16

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 <u>personal</u> <u>belief</u>. 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 it will interfere with my activities 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 |

8. When I sleep poorly 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 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 |

Appendix C: Insomnia Severity Index

For each question, please CIRCLE the number that best describes your answer. Please rate the CURRENT (i.e. LAST 2 WEEKS) SEVERITY of your insomnia problem(s).

Insomnia Problem	None	Mild	Moderate	Severe	Very Severe
1. Difficulty falling asleep	0	1	2	3	4
2. Difficulty staying asleep	0	1	2	3	4
3. Problems waking up too early	0	1	2	3	4

4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?

Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied
0	1	2	3	4

5. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?

Not at all Noticeable	A Little	Somewhat	Much	Very Much Noticeable
0	1	2	3	4

6. How WORRIED/DISTRESSED are you about your current sleep problem?

Not at all Worried	A Little	Somewhat	Much Very	Much Worried
0	1	2	3	4

7. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytimefatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?

Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering
0	1	2	3	4

Appendix D: Sleep Beliefs Scale

This is a survey of the effects of selected behaviours upon sleep. We are interested in knowing your opinion about whether any of these behaviours may influence the quality and/or quantity of sleep. For the following list of behaviours, please indicate whether you believe they produce a 'positive' effect, a 'negative' effect, or 'neither' effect on sleep. Please do not make reference to how they influence your sleep in particular, but to **the effects you think these behaviours have on people in general**. Please answer ALL the statements by ticking the appropriate box, even if you are not completely sure of the answer.

	Positive effect	Neither effect	Negative effect
1. Drinking alcohol in the evening			
2. Drinking coffee or other substances with caffeine after dinner			
3. Doing intense physical exercise before going to bed			
4. Taking a long nap during the day			
5. Going to bed and waking up always at the same hour			
6. Thinking about one's engagements for the next day before falling asleep			
7. Using sleep medication regularly			
8. Smoking before falling asleep			
9. Diverting one's attention and relaxing before bedtime			
10. Going to bed 2 hours later than the habitual hour			
11. Going to bed with an empty stomach			
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities			
13. Trying to fall asleep without feeling tired			
14. Studying or working intensely until late at night			
15. Getting up when it is difficult to fall asleep			
16. Going to bed 2 hours earlier than the habitual hour			
17. Going to bed immediately after eating			
18. Being worried about the impossibility of getting enough sleep			
19. Sleeping in a quiet and dark room			
20. Recovering lost sleep by sleeping for a long time			

Appendix E: Athens Insomnia Scale

Instructions: This scale is intended to record your own assessment of any sleep difficulty you might have experienced. Please, check (by circling the appropriate number) the items below to indicate your estimate of any difficulty, provided that it occurred at least three times per week during the last month.

Sleep induction (time it takes you to fall asleep after turning-off the lights)

| 0: No problem sleep at all | 1: Slightly delayed | 2: Markedly delayed | 3: Very delayed or did not |

Awakenings during the night

| 0: No problem sleep at all | 1: Minor problem | 2: Considerable problem | 3: Serious problem or did not |

Final awakening earlier than desired

| 0: Not earlier at all | 1: A little earlier | 2: Markedly earlier | 3: Much earlier or did not sleep |

Total sleep duration

| 0: Sufficient sleep at all | 1: Slightly insufficient | 2: Markedly insufficient | 3: Very insufficient or did not |

Overall quality of sleep (no matter how long you slept)

| 0: Satisfactory not sleep at all | 1: Slightly unsatisfactory | 2: Markedly unsatisfactory | 3: Very unsatisfactory or did |

Sense of well-being during the day

| 0: Normal | 1: Slightly decreased | 2: Markedly decreased | 3: Very decreased |

Functioning (physical and mental) during the day

| 0: Normal | 1: Slightly decreased | 2: Markedly decreased | 3: Very decreased |

Sleepiness during the day

| 0: None | 1: Mild | 2: Considerable | 3: Int |

Appendix F: Sleep Plot

1a. Show us your understanding of the nature of a **normal night of sleep for a healthy 60 year old**. Please do this by drawing a continuous line in the box below across the normal night time period. Start the line at the X in the upper left corner, representing the start of the night's sleep, and stop the line at the X in the upper right hand corner of the box, representing awakening in the morning. The dashed horizontal line between awake above and sleep below marks the transition point between awake and asleep. The darker bands indicate deeper sleep. With this continuous line indicate your understanding of the progress through the night of a **normal sleep of a healthy 60 year old**.

Awake X	**X Awake**

Asleep

Light Sleep

Deep Sleep

Very Deep

1b. Now please show us your understanding of the nature of **your own typical night's sleep**. Think about how you have slept over the last two weeks. Please do this using the same method of drawing as in the above sleep plot, however the continuous line should indicate your **own typical sleep**.

Awake X	**X Awake**
Asleep	
Light Sleep	
Deep Sleep	
Very Deep	

Appendix G: Ethics Approval Letter (by email)

Dear PROF DOROTHY BRUCK,

Your ethics application has been formally reviewed and finalised.

» Application ID: HRE15-011

» Chief Investigator: PROF DOROTHY BRUCK

» Other Investigators: MS Sandra Nguyen

» Application Title: Comparison of sleep attitudes and beliefs among Vietnamese-Australian migrants and Australians with and without insomnia.

» Form Version: 13-07

The application has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)' by the Victoria University Human Research Ethics Committee. Approval has been granted for two (2) years from the approval date; 02/04/2015.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date or upon the completion of the project (if earlier). A report proforma may be downloaded from the Office for Research website at: http://research.vu.edu.au/hrec.php.

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment. It should also be noted that it is the Chief Investigators' responsibility to ensure the research project is conducted in line with the recommendations outlined in the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007).'

On behalf of the Committee, I wish you all the best for the conduct of the project.

Secretary, Human Research Ethics Committee

Phone: 9919 4781 or 9919 4461

Email: researchethics@vu.edu.au

Appendix H: Post hoc analysis of sex differences between the Vietnamese and Australian samples according to the DBAS 16

The following post hoc analyses were conducted to investigate if there were sex differences for the Australian and Vietnamese samples separately according to the Dysfunctional Beliefs and Attitudes about Sleep Scale 16.

Australian males versus Australian females on DBAS16

The results indicated that there were no significant differences between males and females according to the DBAS16 for the Australian sample. The following shows the descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item according to sex for the Australian sample.

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of sex for the Australian sample

DBAS 16 Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1. I need 8 hours of sleep to feel refreshed and function well during the day.	6.16 (2.69)	6.52 (2.50)	1310.50	-0.72	0.41
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.	5.34 (3.17)	6.05 (3.18)	1245.00	-1.12	0.25
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	5.57 (3.32)	5.66 (3.24)	1375.00	-0.13	0.89
4. I am worried that I may lose control over my abilities to sleep.	2.70 (2.59)	3.56 (3.22)	1252.00	-1.09	0.27
5. After a poor night's sleep, I know it will interfere with my activities the next day.	5.44 (2.87)	5.56 (2.92)	1380.00	-0.28	0.78
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.	3.42 (3.44)	2.92 (3.05)	1308.50	-0.73	0.46
7. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	4.28 (2.89)	3.82 (2.89)	1288.00	-0.85	0.39
8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	2.10 (1.97)	2.36 (2.46)	1397.50	-0.17	0.86
9. Without an adequate night's sleep, I can hardly function the next day.	3.50 (2.77)	4.05 (2.88)	1276.00	-0.93	0.34
10. I can't ever predict whether I'll have a good or poor night's sleep.	5.40 (3.02)	5.36 (3.27)	1413.50	-0.07	0.94
11. I have little ability to manage the negative consequences of disturbed sleep.	4.16 (2.66)	4.21 (2.82)	1414.50	-0.06	0.95
12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	4.80 (2.99)	4.91 (2.87)	1384.00	-0.25	0.79
13. I believe insomnia is essentially the result of a chemical imbalance.	4.12 (2.51)	3.75 (2.70)	1317.00	-0.69	0.49
14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	2.90 (2.40)	2.64 (2.37)	1320.50	-0.66	0.51
15. Medication is probably the only solution to sleeplessness.	2.84 (2.73)	2.52 (2.81)	1305.50	-0.75	0.45
16. I avoid or cancel obligations (social, family) after a poor night's sleep.	3.91(1.30)	3.91 (1.51)	1381.50	-0.27	0.78
Total Scores	66.35 (25.52)	67.88 (28.72)	1396.00	-0.01	0.99

Note: Items on the DBAS 16 were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

Vietnamese males versus Vietnamese females on DBAS16

The results indicated that there were no significant differences between males and females according to the DBAS16 for the Vietnamese sample. The following shows the descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item according to sex for the Vietnamese sample.

Descriptive statistics and summary of analyses of the Mann-Whitney for each DBAS 16 item as a function of sex for the Vietnamese sample

DBAS 16 Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1. I need 8 hours of sleep to feel refreshed and function well during the day.	8.77 (1.49)	8.46 (1.98)	1112.00	-0.30	0.76
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.	7.80 (2.58)	7.59 (2.73)	1102.50	-0.36	0.71
3. I am concerned that chronic insomnia may have serious consequences on my physical health.	9.13 (1.33)	9.03 (1.98)	1120.00	-0.26	0.79
4. I am worried that I may lose control over my abilities to sleep.	7.69 (2.81)	8.25 (1.89)	1078.00	-0.55	0.58
5. After a poor night's sleep, I know it will interfere with my activities the next day.	8.83 (1.63)	8.73 (1.77)	1114.50	-0.28	0.77
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.	5.83 (3.58)	6.15 (3.46)	1093.00	-0.42	0.67
7. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.	8.25 (2.24)	7.51 (2.81)	990.00	-1.19	0.23
8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.	6.55 (2.71)	6.82 (2.95)	1079.00	-0.53	0.59
9. Without an adequate night's sleep, I can hardly function the next day.	7.38 (2.22)	7.51 (2.39)	1091.00	-0.44	0.65
10. I can't ever predict whether I'll have a good or poor night's sleep.	8.50 (2.67)	8.67 (1.72)	1082.00	-0.54	0.58
11. I have little ability to manage the negative consequences of disturbed sleep.	7.72 (2.57)	7.65 (2.46)	1117.50	-0.25	0.79
12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.	8.25 (1.86)	7.96 (2.09)	1026.00	-0.70	0.48
13. I believe insomnia is essentially the result of a chemical imbalance.	6.97 (2.52)	6.68 (2.94)	1069.50	-0.37	0.70
14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.	8.17 (2.33)	8.39 (1.47)	1059.00	-0.46	0.64
15. Medication is probably the only solution to sleeplessness.	6.34 (2.97)	6.32 (3.22)	1101.00	-0.14	0.88
16. I avoid or cancel obligations (social, family) after a poor night's sleep.	6.34 (3.03)	6.68 (2.72)	1071.00	-0.36	0.71
Total Scores	122.82 (23.70)	122.48 (22.77)	1101.00	-0.13	0.88

Note: Items on the DBAS 16 were scored on a 10-point Likert-type scale with 0 = strongly disagree to 10 = strongly agree, SD = Standard Deviation

Appendix I: Post hoc analysis of sex differences between the Vietnamese and Australian samples according to the SBS

The following post hoc analyses were conducted to investigate if there were sex differences for the Australian and Vietnamese samples separately according to the Sleep Beliefs Scale.

Australian males versus Australian females on the SBS

The results indicate that there were no significant differences between males and females on SBS total scores. The following shows the descriptive statistics and summary of analyses of the Mann-Whitney for each SBS item according to sex for the Australian sample.

Descriptive statistics and summary of significance findings of the Mann-Whitney for each SBS item as a function of sex for the Australian sample (* indicates significant difference between sex groups).

SBS Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1. Drinking alcohol in the evening	0.16 (0.86)	0.08 (0.68)	1328.50	-0.64	0.52
2. Drinking coffee or other substances with caffeine after dinner	0.12 (0.87)	0.26 (0.79)	1305.00	-0.80	0.42
3. Doing intense physical exercise before going to bed	-0.16 (0.73)	0.07 (0.82)	1201.00	-1.48	0.13
4. Taking a long nap during the day	0.12 (0.87)	0.29 (0.80)	1271.00	-1.03	0.29
5. Going to bed and waking up always at the same hour	0.18 (0.71)	0.05 (0.83)	1311.00	-0.75	0.44
6. Thinking about one's engagements for the next day before falling asleep	0.04 (0.78)	0.31 (0.80)	1146.00	-1.86	0.06
7. Using sleep medication regularly	0.00 (0.83)	0.26 (0.79)	1177.50	-1.64	0.09
8. Smoking before falling asleep	0.12 (0.68)	0.26 (0.66)	1267.50	-1.08	0.27
9. Diverting one's attention and relaxing before bedtime	0.38 (0.77)	0.31 (0.86)	1395.00	-0.21	0.83
10. * Going to bed 2 hours later than the habitual hour	-0.16 (0.65)	0.14 (0.69)	1097.00	-2.25	0.02
11. Going to bed with an empty stomach	0.22 (0.73)	0.12 (0.78)	1332.00	-0.63	0.53
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	0.20 (0.88)	0.28 (0.79)	1370.00	-0.37	0.71
13. Trying to fall asleep without feeling tired	0.06 (0.73)	0.33 (0.69)	1139.00	-1.93	0.05
14. Studying or working intensely until late at night	0.44 (1.61)	0.35 (0.81)	1363.50	-0.42	0.67
15. * Getting up when it is difficult to fall asleep	-0.08 (0.77)	0.24 (0.78)	1104.00	-2.18	0.03
16. * Going to bed 2 hours earlier than the habitual hour	0.04 (0.78)	0.38 (0.59)	1083.00	-2.32	0.02
17. Going to bed immediately after eating	0.18 (0.82)	0.33 (0.76)	1285.00	-0.94	0.34
18. Being worried about the impossibility of getting enough sleep	0.24 (0.84)	0.33 (0.78)	1349.50	-0.51	0.60
19. Sleeping in a quiet and dark room	0.24 (0.87)	0.33 (0.83)	1347.00	-0.53	0.59
20. Recovering lost sleep by sleeping for a long time	-0.08 (0.82)	0.05 (0.74)	1292.50	-0.88	0.37
Total Scores	2.26 (8.83)	4.82 (9.06)	1161.50	-1.64	0.10

Note: Items on the SBS were scored on a 3-point Likert Scale (-1 = 'negative effect', 0 = 'neither effect', 1 = positive effect'), SD = Standard Deviation.

Vietnamese males versus Vietnamese females on the SBS

The results indicate that there were no significant differences between males and females according to all the items on the SBS for the Vietnamese sample. The following shows the descriptive statistics and summary of analyses of the Mann-Whitney for each SBS item according to sex for the Vietnamese sample.

Descriptive statistics and summary of significance findings of the Mann-Whitney for each SBS item as a function of sex for the Vietnamese sample

SBS Items	Male Mean (SD)	Female Mean (SD)	U	Z	P
1. Drinking alcohol in the evening	-0.03 (0.83)	0.00 (0.82)	1050.00	-0.16	0.86
2. Drinking coffee or other substances with caffeine after dinner	0.14 (0.85)	-0.04 (0.89)	1024.00	-0.51	0.60
3. Doing intense physical exercise before going to bed	0.38 (0.77)	0.19 (0.83)	912.50	-1.05	0.29
4. Taking a long nap during the day	-0.23 (0.85)	-0.17 (0.85)	1028.50	-0.34	0.72
5. Going to bed and waking up always at the same hour	55.22 (232.14)	15.35 (124.90)	1138.00	-0.11	0.91
6. Thinking about one's engagements for the next day before falling asleep	-0.12 (0.80)	0.03 (0.87)	970.00	-0.81	0.41
7. Using sleep medication regularly	-0.06 (0.84)	-0.06 (0.87)	1005.00	-0.03	0.98
8. Smoking before falling asleep	-0.21 (0.78)	-0.21 (0.85)	1011.50	-0.09	0.92
9. Diverting one's attention and relaxing before bedtime	55.08 (232.18)	30.78 (175.27)	1130.00	-0.17	0.86
10. Going to bed 2 hours later than the habitual hour	-0.21 (0.66)	1.34 (12.42)	1088.00	-0.00	1.00
11. Going to bed with an empty stomach	-0.35 (0.73)	-0.38 (0.77)	1035.00	-0.30	0.76
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities	-0.38 (0.73)	-0.33 (0.78)	1044.00	-0.22	0.82
13. Trying to fall asleep without feeling tired	-0.26 (0.79)	1.20 (12.44)	1028.50	-0.48	0.62
14. Studying or working intensely until late at night	-0.03 (0.86)	1.25 (12.43)	920.50	-1.34	0.17
15. Getting up when it is difficult to fall asleep	55.50 (232.07)	15.50 (124.89)	1025.50	-0.96	0.33
16. Going to bed 2 hours earlier than the habitual hour	-0.32 (0.63)	-0.17 (0.79)	977.50	-0.76	0.44
17. Going to bed immediately after eating	-0.44 (0.66)	-0.35 (0.84)	1052.00	-0.16	0.87
18. Being worried about the impossibility of getting enough sleep	-0.23 (0.85)	-0.19 (0.91)	1053.00	-0.15	0.88
19. Sleeping in a quiet and dark room	55.02 (232.19)	30.87 (175.25)	1082.50	-0.55	0.57
20. Recovering lost sleep by sleeping for a long time	0.06 (0.88)	0.03 (0.85)	1068.00	-0.15	0.87
Total Scores	-4.15 (6.70)	-4.06 (7.57)	926.50	-0.14	0.88

Note: Items on the SBS were scored on a 3-point Likert Scale (-1 = 'negative effect', 0 = 'neither effect', 1 = positive effect'), SD = Standard Deviation.

Appendix J: Post hoc analysis of sex differences between the Vietnamese and Australian samples according to the Sleep Plots

The following post hoc analyses were conducted to investigate if there were sex differences for the Australian and Vietnamese samples separately according to the perception of sleep for a <u>healthy 60 year old</u> as well as their <u>own sleep</u>.

Perception of sleep for a <u>healthy 60 year old</u> according to sex for the Australian sample on the Sleep Plots

A Fisher's Exact Test (2X3) was conducted which revealed no significant difference were found between the frequencies reported across males and females for the Australian sample with respect to the three different plot shape categories ($p = 0.84$; Fisher's Exact Test) for the perception of sleep for a <u>healthy 60 year old</u>. The results also revealed that neither the male or female groups had many participants that chose the 'correct' answer (Non U Wake Shape), with only 2 male participants and 1 female participant drawing this shape out of a total of 88 participants. The descriptive data clearly shows that most people thought that it was the U Shape that was representative of a typical night's sleep for a <u>healthy 60 year old</u> with 76.1% representing this. The following shows the frequencies for the three different categories between males and females concerning perceived sleep for a <u>healthy 60 year old</u> for the Australian sample.

Frequencies of different categories of sleep plots between males and females about perception of sleep for a <u>healthy 60 year old</u> for Australians

		U Shape	Non U No Wake	Non U Wake	Total
Male	Count	33	10	2	45
	Expected Count	34.3	9.2	1.5	
Female	Count	34	8	1	43
	Expected Count	32.7	8.8	1.5	
Total	Count	67	18	3	88

Perception of sleep for a <u>healthy 60 year old</u> according to sex for the Vietnamese sample on the Sleep Plots

A Fisher's Exact Test (2X2) was conducted which revealed no significant difference were found between the frequencies reported across males and females for the Vietnamese sample with respect to the three different plot shape categories ($p = 0.66$; Fisher's Exact Test) for the sleep of others. The results also revealed that neither the male or female groups had any participants that chose the 'correct' answer (Non U Wake Shape). The descriptive data clearly shows that most people thought that it was the U Shape that was representative of a typical night's sleep for a <u>healthy 60 year old</u> with 91.8% representing this. The following shows the frequencies for the three different categories between males and females concerning perceived sleep for a <u>healthy 60 year old</u> for the Vietnamese sample.

Frequencies of different categories of sleep plots between males and females about perception of sleep for a <u>healthy 60 year old</u> for Vietnamese

		U Shape	Non U No Wake	Non U Wake	Total
Male	Count	20	1	0	21
	Expected Count	19.3	1.7	0	
Female	Count	47	5	0	52
	Expected Count	47.7	4.3	0	
Total	Count	67	6	0	73

Perception of their <u>own sleep</u> according to sex for the Australian sample on the Sleep Plots

Investigation into the participants reporting of their own sleep was also conducted using the Chi Square Test (2X3) which revealed no significant differences were observed between males and females for the Australian sample according to their own perceived Sleep Plots ($X^2 = 3.77$, $df = 2$, $p = 0.15$). The descriptive data continue to show that most people thought that it was the U Shape that was representative of a typical night's sleep for themselves with 59.8% representing this. The following shows the frequencies for the three different categories between males and females concerning their own perceived sleep for the Australian sample.

Frequencies of different categories of sleep plots between males and females about perception of one's own sleep for Australians

		U Shape	Non U No Wake	Non U Wake	Total
Male	Count	24	12	10	46
	Expected Count	27.5	8.5	10	
Female	Count	31	5	10	46
	Expected Count	27.5	8.5	10	
Total	Count	55	17	20	92

Perception of their <u>own sleep</u> according to sex for the Vietnamese sample on the Sleep Plots

A Fisher's Exact Test (2X3) was conducted which revealed no significant difference were found between the frequencies reported across males and females for the Vietnamese sample with respect to the three different plot shape categories ($p = 0.77$; Fisher's Exact Test) for their own sleep. The results also revealed that neither the male or female groups had many participants that chose the 'correct' answer (Non U Wake Shape), with only 3 male participants and 12 female participants drawing this shape out of a total of 75 participants. The descriptive data clearly shows that most people thought that it was the U Shape that was representative of a typical night's sleep for themselves with 60.0% representing this. The following shows the frequencies for the three different categories between males and females concerning perceived sleep for themselves for the Vietnamese sample.

Frequencies of different categories of sleep plots between males and females about
perception of one's <u>own sleep</u> for Vietnamese

		U Shape	Non U No Wake	Non U Wake	Total
Male	Count	14	5	3	22
	Expected Count	13.2	4.4	4.4	
Female	Count	31	10	12	53
	Expected Count	31.8	10.6	10.6	
Total	Count	45	15	15	75

Appendix K: Comparison of items on the DBAS 16 across factors between Morin,

Vallieres & Ivers (2007), the Vietnamese and Australian samples.

Items	Morin				Vietnamese				Australian			
	F1 Consequences of sleep	F2 Worry about sleep	F3 Sleep expectations	F4 Medication	F1	F2	F3	F4	F1	F2	F3	F4
1			√				√			√		
2			√				√			√		
3		√				√					√	
4		√			√				√			
5		√				√			√			
6				√				√	√			
7	√				√				√			
8	√				√				√			
9	√				√				√			
10		√			√					√		
11		√			√				√			
12	√					√			√			
13		√					√				√	
14		√			√				√			
15				√				√			√	
16	√				√				√			

Appendix L: Comparison of items on the SBS across factors between Adan et. al., (2006), the Vietnamese and Australian samples.

Items	Adan			Vietnamese				Australian			
	F1 Sleep incompatible behaviours	F2 Sleep-wake behaviours	F3 Thoughts and attitudes to sleep	F1	F2	F3	F4	F1	F2	F3	F4
1	√			√					√		
2	√			√				√			
3		√				√			√		
4		√		√				√			
5		√		√				√			
6			√	√				√			
7	√			√				√			
8	√					√		√			
9			√		√			√	√		
10		√				√					
11	√			√							
12	√			√				√			
13			√	√						√	
14	√			√				√			
15			√		√					√	
16		√					√				√
17	√			√				√			
18			√	√				√			
19		√			√			√			
20		√					√				√

Appendix M: Dysfunctional Beliefs and Attitudes about Sleep Scale 16 (Vietnamese)

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 <u>personal</u> <u>belief</u>. Please respond to all items even though some may not apply directly to your own situation.

Dưới đây là một số câu thể hiện niềm tin và thái độ của mọi người về giấc ngủ. Xin hãy cho biết cá nhân quý vị đồng ý hay không đồng ý ở mức độ nào đối với mỗi câu. Không có câu trả lời đúng hay sai. Đối với mỗi câu, hãy khoanh tròn con số tương ứng với niềm tin của <u>cá nhân</u> <u>quý vị</u>. Xin hãy trả lời tất cả các câu mặc dù có thể một số câu không có liên hệ trực tiếp tới hoàn cảnh của riêng quý vị.

Strongly Disagree Hoàn toàn không đồng ý										Strongly Agree Hoàn toàn đồng ý
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.
Tôi cần ngủ 8 giờ để có thể cảm thấy sảng khoái và hoạt động tốt trong ngày.

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.
Khi tôi không ngủ đủ vào một đêm nào đó thì hôm sau tôi phải ngủ bù bằng cách ngủ trưa hoặc ngủ lâu hơn vào đêm sau.

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.
Tôi lo là chứng mất ngủ kinh niên có thể có những hậu quả nghiêm trọng đối với sức khỏe cơ thể của tôi.

| 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.
Tôi lo là tôi có thể mất kiểm soát đối với khả năng ngủ của tôi

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

5. After a poor night's sleep, I know it will interfere with my activities the next day.
Sau một đêm ngủ kém, tôi biết là nó sẽ ảnh hưởng tới các hoạt động của tôi vào ngày hôm sau.

| 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.
Để có thể tỉnh táo và hoạt động tốt ban ngày, tôi tin là tôi nên uống thuốc ngủ thay vì có một đêm ngủ không
đủ.

| 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.
Khi tôi cảm thấy cáu kỉnh, trầm cảm, hoặc lo âu ban ngày, thì chủ yếu là vì đêm trước tôi đã ngủ không ngon.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

8. When I sleep poorly one night, I know it will disturb my sleep schedule for the whole week.
Khi tôi ngủ kém một đêm, tôi biết là nó sẽ làm xáo trộn thời gian ngủ trong cả tuần của tôi.

| 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.
Nếu không ngủ đủ ban đêm, tôi hầu như không thể hoạt động vào ngày hôm sau.

| 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.
Tôi không bao giờ có thể đoán trước là tôi sẽ có một đêm ngủ ngon hay ngủ không ngon giấc.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

11. I have little ability to manage the negative consequences of disturbed sleep.
Tôi có rất ít khả năng kiểm soát các hậu quả tiêu cực của một giấc ngủ bị xáo trộn.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.
Khi tôi cảm thấy mệt mỏi, không có sức, hoặc chỉ có vẻ không hoạt động tốt vào ban ngày, thì thường là do đêm trước tôi đã ngủ không ngon.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

13. I believe insomnia is essentially the result of a chemical imbalance.
Tôi tin là về cơ bản, chứng mất ngủ là do thiếu cân bằng hóa học.

| 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.
Tôi cảm thấy chứng mất ngủ đang hủy hoại khả năng hưởng thụ cuộc sống của tôi và ngăn cản tôi làm những điều tôi muốn.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

15. Medication is probably the only solution to sleeplessness.
    Có thể thuốc là giải pháp duy nhất cho chứng mất ngủ.

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.
Sau một đêm ngủ kém, tôi tránh hoặc bỏ các bổn phận (xã hội, gia đình).

0	1	2	3	4	5	6	7	8	9	10

Appendix N: Insomnia Severity Index (Vietnamese)

For each question, please CIRCLE the number that best describes your answer. Please rate the CURRENT (i.e. LAST 2 WEEKS) SEVERITY of your insomnia problem(s).

Đối với mỗi câu hỏi, xin hãy KHOANH TRÒN con số thể hiện đúng nhất câu trả lời của quý vị. Xin hãy xếp loại MỨC ĐỘ NGHIÊM TRỌNG HIỆN TẠI (tức là TRONG 2 TUẦN VỪA QUA) về vấn đề mất ngủ của quý vị.

Insomnia Problem Vấn đề mất ngủ	None Không	Mild Nhẹ	Moderate Tương đối nặng	Severe Nặng	Very Severe Rất nặng
1. Difficulty falling asleep Khó dỗ giấc ngủ	0	1	2	3	4
2. Difficulty staying asleep Khó giữ giấc ngủ	0	1	2	3	4
3. Problems waking up too early Dậy quá sớm	0	1	2	3	4

4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?

Quý vị HÀI LÒNG/KHÔNG HÀI LÒNG ở mức độ nào với giờ giấc ngủ HIỆN NAY của mình?

Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied
Rất hài lòng	Hài lòng	Tương đối hài lòng	Không hài lòng	Rất không hài lòng
0	1	2	3	4

5. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?

Về việc bị giảm chất lượng cuộc sống, quý vị nghĩ là người khác DỄ NHẬN THẤY vấn đề khó ngủ của quý vị ở mức nào?

Not at all Noticeable	A Little	Somewhat	Much	Very Much Noticeable
Không hề dễ nhận thấy	Một chút	Tương đối	Dễ	Rất dễ nhận thấy
0	1	2	3	4

6. How WORRIED/DISTRESSED are you about your current sleep problem?

Quý vị LO LẮNG/BUỒN BỰC ở mức nào về vấn đề khó ngủ hiện nay của mình?

Not at all Worried	A Little	Somewhat	Much	Very Much Worried
Không hề lo lắng	Một chút	Tương đối	Nhiều	Lo lắng rất nhiều
0	1	2	3	4

7. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytimefatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?

HIỆN TẠI, quý vị coi vấn đề khó ngủ của mình GÂY TRỞ NGẠI ở mức độ nào đối với hoạt động hàng ngày (ví dụ: ban ngày mệt mỏi, tính khí, khả năng làm việc/thực hiện các công việc hàng ngày, tập trung chú ý, trí nhớ, vvv)

Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering
Không trở ngại chút nào	Một chút	Tương đối	Nhiều	Rất nhiều trở ngại
0	1	2	3	4

Appendix O: Sleep Beliefs Scale (Vietnamese)

This is a survey of the effects of selected behaviours upon sleep. We are interested in knowing your opinion about whether any of these behaviours may influence the quality and/or quantity of sleep. For the following list of behaviours, please indicate whether you believe they produce a 'positive' effect, a 'negative' effect, or 'neither' effect on sleep. Please do not make reference to how they influence your sleep in particular, but to **the effects you think these behaviours have on people in general**. Please answer ALL the statements by ticking the appropriate box, even if you are not completely sure of the answer.

Đây là nghiên cứu về tác động của một số hành vi chọn lọc đối với giấc ngủ. Chúng tôi muốn được biết ý kiến của quý vị để xem trong số các hành vi này, liệu có hành vi nào có thể ảnh hưởng tới chất lượng và/hoặc số lượng giấc ngủ. Với danh sách các hành vi sau đây, xin hãy cho biết quý vị có cho rằng chúng tạo ra tác động 'tích cực', tác động 'tiêu cực', hay 'không' có tác động gì đối với giấc ngủ. Xin đừng nói về việc chúng ảnh hưởng thế nào tới giấc ngủ của riêng quý vị, mà hãy nói **quý vị nghĩ là các hành vi này có các tác động thế nào đối với mọi người nói chung**. Xin hãy trả lời TẤT CẢ các câu bằng cách đánh dấu vào ô phù hợp, ngay cả khi quý vị không hoàn toàn chắc chắn về câu trả lời.

	Positive effect Tác động tích cực	Neither effect Không có tác động gì	Negative effect Tác động tiêu cực
1. Drinking alcohol in the evening Uống rượu vào buổi tối			
2. Drinking coffee or other substances with caffeine after dinner Uống cà phê hoặc những đồ uống khác có chứa chất ca- phê-in sau bữa tối			
3. Doing intense physical exercise before going to bed Tập thể dục cường độ mạnh trước khi đi ngủ			
4. Taking a long nap during the day Ngủ một giấc dài vào ban ngày			
5. Going to bed and waking up always at the same hour Luôn ngủ và dậy vào cùng một giờ			
6. Thinking about one's engagements for the next day before falling asleep			

Suy nghĩ về các công việc phải làm ngày hôm sau trước khi ngủ thiếp			
7. Using sleep medication regularly Thường xuyên sử dụng thuốc ngủ			
8. Smoking before falling asleep Hút thuốc trước khi ngủ			
9. Diverting one's attention and relaxing before bedtime Chuyển hướng sự chú ý và thư giãn trước giờ ngủ			
10. Going to bed 2 hours later than the habitual hour Đi ngủ trễ hơn 2 tiếng so với thường lệ			
11. Going to bed with an empty stomach Bụng đói khi đi ngủ			
12. Using the bed for eating, calling on the phone, studying and other non-sleeping activities Dùng giường ngủ để ăn uống, gọi điện thoại, học và các hoạt động khác không phải là ngủ			
13. Trying to fall asleep without feeling tired Cố gắng ngủ khi chưa buồn ngủ			
14. Studying or working intensely until late at night Học hoặc làm việc với cường độ mạnh đến tận khuya			
15. Getting up when it is difficult to fall asleep Dậy khi khó ngủ			
16. Going to bed 2 hours earlier than the habitual hour Đi ngủ sớm hơn 2 giờ so với thường lệ			
17. Going to bed immediately after eating Đi ngủ ngay sau khi ăn			
18. Being worried about the impossibility of getting enough sleep Lo lắng về việc không thể ngủ đủ			
19. Sleeping in a quiet and dark room Ngủ trong phòng tối và yên tĩnh			
20. Recovering lost sleep by sleeping for a long time Ngủ bù bằng cách ngủ thật lâu			

Appendix P: Athens Insomnia Scale (Vietnamese)

Instructions: This scale is intended to record your own assessment of any sleep difficulty you might have experienced. Please, check (by circling the appropriate number) the items below to indicate your estimate of any difficulty, provided that it occurred at least three times per week during the last month.

Chỉ dẫn: Phương pháp đo lường này là để ghi lại sự thẩm định của riêng quý vị về những khó khăn mà quý vị có thể gặp phải về giấc ngủ. Xin hãy đánh dấu (bằng cách khoanh tròn con số phù hợp) các câu dưới đây để thể hiện sự ước lượng của quý vị về bất kỳ khó khăn nào, với điều kiện là nó xảy ra ít nhất ba lần một tuần trong tháng vừa qua.

1. Sleep induction (time it takes you to fall asleep after turning-off the lights)
Dỗ giấc ngủ (thời gian để quý vị ngủ thiếp đi sau khi tắt đèn)

0: No problem sleep at all	1: Slightly delayed	2: Markedly delayed	3: Very delayed or did not
0: Không hề khó nào	1: Hơi lâu	2: Tương đối lâu	3: Rất lâu hoặc không ngủ chút

2. Awakenings during the night
Thức dậy trong đêm

0: No problem sleep at all	1: Minor problem	2: Considerable problem	3: Serious problem or did not
0: Không hề bị chút nào	1: Bị nhẹ	2: Bị tương đối nặng	3: Bị nặng hoặc không ngủ

3. Final awakening earlier than desired
Thức dậy lần cuối sớm hơn mong muốn

0: Not earlier at all	1: A little earlier	2: Markedly earlier	3: Much earlier or did not sleep
0: Không sớm hơn ngủ chút nào	1: Sớm hơn một chút	2: Sớm hơn đáng kể	3: Sớm hơn nhiều hoặc không

4. Total sleep duration
Toàn bộ thời gian ngủ

0: Sufficient sleep at all	1: Slightly insufficient	2: Markedly insufficient	3: Very insufficient or did not
0: Đủ chút nào	1: Hơi thiếu	2: Thiếu đáng kể	3: Rất thiếu hoặc không ngủ

5. Overall quality of sleep (no matter how long you slept)
Chất lượng giấc ngủ nói chung (bất kể quý vị ngủ bao lâu)

| 0: Satisfactory not sleep at all | 1: Slightly unsatisfactory | 2: Markedly unsatisfactory | 3: Very unsatisfactory or did |
| 0: Hài lòng ngủ chút nào | 1: Hơi không hài lòng | 2: Tương đối không hài lòng | 3: Rất không hài lòng hoặc không |

6. Sense of well-being during the day
Cảm tưởng về sức khỏe trong ngày

| 0: Normal | 1: Slightly decreased | 2: Markedly decreased | 3: Very decreased |
| 0: Bình thường | 1: Hơi giảm | 2: Giảm đáng kể | 3: Rất giảm sút |

7. Functioning (physical and mental) during the day
Hoạt động (thân thể và tinh thần) trong ngày

| 0: Normal | 1: Slightly decreased | 2: Markedly decreased | 3: Very decreased |
| 0: Bình thường | 1: Hơi giảm | 2: Giảm đáng kể | 3: Rất giảm sút |

8. Sleepiness during the day
Cảm giác buồn ngủ trong ngày

| 0: None | 1: Mild | 2: Considerable | 3: Intense |
| 0: Không | 1: Hơi | 2: Tương đối | 3: Dữ dội |

Appendix Q: Sleep Plot (Vietnamese)

1a. Show us your understanding of the nature of a **normal night of sleep for a healthy 60 year old**. Please do this by drawing a continuous line in the box below across the normal night time period. Start the line at the X in the upper left corner, representing the start of the night's sleep, and stop the line at the X in the upper right hand corner of the box, representing awakening in the morning. The dashed horizontal line between awake above and sleep below marks the transition point between awake and asleep. The darker bands indicate deeper sleep. With this continuous line indicate your understanding of the progress through the night of a **normal sleep of a healthy 60 year old**.

Hãy cho chúng tôi biết quan niệm của quý vị về đặc điểm của một **đêm ngủ bình thường đối với một người 60 tuổi khỏe mạnh**. Xin hãy làm việc này bằng cách vẽ một đường kẻ liên tục trong ô dưới đây trong suốt quãng thời gian ban đêm bình thường. Bắt đầu vẽ đường kẻ này từ dấu chấm ở góc trái phía trên, thể hiện lúc bắt đầu ngủ ban đêm, và dừng đường kẻ ở dấu chấm ở góc phải phía trên của ô, thể hiện lúc tỉnh dậy vào buổi sáng. Đường kẻ ngang ngắt quãng giữa lúc tỉnh ở bên trên và lúc ngủ bên dưới đánh dấu lúc chuyển đổi giữa lúc ngủ và lúc thức. Vùng tối hơn thể hiện giấc ngủ sâu hơn. Bằng đường kẻ liên tục này, hãy cho biết quan niệm của quý vị về sự tiến triển trong suốt đêm của một **giấc ngủ bình thường của một người 60 tuổi khỏe mạnh.**

Awake X (Thức)   **Awake X (Thức)**

Asleep(Nủ)

Light Sleep

Deep Sleep (Ngủ sâu)

Very Deep

(Ngủ rất sâu)

1b. Now please show us your understanding of the nature of your own typical night's sleep. Think about how you have slept over the last two weeks. Please do this using the same method of drawing as in the above sleep plot, however the continuous line should indicate your own typical sleep.

Bây giờ, xin hãy cho chúng tôi biết quan niệm của quý vị về đặc điểm của giấc ngủ một **đêm điển hình của chính quý vị**. Hãy nhớ lại xem quý vị đã ngủ thế nào trong hai tuần vừa qua. Xin hãy làm điều này sử dụng phương pháp vẽ giống như trong đồ thị giấc ngủ phía trên, chỉ có điều đường kẻ liên tục lần này sẽ thể hiện **giấc ngủ điển hình của chính quý vị**.

Awake X (Thức)	**Awake X (Thức)**

Asleep(Nủ)

Light Sleep

Deep Sleep (Ngủ sâu)

Very Deep

(Ngủ rất sâu)