Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

Sleep Paralysis in New Zealand Tertiary Students: Prevalence, Phenomenology, and Associations with Sleep Quality and Psychological Distress

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Science

In

Psychology

At Massey University, Manawatū, New Zealand.

Bianca Hayes

2026

Abstract

Sleep paralysis (SP) is a transient sleep-wake phenomenon characterised by conscious awareness accompanied by temporary muscle atonia and, often, vivid multisensory hallucinations. Although SP is widely recognised within sleep science and estimated to affect a substantial number of individuals globally, little is known about its prevalence and phenomenology within Aotearoa New Zealand (NZ), particularly among tertiary student populations. Young adulthood is associated with irregular sleep patterns and elevated psychological distress, making tertiary students a population in which SP may be both common and clinically relevant. This study aimed to (1) describe the prevalence of SP among a sample of tertiary students in Aotearoa New Zealand, (2) characterise the main phenomenological features of SP, and (3) examine associations between SP, sleep quality and psychological distress using both qualitative and quantitative analyses.

An online survey was administered to 91 NZ tertiary students aged 18-30. SP status was determined using a screening item consistent with core definitional criteria, outlined in current literature, emphasising conscious awareness with muscle atonia. Standardised measures including the Pittsburgh Sleep Quality Index, Generalised Anxiety Disorder-7 and the Depression, Anxiety and Stress Scale were administered to measure sleep quality and psychological distress respectively. Open-ended responses were analysed using content analysis to examine the phenomenological features, and coping strategies of participants.

Collectively, the research findings indicated that SP was relatively common within this sample of NZ tertiary students, with 42.9% of participants reporting at least one experience of SP. Psychological distress was also elevated across the sample (DASS-21: M anxiety = 11.4, M depression = 12.7, M stress = 18.3; GAD-7 M = 10.3), while 91.1% of participants met criteria for poor sleep quality based on PSQI scores. Students who reported SP demonstrated significantly higher stress scores than those without SP when SP was examined as a binary (yes/no) variable ($U = 617, p = .040$). When SP was examined dimensionally using symptom count, a greater number of SP-associated symptoms was significantly associated with higher generalised anxiety ($r = .33, p = .043$). However, when psychological distress and sleep quality variables were entered simultaneously into a logistic regression model, none were independently associated with SP status and the overall model was not statistically significant ($\chi^2 = 10.00, p = .12$). Qualitative analysis indicated that SP episodes were commonly characterised by threat-related experiences, including sensed presences, auditory phenomena, and distressing bodily sensations. The integration of quantitative and qualitative findings highlights the importance of emotional context, interpretation, and symptom complexity in shaping distress. This research

contributes locally derived prevalence data to an under-research population, extends understanding of the subjective and cultural dimensions of SP, and underscores the relevance of recognising sleep-related phenomena within broader discussions of student mental health and psychological wellbeing.

Acknowledgements

I would like to sincerely thank my supervisors, Dr Rosie Gibson and Dr Nicole Lindsay, for their guidance, support, and expertise throughout this research. Your knowledge, thoughtful feedback, and encouragement have been invaluable at every stage of this project.

Table of Contents

Chapter One: Introduction

There must have been light in the room, because I could sense its familiarity, the outline of furniture, the shape of the door, the quiet stillness of my dorm room. I was awake. I knew I was awake. But I could not move. My body would not respond. My eyes would not open. I tried to lift my arms, to shift my legs, nothing happened. A wave of heat spread across my skin and my heart began to pound so violently I could feel it in my throat. Panic rose quickly, thick and suffocating. Then I heard it: the sound of my dorm room door opening, then closing. I distinctly remembered locking it before lying down. Someone was inside. I could sense a presence in the room, deliberate, aware, moving toward the bed. I could not see it, yet I knew it was there. And then I felt the weight. It climbed on top of me, pressing down into my chest, heavy and undeniable. I felt my shirt being lifted slowly. I tried to fight, to scream, to force my eyes open, but my body remained inert, trapped between intention and paralysis. I was fully conscious, fully aware, and utterly powerless. The fear was not abstract; it was immediate, visceral, overwhelming. In that moment, the experience was indistinguishable from reality. And then, abruptly, it ended. I sat upright, drenched in sweat and gasping for air, scanning the room for movement, for an intruder, for any sign that what I had experienced had truly occurred. The door was still locked. The room was empty.

A Personal Account of My Sleep Paralysis Experience

Experiences of this nature are widely recognised within contemporary scientific discourse as sleep paralysis (SP), a phenomenon defined as a short, transient loss of volitional movement that appear when falling asleep or waking up (American Academy of Sleep Medicine, 2014). During REM sleep, skeletal muscle paralysis serves an adaptive protective function, preventing individuals from physically enacting their dreams (Lu et al., 2006). When this paralysis persists into wakefulness, individuals may awaken cognitively while remaining temporarily immobilised (Wang et al., 2025). Simultaneously, dream-related perceptual imagery can continue, producing multisensory experiences that may be indistinguishable from waking perception (Wang et al., 2025). Although SP episodes are usually brief and physiologically benign, their emotional impact can be considerable (Paradis et al., 2009). Research consistently demonstrates that fear is the dominant affective response, often intensified by the combination of paralysis, vivid imagery, and perceived threat (Paradis et al., 2009). In some cases, the distress associated with episodes contributes to sleep avoidance, anticipatory anxiety, and broader psychological distress. As such, SP occupies a complex position: neurologically grounded and usually benign, yet subjectively profound and, at times, deeply unsettling.

SP is widely recognised within sleep science as a transient disruption of the sleep–wake cycle, yet its prevalence and interpretation remain inconsistent. Early classifications, including the Diagnostic Classification of Sleep and Arousal Disorders (1979), positioned SP as a common phenomenon, a view reinforced by Fukuda et al. (1998), who described it as occurring frequently within the general population. Reported lifetime prevalence rates vary substantially across studies, ranging from approximately 3% to 62% (Cheyne et al., 1999; Fukuda et al., 1998; Ohayon et al., 1999; Sharpless & Barber, 2011; Hefnawy et al., 2024). This variability reflects methodological differences in measurement tools, definitional inconsistencies, and sociocultural influences on disclosure. Most pooled estimates suggest that roughly one third of individuals report at least one lifetime episode when diverse populations are combined (Sharpless & Barber, 2011). Notably, prevalence appears elevated in student samples, with rates ranging from approximately 21% to 42% across university populations and adolescence and early adulthood consistently being identified as the typical period of onset (Fukuda et al., 1998; Spanos et al., 1995; Cheyne et al., 1999). This variability in reported prevalence rates underscores the need for population-specific research, particularly in contexts like Aotearoa New Zealand, where SP has received comparatively limited focused research attention.

While the dominant explanatory framework of SP is biomedical; individuals frequently interpret episodes through spiritual, supernatural, or folkloric lenses. Across cultures, SP has been attributed to encounters with demons, spirits, night hags, witchcraft, or malevolent forces (Cheyne et al., 1999; Hufford, 2005; McCleese, 2019; Sharpless & Barber, 2011). In societies lacking established cultural terminology for SP, fear of being labelled “crazy” or mentally ill may discourage disclosure (McCleese, 2019), contributing to under-reporting and variability in prevalence estimates. These interpretive dynamics shape not only whether episodes are reported, but also how distressing they become and how individuals respond to them. Despite this, the majority of research has relied on quantitative survey methods, with comparatively fewer studies examining how individuals experience, interpret, and make meaning of SP episodes in their own words. These issues are particularly relevant within Aotearoa New Zealand, a multicultural context in which spiritual, psychological, and biomedical explanatory models may coexist. However, empirical research examining SP within New Zealand populations remains comparatively sparse, and there is a notable absence of locally derived prevalence data. Most epidemiological estimates originate from North American, European, or select Asian samples, leaving it unclear whether international findings generalise to the New Zealand sociocultural and educational environment.

This thesis examines SP within a population where the phenomenon is likely to be both common and consequential: tertiary students. Young adulthood is a developmental period characterised by ongoing maturation of sleep–wake regulation, combined with lifestyle and

environmental pressures that often destabilise sleep (irregular schedules, academic stress, and reduced sleep opportunity) (Hershner & Chervin, 2014). This combination can create what has been described as a "perfect storm" for unusual sleep experiences, where vulnerability at the sleep–wake transition coincides with heightened stress and reduced recovery (Hershner & Chervin, 2014). From a practitioner perspective, this matters because tertiary students frequently present to health and wellbeing services with sleep disruption and psychological distress (Schlard et al., 2017). Given the well-established bidirectional relationship between sleep disruption and psychological distress, phenomena such as SP may be both more likely to occur and more distressing within this group. Understanding SP among tertiary students is therefore important not only for documenting prevalence, but also for informing student wellbeing services and reducing the potential for misinterpretation, stigma, or unnecessary psychological alarm.

Despite growing international interest in SP, significant gaps remain within the Aotearoa New Zealand literature. To date, there is a lack of locally derived prevalence data for SP among tertiary students, leaving it unclear whether international findings generalise to this sociocultural context. In addition, little is known about how SP is phenomenologically experienced within New Zealand student populations, or which features are most salient and distressing in this group. Furthermore, quantitative symptom measures capture the presence of features but cannot fully convey how individuals experience, interpret, and respond to these episodes, including the ways cultural or spiritual framings may shape disclosure and coping. International research has linked SP with psychological distress and poor sleep quality (Denis et al., 2018; Sharpless et al., 2011; Otto et al., 2006). However, findings are not always consistent, and relatively few studies have examined these associations within NZ tertiary samples. Young adulthood and student life are characterised by factors frequently discussed as potential contributors to sleep instability and emotional vulnerability (Hershner & Chervin, 2014). However, the extent to which SP in NZ tertiary students is associated with sleep quality, mood, and general wellbeing remains unclear.

Research objectives

Against this backdrop, the present study aimed to examine SP among tertiary students in Aotearoa New Zealand using an integrated quantitative–qualitative approach. This mixed-method design was selected to allow for both systematic measurement of prevalence and psychological associations, and in-depth exploration of how SP is experienced, interpreted, and managed within a culturally diverse student population. Given that SP is simultaneously a measurable sleep-related phenomenon and a highly subjective, meaning-laden experience, integrating quantitative and

qualitative methods provides a more comprehensive understanding than either approach alone. The primary objectives were to:

- Describe the prevalence of SP among a sample of tertiary students in Aotearoa NZ
- Characterise the phenomenological features of SP
- Examine the associations between sleep quality, general mood and wellbeing, and the prevalence of experiencing SP among tertiary students.

This research aims to contribute to the literature by extending SP research into a New Zealand tertiary context and by providing preliminary prevalence estimates within a sample of students. By integrating quantitative and qualitative approaches, the study offers insight into both the measurable occurrence and lived experience of SP within this population. In doing so, it contributes to ongoing discussions regarding dimensional versus categorical measurement and highlights the importance of interpretive frameworks in shaping distress and coping. Practically, the findings may inform student health and wellbeing services by supporting accurate recognition and normalisation of SP experiences within tertiary settings.

The remainder of this thesis is organised as follows. Chapter Two, Three and Four reviews the empirical literature on SP prevalence, phenomenology, explanatory models, and psychological and sleep correlates, with attention to cultural interpretation and student populations. Chapter Five outlines the methodology, including recruitment, measures, and analytic strategies for quantitative and qualitative components. Chapter Six presents the quantitative and qualitative findings. Chapter Seven integrates findings in discussion, outlining implications for theory, practice, and future research, before concluding with study limitations and recommendations.

Chapter Two: Sleep, Sleep Regulation, and Sleep Health in Tertiary Students

This chapter provides the foundational context for understanding sleep paralysis by outlining the biological and behavioural processes that regulate normal sleep. It begins by reviewing key mechanisms of sleep regulation, before examining how sleep quality is defined and measured. The chapter then focuses on sleep within tertiary student populations, a group characterised by increased vulnerability to sleep disturbance. Particular attention is given to the relationship between sleep and psychological wellbeing, as well as the contextual factors that influence sleep behaviours in young adults. Together, this chapter establishes sleep health as a critical framework for understanding the conditions under which sleep paralysis may occur.

Sleep and Sleep Regulation

Definition and Functions of Sleep

Sleep is commonly defined, in behavioural terms, as a reversible state characterised by perceptual disengagement from and reduced responsiveness to the external environment (Fuller et al., 2006). This state is typically, though not exclusively, marked by physical stillness, a reclined posture, closed eyes and reduced voluntary motor activity (Fuller et al., 2006). While such definitions capture observable features of sleep, they do not fully reflect its complexity. Through contemporary perspectives, sleep is more accurately understood as a dynamic integration of physiological and behavioural processes that support restoration, cognition and emotional regulation (Fuller et al., 2006).

Across the course of a typical night's sleep, individuals cycle repeatedly through two primary sleep states: namely rapid eye movement (REM) and non-REM (NREM)(Patel et al., 2024). NREM sleep is further subdivided into four stages reflecting a continuum of increasing sleep depth and is generally associated with reduced conscious mental activity (Wang et al., 2025). Although voluntary movement decreases during NREM sleep, the body remains capable of movement, and the brain remains actively engaged in autonomic and homeostatic regulation. In contrast, REM sleep is characterised by heightened cortical activation, vivid dream imagery and generalised muscle atonia. REM sleep has often been described as a state involving an activated brain within a paralysed body, due to brainstem-mediated inhibition of spinal motor neurons that suppress voluntary muscle tone. This brain-body dissociation between an activated brain and a paralysed body is a defining feature of REM sleep. Sleep paralysis occurs mainly in the transition between REM sleep and wakefulness. Therefore, it is imperative to understand the brain circuitry that controls REM sleep in order to clarify the mechanism of sleep paralysis.

Sleep Architecture and Regulation

Sleep regulation is governed by the interaction of three core biological processes: a homeostatic process, a circadian process and an ultradian process. The homeostatic process increases the need for sleep as the period of wakefulness lengthens, while the circadian process (internal clock) regulates the timing of sleep and wakefulness according to endogenous biological rhythms. The ultradian process governs the cyclical alternation between NREM and REM sleep across the night. These processes are commonly conceptualised within the two-process model of sleep regulation (Borbely, 1982). REM sleep is generated and regulated by a complex network of brainstem and forebrain circuits that operate through reciprocal excitation and inhibition (Wang et al., 2025). Central to this system are populations of "REM-on" neurons, which are highly active during REM sleep and promote its defining features, and "REM-off" neurons, which suppress REM activity during wakefulness and non-REM sleep (Wang et al., 2025). These neuronal populations are distributed across regions of the pons, medulla, midbrain, hypothalamus, thalamus, and cortex, and function through a flip-flop–like mechanism of mutual inhibition that enables rapid transitions between sleep states (Wang et al., 2025). Key structures within this network include the sublaterodorsal nucleus, pontine tegmentum, ventromedial medulla, locus coeruleus, dorsal raphe nucleus, and ventrolateral periaqueductal gray (Wang et al., 2025). REM regulation is further modulated by multiple neurotransmitter systems, including glutamate, GABA, glycine, acetylcholine, serotonin, and norepinephrine, as well as neuropeptides such as orexin and melanin-concentrating hormone, which exert opposing influences on REM promotion and suppression (Wang et al., 2025). Together, these interacting circuits coordinate the initiation, maintenance, and termination of REM sleep as part of the broader sleep–wake regulatory system.

Physiological changes in sleep regulation during adolescence and young adulthood are characterised by a delay in circadian phase and a shift toward a nocturnal or "evening-type" preference (Jenni & Carskadon, 2007). This developmental change emerges around puberty and is associated with both a delayed circadian rhythm and alterations in homeostatic sleep drive (Crowley et al., 2007). More physically mature adolescents and young adults tend to experience reduced sleep pressure in the evening, resulting in decreased sleepiness at night and difficulty initiating sleep at socially conventional bedtimes (Hershner & Chervin, 2014). This shift is further supported by differences in intrinsic circadian period, which is slightly longer in adolescents and young adults than in older adults, making it easier for bedtimes to drift later (Crowley et al., 2007). A hallmark consequence of this delayed circadian system is increased variability in sleep timing, with shorter sleep duration on weekdays and compensatory "catch-up" sleep on weekends (Hershner & Chervin, 2014). Studies consistently show that high school and university students experience a sleep deficit

of approximately one to three hours on academic nights, followed by longer sleep duration and later wake times on weekends (Lund et al., 2010; Hershner & Chervin, 2014). Longitudinal research suggests that this nocturnal preference persists into the late teenage years and early twenties, with bedtimes continuing to delay through the transition from high school to university (Thorleifsdottir et al., 2002). The move into tertiary education appears to exacerbate this pattern, with college students going to bed substantially later than their high school counterparts (Lund et al., 2010). Collectively, these developmental and lifestyle-related changes contribute to irregular sleep–wake schedules and chronic sleep restriction in young adults, creating conditions that may destabilise normal sleep–wake boundaries and increase vulnerability to REM intrusion phenomena such as sleep paralysis.

Although the present study does not include objective physiological measures of sleep architecture, an understanding of normative sleep regulation and state transitions is essential for contextualising subjective sleep related phenomena. SP is widely understood to involve a dissociation between components of REM sleep physiology, most notable muscle atonia, and waking consciousness, resulting in the conscious experience of paralysis, altered sensory perception, and distress. By outlining typical sleep architecture and regulatory mechanisms, this section provides a foundation for understanding how sleep paralysis reflects a disruption of normal sleep–wake boundaries. This physiological overview therefore serves to contextualise participants' subjective accounts of sleep paralysis experiences explored in this thesis, rather than to imply direct measurement of underlying neurophysiological processes.

Sleep Health and "Poor Sleep Quality"

Conceptualising Sleep Quality

Sleep health is fundamentally interconnected with overall physical, psychological, and mental well-being. Sleep quality, often conceptualised within the broader framework of sleep health, refers to a multidimensional pattern of sleep-wake functioning that supports optimal daytime functioning and overall wellbeing (Buysse, 2014). Rather than being defined solely by the absence of sleep disturbances, sleep quality reflects the interaction of sleep duration, continuity, timing, regularity, and subjective experience and is influenced by both modifiable factors (e.g lifestyle, sleep habits, work schedules, and environmental conditions) and non-modifiable factors (e.g age, biological sex) (Leger et al., 2024). A growing body of evidence has demonstrated that poor sleep, whether in the form of insufficient duration, poor quality or disrupted sleep patterns, can have adverse effects across multiple biological and psychological systems (Leger et al., 2024).

Although the term *poor sleep* is widely used in the scientific literature, there remains a lack of consensus regarding its definition, particularly outside the context of formally diagnosed sleep

disorders. In epidemiological research, poor sleep is often identified using threshold scores on self-report measures, whereas other approaches emphasise subjective dissatisfaction with sleep, daytime functional impairment, or disruptions to sleep quality, continuity, or duration that do not meet diagnostic criteria for a formal sleep disorder (Leger et al. 2024). Léger et al. (2024) argue that existing diagnostic frameworks are insufficient for capturing the breadth of sleep-related difficulties experienced in the general population and propose that poor sleep should be conceptualised as a broader, multidimensional construct that incorporates both objective and subjective indicators, while accounting for individual variability in sleep habits (Leger et al. 2024).

Within this framework, poor sleep encompasses impairments across several interrelated domains. Sleep quality is reflected in subjective experiences such as reduced sleep satisfaction, diminished restorative value, or low perceived sleep efficiency (Leger et al. 2024). Sleep quantity is characterised not only by shortened duration, but also by disrupted continuity, irregular timing, and chronic patterns of insufficient or poorly timed sleep (Leger et al. 2024). Importantly, Léger et al. (2024) emphasise the inclusion of daytime functioning, whereby symptoms such as fatigue, cognitive impairment, or unplanned napping signal the functional consequences of poor sleep. By integrating subjective perceptions of sleep with objective sleep parameters and daytime outcomes, this model reinforces the conceptualisation of poor sleep as an individual and functionally meaningful experience rather than a discrete clinical diagnosis.

Consequences of Poor Sleep

A substantial body of research has demonstrated that inadequate sleep is associated with adverse physical and mental health outcomes. Physiologically, poor sleep is associated with a heightened risk of cardiometabolic dysfunction (Direksunthorn, 2025), immune and hormonal dysregulation and inflammatory processes (Singh, et al., 2024) which can compound existing health conditions or contribute to their development. Psychologically, poor sleep is consistently associated with heightened emotional reactivity, delinquent behaviours, increased anxiety and depressive symptoms, and reduced stress tolerance (Shah et al., 2025). These associations are especially pronounced in adolescent and young adult populations, where sleep patterns are often irregular and vulnerable to disruption due to academic demands, social schedules and technology use (Hershner & Chervin, 2014). However, this relationship is not uniformly supported across all research, particularly in relation to technology use. Recent research suggests that the impact of digital device use on sleep in young people may be more modest or context-dependent than previously assumed, with factors such as timing, content, and individual differences playing a more significant role than screen exposure alone (Orben & Przybylski, 2019; Scott et al., 2019).

Sleep in Tertiary Student Populations

Prevalence of Poor Sleep in University Students

Previous research has consistently documented a high prevalence of sleep problems in university students. One study surveying nearly 2000 Taiwanese tertiary students found that almost half reported sleep problems, with insufficient sleep cited as the most common concern (Yang et al.,2003). Similar patterns have been observed internationally. College students frequently report poor sleep, and studies using the Pittsburgh Sleep Quality Index (PSQI), a widely used measure of sleep quality in adults, indicate that between 40% and 65% of college students in the United States meet established cut-off criteria for poor sleep (Fontana et al., 2014). Further evidence suggests that a sizeable minority of students (approximately 25–33%) experience difficulties across multiple PSQI components (Denis, 2018). For instance, more than one-quarter of students rate their overall sleep quality as poor, around one-third report obtaining fewer than seven hours of sleep per night, and nearly half report sleep onset latency exceeding 30 minutes at least once per week (Vargas et al., 2014). A large survey of 1,845 university students enrolled in introductory psychology courses found that approximately 27% met the criteria for a clinically diagnosable sleep disorder, and a substantially larger proportion experienced recurring sleep difficulties (Gaultney, 2010). These problems often worsen as students' progress through their degree programmes, likely reflecting cumulative academic, social and occupational demands.

Consequences of Poor Sleep in University Students

Within tertiary student populations, the consequences of poor sleep across academic, cognitive, emotional, and behavioural domains appear particularly pronounced (Hershner & Chervin, 2014). The university period represents a critical developmental transition marked by increased autonomy, academic pressure, irregular schedules, and competing social and occupational demands (Hershner & Chervin, 2014). Sleepiness and sleep deprivation during this period can substantially compromise learning, memory consolidation, academic performance, emotional regulation, and safety-related behaviours (Hershner & Chervin, 2014). Academic performance has been one of the most frequently examined outcomes of sleep disruption in university students. While grade point average (GPA) is influenced by a complex interaction of individual and contextual factors, including motivation, intelligence, workload, and socioeconomic status (Taylor et al., 2013), existing evidence suggests a meaningful association between sleep and academic outcomes. Students obtaining longer sleep durations have been shown to achieve higher GPAs compared to short sleepers (Kelly et al., 2001), although accumulating evidence indicates that sleep timing and regularity

may be more influential than total sleep duration alone (Hershner & Chervin, 2014). Earlier and more consistent bedtimes and rise times have been associated with better academic performance, whereas whereas delayed and irregular sleep schedules, which is common among students with an evening chronotype, have been linked to poorer academic outcomes (Philips et al. 2017). These findings suggest that misalignment between biological sleep preferences and academic schedules may contribute to academic impairment, particularly among students with delayed circadian rhythms.

Sleep disorders are also highly prevalent within university populations and represent an additional risk factor for academic difficulties. Estimates suggest that up to one-quarter of students may be at risk for at least one sleep disorder, including insomnia, circadian rhythm sleep–wake disorders, hypersomnia, restless legs syndrome, or obstructive sleep apnoea (Gaultney, 2010; Gilstrap et al., 2023). Students at risk for academic failure are disproportionately more likely to screen positive for sleep disorder, highlighting sleep pathology as a potential contributor to academic underperformance (Hershner & Chervin, 2014). Delayed sleep-wake phase disorder, in particular, is common among students with strong evening preferences and has been associated with missed classes, excessive daytime sleepiness, reduced concentration, and lower grades (Hershner & Chervin, 2014).

Beyond academic functioning, poor sleep poses significant risks to student safety, particularly in relation to driving. Drowsy driving is highly prevalent among young adults, with a substantial proportion of students reporting falling asleep at the wheel or experiencing near-miss accidents due to sleepiness (Taylor & Bramoweth, 2010). Experimental evidence indicates that prolonged wakefulness produces driving impairment comparable to legally intoxicated blood alcohol levels (Hershner & Chervin, 2014). The combination of sleep deprivation and alcohol, both common in university settings, has a synergistic detrimental effect on driving performance, markedly increasing crash risk even at blood alcohol concentrations below legal thresholds (Taylor & Bramoweth, 2010). These findings underscore sleep deprivation as a critical but often underestimated public health risk among tertiary students.

Mood and emotional functioning are also closely intertwined with sleep in this population. Depressive symptoms have been examined extensively in relation to sleep, with evidence consistently indicating that insufficient sleep, late bedtimes, prolonged sleep onset latency, and irregular sleep schedules is associated with elevated depressive symptomatology (Brooks et al., 2009). For example, one study found that students with depressive symptoms tend to experience poorer subjective sleep quality, longer sleep onset latency, more night wakings, and greater daytime sleepiness, compared to students without depressive symptoms (Becker et al., 2018). Studies that have examined anxiety and depression concurrently have generally found that both internalising

symptom domains are independently associated with poorer sleep quality (Chaput et al., 2016; Lund et al., 2010; Taylor et al., 2005). Large-scale survey research involving university students has shown that individuals with co-occurring anxiety and depression report the highest prevalence of sleep problems and are more likely to perceive sleep difficulties as negatively impacting their academic functioning (Schlarb et al, 2017). These findings suggest that poor sleep quality is linked to multiple domains of psychological distress in tertiary student, rather than being specific to one particular mood outcome. Although the majority of studies indicate that both anxiety and depressive symptoms are associated with poorer sleep, some variability exists in the relative strength of these associations. For example, some research has found anxiety symptoms to be more strongly associated with overall sleep quality than depressive symptoms, particularly when global sleep indices are used rather than specific sleep components (Lund et al., 2010). Despite these mixed findings, the prevailing evidence supports a bidirectional relationship between sleep quality and mood, whereby disturbed sleep is associated with heightened symptoms of anxiety and depression, and emotional distress may in turn exacerbate sleep difficulties (Becker et al., 2018).

More severe outcomes have also been documented, with sleep disturbance, insomnia, and nightmares associated with suicidal ideation in tertiary students (Garlow et al., 2008). While these relationships are complex and influenced by comorbid conditions such as depression, anxiety, and trauma exposure, evidence suggests that certain sleep-related symptoms, particularly nightmares, may serve as important clinical warning indicators for psychological distress (Hershner & Chervin, 2014; Garlow et al., 2008). Collectively, this body of research highlights poor sleep as a pervasive and consequential issue within tertiary student populations, affecting academic performance, emotional wellbeing, and safety. These findings provide important context for examining SP within this group, given its close links to sleep disruption, psychological distress, and irregular sleep–wake patterns.

Contributors to Poor Sleep in Tertiary Students

Poor sleep among tertiary students is driven by a convergence of physiological, behavioural, and environmental factors that collectively promote irregular sleep-wake patterns. One of the most common contributors to poor sleep quality in college-aged populations is insufficient sleep resulting from delayed betimes combined with early morning obligations (Hershner & Chervin, 2014). This pattern is particularly prevalent in university contexts, where academic demands, examinations, and part-time employment frequently require late-night study or work, while fixed class schedules necessitate early rising. These pressures are often compounded by social activities that occur in the evening, further delaying bedtimes and reducing total sleep duration.

Behavioural factors related to sleep hygiene play a central role in the development and maintenance of poor sleep in tertiary students. Many students engage in habits that are incongruent with restorative sleep, including irregular sleep–wake schedules, exposure to stimulating activities before bed, and consumption of substances that interfere with sleep onset and continuity (Brown et al. 2002). The widespread use of electronic devices late at night is particularly problematic, as technology use prior to bedtime has been consistently associated with longer sleep onset latency, increased night time awakenings, and reduced perceived sleep quality (Thomee et al. 2007). Exposure to artificial light from screens suppresses melatonin secretion, delaying circadian rhythms and making it more difficult to initiate sleep, an effect that may be especially pronounced in young adults who already exhibit a delayed circadian preference (Hershner & Chervin, 2014).

Substance use further contributes to sleep disruption in tertiary student populations. Caffeine consumption, including through coffee and energy drinks, is commonly used to counteract sleepiness but can significantly impair sleep onset when consumed even in the afternoon or evening (Hershner & Chervin, 2014). Energy drinks, which are widely consumed among young adults, often contain high and variable doses of caffeine and are frequently used to compensate for i insufficient sleep, perpetuating a cycle of disrupted sleep (Hershner & Chervin, 2014). Alcohol use is also highly prevalent among university students and, although it may initially reduce sleep latency, it leads to fragmented sleep later in the night and poorer overall sleep quality (Hershner & Chervin, 2014). Some students report using alcohol intentionally as a sleep aid, despite evidence that it disrupts normal sleep architecture (Lund et al. 2010). The use of stimulant medications, both prescribed and non-prescribed, represents another contributor to poor sleep in tertiary students. Stimulants are commonly used to enhance alertness or concentration during periods of academic demand but are associated with increased sleep latency, reduced REM sleep, and poorer subjective sleep quality (Hershner & Chervin, 2014). Non-prescribed stimulant use is particularly concerning, as it is often associated with higher levels of substance use more broadly and may further destabilise sleep patterns (Hershner & Chervin, 2014).

Environmental and psychosocial stressors also play a significant role in shaping sleep quality among tertiary students. Shared living environments, noise, and limited control over sleep conditions can disrupt sleep continuity, while academic stress, financial pressures, and uncertainty about future career prospects increase cognitive and emotional arousal before bedtime (Hershner & Chervin, 2014). Over time, these factors may contribute to the establishment of maladaptive sleep behaviours, creating a bidirectional cycle in which poor sleep exacerbates psychological distress, and heightened distress further impairs sleep (Hershner & Chervin, 2014). Importantly, while many students experience poor sleep due to behavioural and contextual factors, tertiary populations are not immune

to formal sleep disorders. A minority of students are at risk for conditions such as insomnia, circadian rhythm sleep–wake disorders, or sleep-related breathing disorders, which can further contribute to chronic sleepiness and impaired functioning (Hershner & Chervin, 2014). Beyond their impact on sleep quality and duration, these factors may also increase vulnerability to under-recognised sleep-related phenomena, including dissociative or REM-related experiences, providing an important contextual foundation for understanding SP within this population (Hershner & Chervin, 2014).

Formal and Under-Recognised Sleep Phenomena

Sleep disorders refer to a group of conditions that disrupt normal sleep patterns and interfere with the restorative functions of sleep, often resulting in impaired physical, psychological, and cognitive functioning. The *International Classification of Sleep Disorders* (ICSD-3) categorises sleep disorders into several broad groups, including insomnia disorders, sleep-related breathing disorders, central disorders of hypersomnolence, circadian rhythm sleep–wake disorders, parasomnias, and sleep-related movement disorders. These conditions can affect sleep initiation, sleep maintenance, sleep timing, or behaviour during sleep, and may significantly impair daytime functioning, health, and overall quality of life.

Sleep disorders are widely recognised as a common health concern among tertiary students (Haile et al., 2017; Pascoe et al., 2020). Epidemiological studies consistently report high rates of sleep disorders in college populations, with insomnia being among the most prevalent conditions. Estimates suggest that insomnia symptoms may affect up to 69% of university students (Abdalqader et al., 2018; Sing & Wong, 2010). Other commonly reported sleep disorders include circadian rhythm sleep–wake disorders (approximately 19.6%), affective sleep disturbances (14.5%), restless legs syndrome, and obstructive sleep apnoea, though prevalence estimates vary considerably across studies and populations (Gaultney, 2010; Piro et al., 2018). These sleep disorders are associated with significant consequences for student wellbeing, including impaired concentration, daytime sleepiness, and reduced academic performance (Alhola & Polo-Kantola, 2007; Gaultney, 2010).

While research has largely focused on these more widely recognised sleep disorders, a range of less commonly studied sleep phenomena also occur within tertiary student populations. These include parasomnias and other atypical sleep experiences that arise during transitions between sleep and wakefulness (Ibrahim et al., 2024). Although such phenomena are less frequently investigated in epidemiological research, they may still occur at notable rates and can be associated with significant distress (Schlarb et al., 2017). One such phenomenon is sleep paralysis (SP), a REM-related parasomnia characterised by temporary muscle atonia during sleep–wake transitions, often accompanied by vivid hallucinations and intense fear (Paradis et al., 2009; Hefnawy et al., 2024).

Despite growing recognition of SP within sleep research, it remains comparatively under-examined in tertiary student populations relative to more commonly studied sleep disorders. As such, examining the prevalence and characteristics of SP within university students represents an important extension of existing research on sleep disturbances in this group. The following chapter therefore takes a deeper examination of sleep paralysis, outlining its definition, key phenomenological features, diagnostic considerations, and the factors associated with its occurrence.

Chapter Three: Sleep Paralysis Definition, Mechanisms and Cultural Interpretations

This chapter examines SP as a distinct sleep-related phenomenon. It begins by outlining contemporary definitions of SP and its underlying neurophysiological mechanisms. The chapter then reviews prevalence estimates and describes the core phenomenological features of SP. Importantly, it extends beyond biomedical accounts to consider how SP is interpreted across cultural contexts, with particular relevance to Aotearoa New Zealand and Māori worldviews. This chapter positions SP as both a neurophysiological event and a culturally mediated experience, highlighting the importance of integrating multiple explanatory frameworks.

Sleep Paralysis: Definition and Preference

Contemporary Definition of Sleep Paralysis

Consistent with a biomedical paradigm, SP is defined primarily as a condition of the physical body, characterised by transient episodes of muscle atonia occurring at sleep-wake transitions (Olunu et al. 2018). The term "sleep paralysis" was first defined by British neurologist S.A Kinnier Wilson in 1928, who described it as a "short, transient loss of volitional movements that appear when falling asleep or waking up" (Ashworth & Jellinek, 2001). This definition highlighted observable, bodily manifestations, particularly immobility, and represented a conceptual shift toward viewing SP as a neurological rather than a supernatural or psychological phenomenon (De Sá & Mota-Rolim. 2016).

Early medical descriptions, such as Goode's (1962) account of SP as an "unusual neurologic phenomenon" involving the inability to move the limbs, speak, or open the eyes, similarly emphasised the motor aspects of the experience (Dahlitz & Parkes, 1993; Thorpy, 2002). Present day definitions, however, have expanded to incorporate the sensory and affective definitions. SP is now commonly defined as a phenomenon involving temporary paralysis of most skeletal muscles during sleep onset or upon awakening, while eye and diaphragm function is typically preserved, and is often accompanied by vivid hallucinations and intense fear (De Sá & Mota-Rolim. 2016; Wróbel-Knybel et al., 2018). Some discrepancies exist across definitions, particularly regarding the extent of retained voluntary control. For example, while most accounts acknowledge that eye movements remain intact, there is less consensus on whether individuals can exert intentional control over these movements or produce small voluntary actions (De Sá & Mota-Rolim, 2016; Sharpless & Doghramji, 2015). In addition, definitions differ in whether associated features such as hallucinations and sensed presence are considered central components of SP or common but non-essential characteristics (Cheyne, 2003; Jalal & Hinton, 2015). Despite these variations, all descriptions consistently centre on the transient inability to move during sleep–wake transitions as the defining feature of SP (De Sá & Mota-Rolim, 2016). These inconsistencies have implications for how SP is operationalised and measured across

studies, particularly in relation to prevalence estimates and the classification of SP experiences (Sharpless & Doghramji, 2015; Denis et al., 2018).

SP is recognised as a REM sleep-related parasomnia and is commonly understood to involve a disruption in the normal transition between REM sleep and wakefulness (Ableidinger & Holzinger., 2023). Narcolepsy is defined by the occurrence of sleep attacks, cataplexy, hypnagogic hallucinations and SP (Chavda et al., 2022). Within this context, SP is highly prevalent, with estimates suggesting that 30-50% of individuals with narcolepsy also experience SP episodes (Chavda et al., 2022). Historically, this strong association with narcolepsy led researchers to assume that the presence of SP in an otherwise healthy population was evidence of undiagnosed pathology (Hastings et al., 2025) A 1979 survey by the Sleep Disorders Classification committee reported SP prevalence rates of 3-6% in the general population, but these findings were rationalised as likely reflecting unrecognised cases of narcolepsy (Harris & Thorpy, 2012). These interpretations demonstrate a longstanding reluctance to acknowledge SP as a common, non-pathological phenomenon.

Only in the past several decades has recognition grown that SP can occur independently of narcolepsy or other sleep disorders. In these instances, the term "isolated sleep paralysis" (ISP) is applied (Sateia, 2014). The International Classification of Sleep Disorders (ICSD) formally distinguished this condition in its second edition, using the term "recurrent isolated sleep paralysis" (RISP) to describe repeated episodes occurring outside of a broader diagnostic framework (Sateia, 2014). This definition required multiple episodes for diagnosis but did not specify a minimum threshold nor did it incorporate distress or hallucinations into the criteria (Sateia, 2014). Consequently, individuals experiencing benign or even pleasant episodes could still meet diagnostic criteria. The third edition of the ICSD (2014) refined this by including clinically significant distress as a necessary criterion, thereby recognising the variability of subjective experience and limiting diagnosis to cases with meaningful psychological or functional impact (Sateia, 2014).

Prevalence and diagnosis of Sleep Paralysis

Epidemiological evidence indicates that SP prevalence is not evenly distributed across populations. A recent systematic review and meta-analysis estimated the pooled global prevalence of SP at approximately 30% when combining data from general population samples, students, psychiatric patients, and other subgroups (Hefnawy et al., 2024). However, prevalence rates differed substantially across populations, with students and psychiatric patients consistently demonstrating higher rates relative to general community samples. Sharpless and Barber (2011) reported that approximately 28% of students endorsed at least one lifetime SP episode (Sharpless & Barber, 2011), with other international student studies reporting prevalence rates between approximately 21% and

42% (Sharpless & Barber, 2011). The developmental timing of SP onset also aligns with this pattern, as adolescence and early adulthood are commonly identified as peak periods for first occurrence (Denis et al., 2018) Thirty per cent of a sample of university students reported at least one experience of sleep paralysis. Three quarters of those reported at least one halluncinoid experience and approximately 10% experienced three or more hallucinations (Cheyne et al., 1999).

Phenomenological Features of Sleep Paralysis

Phenomenologically, SP typically lasts between five to six minutes and it most likely to occur in the supine sleeping position (lying flat on the back with the face and torso facing upward) (Cheyne., 2002). SP is marked by a constellation of phenomenological features that together distinguish it from other sleep-related experiences (Wróbel-Knybel et al., 2022). While no two episodes are identical, reports consistently point toward a cluster of recurring perceptual, physiological and affective phenomena that appear across cultures, contexts, and theoretical explanations (Wróbel-Knybel et al., 2022) .These experiences are often emotionally impactful, leaving lingering distress long after the episode has resolved (Paradis et al., 2009) . Researchers have therefore argued that, despite cultural variations in interpretation, the recurrence of certain core features indicates a shared lived structure underlying SP (Brooks, 2024). These features include muscle atonia, chest pressure, hallucinations and fear and are described below. First, the characteristic features of the experience are outlined. This is followed by a review of neurophysiological explanations for these symptoms, before considering cultural and interpretive accounts that have been used to make sense of sleep paralysis experiences.

Paralysis/Muscle Atonia

The most defining feature of SP is the sudden onset of muscular atonia or paralysis, during which individuals are rendered immobile despite being conscious (Paradis et al., 2009) . Reports typically describe an inability to move limbs or vocalise, with only eye movements remaining under voluntary control (Paradis et al., 2009). The inability to produce speech, particularly to call for help, is often emphasised in personal accounts. Moaning or guttural vocalisations are occasionally reported near the end of episodes, further describing the distress of being silenced during the experience (de Sá & Mota-Rolim, 2016). SP is distinctive in that it occurs at the boundary between sleep and wakefulness (Ableidinger & Holzinger, 2023). Individuals report being fully conscious and aware of their immediate surroundings yet find their bodies unresponsive. This paradoxical state has been attributed to asynchronous transitions between REM and waking, with cortical arousal preceding the resumption of voluntary motor control (Wang et al., 2025). Experiences frequently describe the

disorienting conflict of having a full awake mind while their body stays “asleep”, which heightens feelings of being trapped and vulnerable (Paradis et al., 2009).

Chest Pressure

Another frequently reported symptom involves altered breathing sensations. Although physiological respiration remains intact, individuals often experience the subjective impression of suffocations, throat constriction or crushing pressure on the chest (Hefnawy et al., 2024). This symptom has been described for centuries in cultures that attribute SP to demonic entities sitting on the chest. Modern day accounts echo this imagery, with experiences describing being sat upon, held down, or otherwise physically restrained by a presence (Brooks, 2024). Such sensations are not merely uncomfortable, they often trigger acute panic, heightening the affective intensity of the episode (Paradis et al., 2009).

Hallucinations

Among the most striking and distressing features of SP are vivid hallucinations that occur either during sleep onset (hypnagogic) or awakening (hypnopompic) (Cheyne & Girard, 2007). Here, hypnagogic and hypnopompic refer to the timing of the SP episode relative to REM sleep-wake transitions, rather than to sleep onset at the beginning of the night. These hallucinations often blend seamlessly with real environmental cues, contributing to their apparent realism (Cheyne & Girard, 2007). They can involve any sensory modality: visual, auditory, tactile, and often carry a threatening or uncanny quality (Cheyne & Girard, 2007). The types of hallucinations are further organised into three categories: 1) intruder hallucinations, 2) incubus hallucinations, and 3) bodily experiences (Denis et al., 2018; Cheyne et al. 1999). While reported as terrifying in many instances, these perceptual experiences can also take neutral or even positive forms, underscoring the heterogeneity of SP.

The most commonly reported form is the intruder hallucinations or sensed presence, in which individuals feel that an entity or presence is nearby (Cheyne & Girard, 2007). This presence may be accompanied by footsteps, whispers, tactile sensations such as restraint, tugging or touching, or fleeting visual shadows (Cheyne & Girard, 2007). Such multisensory intensity reinforces the conviction that the presence is real, amplifying fear and distress. Incubus hallucinations, though distinct, often overlap with intruder phenomena. They involve chest pressure, breathing restriction and feelings of imminent death or assault (Cheyne & Girard, 2007). In some cases, individuals interpret these as violent or sexual assaults by supernatural or human agents (Cheyne & Girard, 2007). Bodily hallucinations, or vestibular-motor experiences, contrast sharply with the other two

categories, involving sensations of bodily movements, levitations, spinning or out-of-body experiences (Wang et al., 2025). Unlike the other types, bodily experiences are often described as pleasant or even euphoric and may overlap with lucid dreaming states (Cheyne & Girard, 2007).

Fear, Terror and Vulnerability

The most prevalent emotion associated with SP experiences is often fear. Fear, terror, and panic dominate the phenomenological reports, with up to 90-80% of participants in survey studies identifying fear as a central feature (Cheyne & Girard, 2007). In a sample of Irish university students, fear was found to be the most prevalent emotion, with 82% of respondents stating that they have experienced fear at some point during an SP episode (Solomonova, 2018; Ohayon & Pakpour, 2022). The origins of this fear are multifaceted: threatening presences, the vulnerability of being in a paralysed state, the sensation of constricted breathing and uncontrollable visions may increase the state of distress (Cheyne & Girad, 2007).

The Neurophysiological Basis of SP

The defining features of SP are remarkably stable across biomedical and physiological contexts, suggesting a strong neurophysiological basis as the universal driver of the phenomenon (Wang et al., 2025). Scientific explanations consistently observe SP within the dysregulation of REM sleep processes. Under typical conditions, REM sleep is characterised by vivid cortical activation alongside brainstem-mediated muscle atonia that prevents enactment of dreams (Lu et al., 2006). SP occurs when elements of this REM physiology persist into wakefulness, producing a state in which conscious awareness is restored while skeletal muscle inhibition remains active. This dissociation reflects disruption in the neural circuits that normally coordinate simultaneous recovery of motor control and cortical arousal (Wang et al., 2025). Evidence from early polygraphic recordings provides robust support for this model. Pioneering studies by Hishikawa and colleagues (1965, 1978) demonstrated that SP emerges during 'sleep-onset REM periods', wherein REM sleep occurs prematurely following sleep onset (Hishikawa et al., 1978; Hishikawa & Kaneko, 1965). Although these findings were drawn primarily from population samples with a diagnosis of narcolepsy, subsequent research suggests that a similar mechanism operates in non-narcoleptic populations (Wang et al., 2025). In both groups, the intrusion of REM features, most notable paralysis and dream imagery, into a waking state underpins the experience.

Central to this process is dysregulation within the sublaterodorsal nucleus (SLD) of the pons, a key "REM-on" structure responsible for initiating and maintaining REM sleep (Wang et al., 2025). The SLD contains two major populations of glutamatergic neurons: one that promotes cortical

activation and REM maintenance, and another that generates descending motor inhibition responsible for muscle atonia (Lu et al., 2006). During normal awakening, both neuronal populations are suppressed, permitting restoration of voluntary movement and stable consciousness (Lu et al., 2006). In SP, however, this coordinated deactivation fails. Neurons responsible for motor inhibition remain active while those supporting cortical arousal resume wake-like activity, resulting in preserved consciousness accompanied by persistent paralysis (Wang et al., 2025). Noradrenergic neurons within the locus coeruleus (LC), which are normally highly active during wakefulness, also play a crucial modulatory role (Lu et al., 2006). These neurons suppress REM-related atonia by inhibiting REM-promoting brainstem circuits (Lu et al., 2006). Transient reductions in LC firing during REM–wake transitions can therefore permit continued activation of motor inhibitory pathways despite emerging consciousness, thereby prolonging paralysis (Wang et al., 2025). This mechanism parallels evidence showing that LC inactivation contributes to states of muscle atonia in other REM dissociation phenomena and suggests that insufficient noradrenergic reactivation may contribute to SP (Wang et al., 2025). Motor inhibition is further sustained by downstream brainstem pathways. Inhibitory signals from the pontine reticular formation project via the ventromedial medulla, where GABAergic and glycinergic neurons suppress spinal motor neuron activity, maintaining loss of muscle tone (Wang et al., 2025). While this REM-intrusion model accounts for the basic physiology of paralysis, it does not adequately explain the hallucinatory and overwhelmingly fearful quality associated with SP episodes. While only a minority of dreams are negatively emotionally toned, SP experiences are disproportionately described in intensely distressing terms. Comparative research indicates that dream content differs substantially from SP hallucinations, with the latter characterised by hostile or aggressive images, and participants frequently reporting themselves as victims of attack (Cheyne, 2003; Parker & Blackmore., 2002). These findings have prompted further exploration of neural circuits beyond those regulating REM. Central to this enquiry is the amygdala, a brain structure intimately involved in fear processing.

The amygdala, particularly its central nucleus, has direct connections with REM-regulating brainstem nuclei and contributes to modulation of REM-related atonia (Sardar et al., 2023). Heightened negative emotional states such as fear and stress increase inhibitory signalling from the amygdala to REM-off regions, indirectly promoting REM-like motor inhibition (Sardar et al., 2023). The insula and anterior cingulate cortex form interconnected networks with the amygdala that integrate emotional salience and interoceptive awareness, potentially intensifying the subjective experience of paralysis (Wang et al., 2025). These limbic influences may help explain why SP episodes are frequently accompanied by heightened emotional intensity and threat perception. The conscious awareness of bodily paralysis, coupled with somatic disturbances such as chest pressure, is thought

to activate the amygdala, generating an acute fear or panic-like response (Wang et al., 2025). Attempts to resist paralysis, such as struggling to move or breathe deeply, may exacerbate this response by producing feelings of suffocation (Wang et al., 2025). This interaction between REM motor inhibition and limbic threat processing provides a coherent explanation for the characteristically terrifying quality of SP. Respiratory sensations frequently reported during SP also have a physiological basis. Although the diaphragm remains active during REM-related atonia, inhibition of accessory respiratory musculature reduces tidal volume and contributes to shallow breathing (Wang et al., 2025). This can produce hypercapnia and heightened awareness of respiratory effort, leading to sensations of chest pressure, suffocation, or an external weight on the torso often described during episodes (Wang et al., 2025). Hallucinatory experiences during SP are similarly linked to persistence of REM-related perceptual activity into wakefulness. During REM sleep, internally generated imagery is experienced as real due to reduced sensory input and altered cortical modulation (Wang et al., 2025). When this dream mentation intrudes into wakefulness, individuals may experience vivid multisensory phenomena superimposed onto awareness of the physical environment (Wang et al., 2025). Serotonergic systems appear particularly implicated in this process. Activation of serotonin 2A receptors within visual and limbic cortices increases cortical excitability and modulates emotional processing, intensifying perceptual vividness while amplifying fear responses (Wang et al., 2025). This neuromodulatory profile helps explain why SP hallucinations often feel immersive and realistic despite occurring in a transitional brain state.

The temporal architecture of sleep cycles further clarifies the conditions under which SP arises. Normally, an individual transition through stages of non-REM sleep before entering REM approximately 90-120 minutes after sleep onset (Patel et al., 2024). However, disruptions such as premature entry in REM, are associated with narcolepsy and have been strongly linked to SP (Wang et al., 2025). Experimental paradigms have demonstrated that SP can be indeed through methods that fragment sleep or enforce polyphasic sleep-wake cycles, both of which increase the probability of sleep onset REM periods (Cheyne., 2002). These findings highlight the role of sleep continuity and architecture in shaping vulnerability to SP, particularly in populations such as students, who often exhibit irregular sleep patterns.

While advances in sleep physiology have substantially improved understanding of the biological mechanisms underlying sleep and unusual sleep-related experiences such as SP, alternate explanations for these phenomena are also widely documented across cultural context. A growing body of cross-cultural evidence demonstrates that individuals interpret SP through frameworks that are profoundly shaped by their cultural and spiritual worldviews (Olunu et al., 2018). When these interpretations are ignored or invalidated within clinical and research contexts, important dimensions

of the phenomenon, such as its emotional impact, spiritual significance, and cultural salience, are overlooked (Brooks, 2024). As Hinton et al., (2005) and Jalal & Hinton (2013) note, the meanings attached to SP often influence the level of distress experienced during and after episodes (Hinton et al., 2005; Jalal & Hinton 2013). For example, communities that frame SP as a form of spirit visitation or ancestral contact may view the experience as meaningful, even protective, whereas those who interpret it as demonic assault or medical dysfunction may experience heightened fear and anxiety. Recognising such framework, therefore is not merely an anthropological concern but a clinical necessity, as it directly informs how individuals make sense of their symptoms and seek support (Olunu et al., 2018). While sleep paralysis is grounded in well-characterised neurophysiological mechanisms, its prevalence, severity, and emotional impact cannot be fully understood through physiology alone. The influence of external and contextual factors on sleep paralysis experiences is examined in the following section.

Cultural Variability in SP Interpretation

Although biomedical models describe SP as a REM-related dissociative state, a physiological overlap between waking consciousness and muscle atonia, many experiencers interpret episodes through cultural, spiritual, or paranormal narratives, often even after learning a neurological explanation (McCleese, 2019). Anthropological and psychological research consistently shows that culture shapes not only how SP is understood but also how it is perceived and reported. As highlighted by McCleese (2019), the anthropological literature on SP remains limited, in part because Western scholarship has historically dismissed culturally grounded explanations as superstition or folklore (McCleese, 2019). This neglect reflects a broader ethnocentric bias within the scientific community, where spiritual or supernatural interpretations are marginalised in favour of biomedical reductionism (McCleese, 2019). In societies lacking a recognised cultural framework for SP, such as the United States, the phenomenon often remains unacknowledged, unreported, or pathologised, as individuals fear being perceived as delusional or mentally ill (McCleese, 2019). Conversely, in cultures that possess established folklore, terminology, and communal understanding of SP, the experience is widely recognised, socially validated, and integrated into existing spiritual or cosmological systems (McCleese, 2019). This contrast underscores how cultural context influences both the prevalence of reported cases and the physiological impact of the event.

Research supports that the cultural environment provides both a cognitive schema and an emotional framework that shape the content and interpretation of SP episodes (McCleese, 2019). As De Sá and Mota-Rolim (2016) describe, although the physiological mechanisms of SP, REM intrusion, paralysis, and hypnagogic hallucinations, are universal, the way they are perceived varies

according to local cosmology (de Sá & Mota-Rolim, 2016b) . Cultures often produce specific entities, such as spirits, demons, or hags, which act as explanatory anchors for the event, giving form to sensations of pressure, immobility, or presence (de Sá & Mota-Rolim, 2016b). This process aligns with Hufford's (1982, 2005) Cultural Source Hypothesis, which suggests that cultural belief systems "load" the state of consciousness during SP with imagery and meaning, thereby shaping perceptual content (Hufford, 2005). However, Hufford also complicates this framework by arguing that culture does not fully determine the experience; rather, the experience itself can generate new spiritual beliefs in those previously secular or sceptical (Hinton et al.,2005). In other words, SP can act as both a culturally mediated and belief-generating event, blurring the assumed boundary between scientific and spiritual epistemologies.

Culture not only provides a framework of meaning for the experience but also influences emotional outcomes and social responses. In cultures with established supernatural explanations, such as those referencing night demons, ancestral visitations, or spiritual attacks, the experience is often terrifying yet interpretable an encounter with known forces rather than a descent into madness. This collective understanding offers sufferers a framework for coping, ritual protection, or spiritual remedy. In contrast, within biomedical or secular contexts, SP tends to be depersonalised and medicalised, described in terms of dysfunction or pathology. The absence of shared cultural meaning can leave experiencers isolated and fearful, compounding the distress of the event. As Hufford (2005) notes, individuals in secular Western contexts frequently suppress disclosure of their experienced due to stigma, leading to underreporting and misdiagnosis (Hufford, 2005). Consequently, the presence, or absence, of cultural narratives not only shapes the phenomenological character of SP but also determines whether the experience is integrated, feared, or silenced (Hufford, 2005). From a critical standpoint, this comparison highlights a profound epistemological divide between biomedical and cultural interpretations. The biomedical model, grounded in Western secular materialism, privileges causal reduction and objective measurement seeking to categorise SP as a disorder of REM physiology. In contrast, cultural frameworks view the event relationally, locating its cause and meaning within moral, spiritual, and existential contexts. These differing ontologies produce distinct psychological outcomes: when SP is interpreted through cultural systems that offer shared explanation and ritual response, distress may be mitigated through collective meaning-making; yet when explained solely through biomedical language, the same experience may be pathologised, invalidated, or stripped of personal significance.

SP offers compelling evidence of how a universal neurobiological phenomenon is interpreted and shaped through diverse cultural frameworks. While the core phenomenological features, paralysis, chest pressure, and a sensed presence, remain consistent, its interpretation varies

dramatically according to local cosmology and belief systems (De Sá & Mota-Rolim, 2016; Hinton et al., 2005). These cultural frameworks transform a brief episode of paralysis and intense fear into an encounter with the supernatural, embedding it within a community's broader spiritual and moral worldview. In this way, SP functions as both a biological event and a culturally mediated experience that reflect each society's distinctive understanding of the relationship between body, spirit, and the unseen. The following section traces how these cultural frameworks have emerged historically and continue to shape interpretations of sleep paralysis across diverse societies today.

Historical and Modern-day Interpretations of Sleep Paralysis Across Cultures

Interpretations of the phenomenon now recognised as SP have shifted markedly across historical periods and cultural contexts, reflecting broader changes in religious, medical, and explanatory frameworks for SP experiences. The earliest references recorded in literature can be traced to around 400 BC, both in Chinese texts and in the writings of Hippocrates, demonstrating that the experience was acknowledged long before it acquired formal medical classification and has been observed for over two millennia (Olunu et al., 2018) . In Ancient Greece, the condition was described as ephialtes, a term roughly meaning "to leap upon", which alluded directly to the common sensation of oppressive weight or pressure on the chest (de Sá & Mota-Rolim, 2016). The prefix "Pan", invoking the horned woodland deity, was often attached to the word. Within this framework, ephialtes was sometimes interpreted as Pan engaging in sexual encounters with the dreamer, symbolising a promise of future prosperity and fortune (de Sá & Mota-Rolim, 2016). With the emergence of the Christian Middle Ages, such interpretations shifted considerably. The overtly sexual associations once linked to ephialtes conflicted with the moral codes of Christianity, which strongly condemned sexual immorality (de Sá & Mota-Rolim, 2016). As a result, episodes SP increasingly came to be viewed as manifestations of the Devil's influence, marked by sensations of terror, immobility, bodily coldness, and muteness (de Sá & Mota-Rolim, 2016). Contemporary texts frequently attributed the experience to nocturnal attacks by demonic beings such as Incubi and Succubi, figures said to exploit sleepers through sexual seduction or assault within dreams (de Sá & Mota-Rolim, 2016).

Alongside supernatural explanations, early medical traditions also sought to define SP through physiological explanations. Greek physicians, including Galen, attributed the condition to gastric disturbances such as indigestion, overheating or excessive alcohol consumption (Hufford et al., 2005). During the Islamic Golden Age, physicians Rhazes and Akhawayni offered some of the earliest detailed scientific descriptions. Rhazes described the classical features of oppressive chest pressure and an inability to yell out, and Akhawayni attempted to naturalise it's aetiology by attributing it to 'vapors' rising from the stomach to the brain (Golzari et al., 2012). He also suggested a link between

sleep paralysis and epilepsy, an association that modern sleep medicine continues to explore. Treatments during this period reflected prevailing medical theories, ranging from dietary modifications to purgation and venesection (Golzari et al., 2012). The former sometimes resembling modern observations that dietary changes can influence sleep disorder, though not specifically sleep paralysis. Taken together, historical perspectives show how SP has been repeatedly reinterpreted, from diving or demonic affliction to humoral imbalance, to rudimentary medical explanation, depending on the dominant intellectual and cultural frameworks of the era.

Today across cultures, remarkably similar explanatory narratives have emerged. In Latin-based cultures, the imagery associated with SP often takes the form of suffocating entities that physically restrain the sleeper. In Mexico, the experience is known as *se me subió el muerto*, (translation: "a dead body climbed on top of me"), evoking the sense of a heavy, ghostly weight pressing on the chest. Similar motifs appear in Catalonia, where the *Pesanta*, a black dog or cat with holes in its paws, is said to invade homes at night to sit upon the sleeper and restrict their breathing. Likewise, in Brazil, the folkloric *Pisadeira* is a hag-like creature who tramples on the chests of those who sleep on their backs, producing the familiar sensations of immobility and suffocation. Among the Inuit of Canada's subarctic region, SP is referred to as *uqumangirniq*, an event understood within a spiritual framework that connects bodily paralysis to the actions of shamans (*angakkuit).* Inuit tradition holds that shamans, while usually benevolent spiritual mediators, can cast harmful spells (*ilisiiqsijuq*) to attack their enemies during sleep, exploiting the momentary disconnection between the body and the soul (*tarniq)*. This belief reinforces the culturally embedded notion that the boundary between the physical and spiritual realms becomes porous during sleep, leaving individuals vulnerable to supernatural interference. Similarly, in Japan, *kanashibari (translation: to be bound in metal chains)* is interpreted as the consequence of a curse or the act of a summoner who sends a vengeful spirit to immobilise a victim. Despite its representation in popular culture, such as manga, the phenomenon retains a deep association with spiritual imbalance and karmic retribution. In Japanese folklore, *kanashibari* happens whenever a person is about to encounter a supernatural being. It is something of a premonition (Johnson, 2023).

In Southeast Asia, SP interpretations are often intertwined with historical trauma and religious cosmology. Among Cambodian refugees studied by Hinton and colleagues (2005), SP, known as *khmaoch sângkât or "the ghost that pushes you down",* was reported by 42% of participants, many of whom were survivors of the Khmer Rouge genocide. The episodes were often attributed to ghosts of the unburied or violently killed, whose spirits linger to torment the living. The distress of these experiences was compounded by post-traumatic stress disorder (PTSD), as physical sensations such as chest pressure and suffocation were linked to past memories of torture, forced labour, and near

drowning. Here, SP becomes a conduit through which both cultural beliefs and trauma are embodied, highlighting the interplay between collective memory, personal suffering, and spiritual interpretation. Similarly, in Thailand, *phi am* is described as a haunting spirit that immobilises sleepers. In Egypt, the phenomenon is attributed to the *Jinn,* malevolent beings capable of possessions or harm (Jalal & Hinton, 2013). In Ethiopia, SP is associated with the *dukak,* an evil nocturnal spirit, while among the Hmong people of Vietnam and Laos, a "pressing spirit" is believed to sit on the chest and steal the breath of the sleeping person (Adler, 2011). Chinese folk belief similarly refers to SP as *gui ya shen (ghost oppression)*, rooted in the idea that the soul is vulnerable to wandering spirits during sleep (Yeung et al., 2005). In West Africa, the Yoruba attribute SP to *Ogun Oru,* a female demon who possesses the body and mind during dreaming (Aina & Famuyiwa, 2007).

In the Western world, remnants of these supernatural explanations persist. In Newfoundland, Canada, the "Old Hag" or "Ag Rog" legend described a witch who sits upon the sleeper's chest and prevents movement (Johnson, 2023; de Sá & Mota-Rolim, 2016). Experiences typically describe awakening suddenly, unable to move or speak, often soon after falling asleep. This paralysis is commonly accompanied by a sensation of heavy pressure on the chest, paired with the perception of a witch-like creature sitting on the chest of the experiencer. Local explanations for the Old Hag experience vary. The most common proposes that sleeping on one's back, or in the supine position, predisposes an individual to an attack. Others link vulnerability to overwork and bodily depletion, reflecting the physically demanding lifestyles of earlier generations. A third explanation attributes the experience to witchcraft, believed to be enacted by someone harbouring hostility toward the victim. Importantly, within this community, as well as in South Carolina and Georgia, the Old Hag is not viewed as an illness, nor is it thought to have lasting health consequences.

Within *te ao Māori* (the Māori worldview), sleep and altered states of consciousness are understood through the concept of *wairua* (spirit), reflecting the interconnected nature of spiritual, physical, and emotional dimensions of existence (Haami et al., 2023). Similar to Indigenous worldviews globally, Māori have been shown to conceptualise existence as relational and interconnected encompassing both the seen and unseen worlds. Within *te ao Māori* spiritually provides meaning and purpose to life, embodied through *wairua,* the vital essence that connects people to their ancestors (*tūpuna)*, environment, and the cosmos (Haami et al., 2023). This connection is continuous, bridging past, present, and future, a relationship often symbolised by the *pito* (umbilical cord), which represents the inseparability of these domains (Timoti et al., 2017). As Kennedy et al. (2015) notes, *wairua* is considered "as real as the tangible" forming the basis of Māori identity and wellbeing (Kennedy et al., 2015). Historical accounts from early ethnographers such as Beattie (1918) and Best (1922) describe traditional Māori understanding of *wairua* during altered states of

consciousness such as sleep, dreaming, or near-death experiences. In these states, *wairua* may temporarily depart the body, travelling across spiritual dimensions to gather knowledge, perceive danger, or receive messages from the spiritual realm (Beattie, 1918). Dreams and nocturnal visions are therefore viewed as valid sources of insight, warning, or communication from *tūpuna (ancestors)* or *kaitiaki* (spirit guardians). Within this worldview, experiences resembling SP, such as paralysis, a sensed presence, or out-of-body sensations, may be interpreted not as pathological disturbances, but as *wairua* events reflecting the porous boundaries between the physical and spiritual realms. Contemporary Māori research similarly recognises *wairua* experiences as part of everyday spiritual life (Lindsay et al., 2025). These experiences are sometimes associated with *matakite,* a cultural concept describing intuitive or visionary abilities, including the capacity to forsee events, communicate with unseen presences, or sense spiritual disturbances (Best, 1922; Ngata, 2014; NiaNia et al., 2019). From this perspective, encounters with presences during sleep or the sensation of being immobilised may align with *matakite* experiences rather than biomedical symptomatology. Communication with *tūpuna* or *kaitiaki* is often described as ongoing, providing comfort, guidance, or warnings, and reinforcing a world view in which the material and spiritual are inherently linked (Mark & Lyons, 2010; Taitimu et al., 2018).

Consequences of Ignoring Cultural Meaning

The study of SP has been dominated by biomedical and psychological paradigms that conceptualise the phenomenon as a sleep disorder rooted in REM physiology. Within this framework, SP is described as a form of "dissociated sleep" in which elements of REM, particularly muscle atonia, intrude into wakefulness, producing transient paralysis, vivid hallucinations, and intense fear (Sharpless & Barber, 2011). While such explanations offer a valuable understanding of underlying physiological mechanisms, their dominance has often come at the expense of acknowledging the experiential, cultural, and existential dimensions of SP. Contemporary scholarship increasingly recognises that a strictly medical model cannot account for the full range of meanings individuals attribute to their experiences, nor can it adequately address the diversity of responses observed across cultural settings.

Fukuda (1993) demonstrated that even the terminology used in research instruments can dramatically influence prevalence rates. When culturally resonant terms such as *kanashibari* were used in Japan, reports of SP increased substantially compared with questionnaires that employed biomedical descriptors such as "transient paralysis" (Fukuda, 1993). This finding illustrated that research design itself is culturally loaded: when scientific language fails to engage with local concepts of beliefs, it risks underestimating the phenomenon's true prevalence. Moreover, it reinforces that

participants' recognition and willingness to report SP are dependent on whether the language of inquiry aligns with their lived and cultural realities. Consequently, methodologies that rely exclusively on medicalised terminology reproduce epistemological bias, privileging Western conceptions of illness while marginalising alternative ontologies of experience (Fukuda, 1993) . Clinically, the failure to recognise non-medical frameworks can have serious implications for diagnosis and treatment. Cases have been documented in which patients presenting with SP episodes were misdiagnosed with psychosis or severe anxiety disorders because clinicians interpreted their descriptions of "spirits", "presences", or "attacks" as evidence of delusion rather than as culturally meaningful expressions (Gangdev, 2004; De Jong, 2005). Such misinterpretations can lead to inappropriate treatment, sometimes including unnecessary pharmacological intervention, and can reinforce stigma, alienation, and distrust toward healthcare services. By contrast, clinicians who incorporate cultural understanding and collaborate with patients' belief systems can mitigate fear and improve therapeutic outcomes. Integrative approaches that combine psychoeducation about SP's physiological mechanisms with respectful acknowledgement of cultural and spiritual frameworks have been shown to reduce distress and enhance patient engagements (Jalal, 2016). From a research perspective, the continued privileging of biomedical discourse reflects a broader epistemic hierarchy in which Western scientific rationalism is treated as the default framework for interpreting human experience. This stance marginalises alternative knowledge systems and perpetuates the assumption that spiritual or supernatural interpretations are irrational. Yet, as Hufford (2005) argues, SP demonstrates that spiritual experiences can coexist with biological processes without contradiction. Recognising non-medical frameworks, therefore does not undermine scientific inquiry, but enriches it, expanding our understanding of how biological, psychological, and cultural systems interact (Hufford 2005). In contemporary societies characterised by increasing cultural diversity and global interconnectedness, the need for such recognition is more pressing than ever. Research and clinicians must move beyond binary distinctions between "scientific" and "superstitious" explanations to adopt models that are culturally inclusive and phenomenologically grounded. Doing so allows SP to be understood not only as a neurophysiological anomaly but also as a deep human experience that reflects the interplay of body, mind and culture.

Recognising non-medical frameworks is especially important within culturally diverse societies such as Aotearoa NZ, where multiple worldviews coexist and inform understanding of health, illness, and spirituality. Within this context, Māori world views on sleep, consciousness and spirit reflect ontologies that differ fundamentally from Western biomedical paradigms. This interpretive gap highlights the epistemological tension between Māori spiritual frameworks and the dominant scientific discourse. Within clinical settings, these differences can have significant implications.

Research indicates that Māori often hesitate to disclose spiritual experiences to clinicians for fear of being misunderstood, pathologised, or dismissed (Lapsley et al., 2002; Taitimu et al., 2018). The biomedical's focus on individual pathology overlooks the relational and spiritual dimensions central to Māori world views of wellbeing, creating barriers to culturally safe care. Thus, while Māori may conceptualise SP-like episodes as *wairua* experiences or expressions of *matakite*, these interpretations are rarely acknowledged within clinical or research frameworks. This interpretive divide may help explain the absence of New Zealand specific data on Indigenous perspectives of SP. As Māori understandings of sleep emphasise the connection between body and spirit, acknowledging *te ao Māori* perspectives provides critical insight into how SP might be experienced and interpreted within Aotearoa NZ. Recognising such views challenged the university of biomedical models and underscores the need for culturally grounded research that honours Indigenous ontologies of mind, body and spirit.

Chapter Four: Sleep Paralysis as a Multifactorial Phenomenon

Chapter three examines the range of factors associated with the occurrence and experience of SP emphasising its multifactorial nature. It synthesises research on sleep-related contributors alongside psychological factors. Behavioural and lifestyle influences, including irregular sleep patterns and environmental demands, are also considered, with particular attention to tertiary student populations as a high-risk group. By integrating findings across these domains, this chapter highlights how SP emerges from the interaction of physiological, psychological, and contextual factors, providing a conceptual framework for interpreting the findings of the present study.

Factors contributing to Sleep Paralysis

According to Western scientific frameworks, SP appears to be rooted in neurophysiological mechanisms relating to REM-wake transitions; however, research increasingly demonstrates that external and psychosocial factors precede the likelihood, severity and phenomenology of episodes. Rather than operating independently of sleep-state physiology, these factors are understood to interact with and influence underlying sleep regulatory processes that foster SP. The contribution of these external factors, and their role in influencing both the prevalence and subjective quality of SP, will be examined in detail in the following sections.

Sleep Health

A substantial body of evidence demonstrates the SP is closely tied to overall sleep health, with both subjective and objective indicators of sleep quality influencing the prevalence of episodes. Large-scale epidemiological studies consistently show that individuals reporting poorer sleep quality are more likely to experience SP. For instance, survey data from China and Japan revealed that individuals rating their sleep as “bad” or “very bad” were at significantly greater risk of reporting SP compared to those with “good” or “very good” sleep quality (Ma et al., 2014). More nuanced work using validated sleep measures have found that higher global scores, indicating poorer sleep, are positively associated with SP (Denis et al., 2018). Specifically, longer sleep latency (taking more time to fall asleep) and increased daytime dysfunction (difficulty staying awake or sustaining enthusiasm during daily activities) were the strongest predictors of SP occurrence (Denis et al., 2018). Body position has also been indicated to play an additional role: episodes are most frequently reported when individuals fall asleep supine (on their backs), although posture alone is not sufficient to account for SP onset (Denis et al., 2018).

The relationship between SP and sleep health extends beyond general quality to include insomnia symptoms. Multiple studies show that difficulties initiating or maintaining sleep, frequent nocturnal awakenings and heightened pre-sleep arousal (both cognitive and somatic) are significantly associated with SP (Denis, 2018; Hsieh et al., 2010). In some analyses, insomnia symptoms predicted SP more strongly than global sleep quality, suggesting they may represent a more precise indicator of vulnerability (Denis, 2018). Maladaptive thoughts about sleep, such as persistent worry about being unable to fall asleep or maintain control over the sleep process, have been associated with greater vulnerability to SP (Denis, 2018). Epidemiological work has similarly linked later bedtimes (after midnight) to increased SP risk, although evidence for sleep duration and waking time remains inconsistent across studies (Denis, 2018). Importantly, poor sleep may serve as both a cause and consequence of SP. On one hand, poor sleep quality appears to predispose individuals to episodes. On the other hand, recurrent SP, especially when accompanied by fear and distress, can itself disrupt subsequent sleep, leading to avoidance behaviours (e.g., resisting sleep to prevent recurrence) or heightened pre-sleep anxiety. This bidirectional relationship may help explain the clustering of SP with other anomalous sleep experiences such as nightmares and nocturnal panic. Over time, such interactions can create a feedback loop in which disturbed sleep increases SP risk, while SP episodes exacerbate ongoing sleep problems.

At the physiological level, SP appears strongly influenced by disruptions to the normal progression of REM and NREM sleep stages. As mentioned previously, during each sleep cycle, the body alternates between these two phases, but factors such as sleep deprivation and stress can disrupt this orderly progression and trigger “rebound sleep”, an increase in REM, NREM or both (Lu et al., 2006). REM rebound in particular has been consistently identified as one of the most important risk factors for SP. Takeuchi and colleagues (1992) replicated this theory by subjecting participants to a nocturnal asleep-interruption schedule across four sleep cycles. They were successful in inducing six episodes of SP by disrupting REM-NREM continuity and causing partial REM deprivation. Similar findings have emerged in relation to irregular sleep schedules, such as shift work or jet lag (Takeuchi et al., 1992). While this research illustrates how sleep fragmentation and altered sleep timing can elicit SP, the research was conducted with a sample that reported experiencing SP frequently. Additionally, the number of episodes researchers were able to produce remained relatively low, suggesting that sleep disruption alone does not fully explain why SP happens. Instead, it likely combines with other personal or situational factors that make some individuals more vulnerable than others.

Stress, Trauma and Adverse Life Events

A substantial body of research highlights the role of stress, trauma and negative affective states in shaping vulnerability to SP. The Panic-Hallucination model (Jalal, 2016) provides a useful framework for understanding this relationship, proposing that the terrifying and immobilising sensations characteristic of SP can trigger catastrophic cognitions (e.g., believing one is permanently paralysed), which in turn amplify fear and perpetuate the episode through a feedback loop of distress (Jalal, 2016). This model aligns with findings that SP is strongly associated with panic disorder across diverse populations including African Americans (Paradis et al., 1997, Ramsawh et al., 2008), where panic-related cognitions and hyperarousal appear to intensify the experience. Post-traumatic stress disorder (PTSD) has also been consistently linked to SP, with evidence that individuals with trauma histories, such as firefighters, or refugees, are at elevated risk (Denis et al., 2018). Multiple studies further indicate that individuals with histories of childhood trauma, particularly sexual abuse, report both higher prevalence and greater distress during SP episodes, with phenomenology often characterised by vivid intruder or incubus hallucinations (Akhtar, 2025; Denis et al., 2018; Abrams et al., 2008). Beyond childhood adversity, war-related trauma and forced migration have been identified as significant risk factors. For example, higher prevalence rates have been documented among refugees and immigrant populations exposed to armed conflict (Akhtar, 2025), with cultural interpretations often framing SP in supernatural or spiritual terms. PTSD has also been associated not only with the occurrence of SP, but with more intense hallucination experiences, including intruder, incubus, and vestibular-motor phenomena (Abrams et al., 2008). Relatedly, traumatic experiences themselves have been repeatedly linked to SP (Sharpless et al., 2010), suggesting that trauma exposure may be an important pathway through which SP risk is elevated. However, the PTSD literature is not entirely uniform. For example, one study of African American participants found numerically higher current and lifetime PTSD rates in those with SP, but these differences were not statistically significant (Mellman et al., 2008). This suggests that while the PTSD–SP link is strong overall, it may vary across samples and study designs.

Mood and Psychological Symptoms

A consistent finding in the literature is that SP is more common among individuals experiencing poorer mental health and certain psychiatric disorders. Broadly, poorer general mental health has been associated with greater SP frequency in multiple non-clinical studies, suggesting that SP is not only linked to diagnosed disorders but may also occur more often in the context of elevated psychological distress more generally (Denis et al., 2018; Sharpless et al., 2011; Otto et al., 2006). Although this pattern has not been universal, with some studies failing to find a significant

relationship, the overall evidence indicates that compromised mental health is an important vulnerability factor.

Among specific disorders, anxiety-related conditions appear to show some of the strongest and most consistent associations with SP. Elevated SP prevalence has been reported in individuals with generalized anxiety disorder (15.8%), panic disorder (20.8–30.6%), and social phobia (22%) (Denis et al., 2018; Denis, 2018). Panic disorder in particular has been repeatedly implicated, with lifetime SP prevalence rates as high as 56–59% reported in panic disorder samples, compared with approximately 19% in those without panic disorder (Yeung et al., 2005). Other studies have similarly found SP to be more common in individuals with panic attacks than in those without (Paradis et al., 2009; Mellman et al., 2008), and recurrent SP has been shown to be especially elevated among people with panic disorder relative to those with other anxiety disorders (Paradis et al., 1997). At the symptom level, anxiety, anxiety sensitivity, and social anxiety have also been linked to SP, including recurrent and fearful SP (Sharpless et al., 2010; Otto et al., 2006). Notably, SP episodes involving a "felt presence" hallucination have been associated with higher levels of social anxiety and greater episode-related distress (Simard & Nielsen 2005). Even so, not all studies have found anxiety variables to independently predict SP indicating that anxiety is likely an important, but not exclusive, contributor.

Depression has shown a more mixed and generally weaker relationship with SP than anxiety or PTSD. Higher levels of self-reported depressed mood have been associated with more frequent SP in some studies (Mellman et al., 2008; Sharpless et al., 2010), and one study found this relationship remained significant even after controlling for anxiety symptoms (Szklo-Coxe et al., 2007). However, other multivariate studies have failed to identify depressed mood as an independent predictor once other factors, such as anxiety, sleep quality, dissociation, or stressful events, were considered. Similarly, clinical studies have not consistently found higher SP prevalence in those meeting diagnostic criteria for depression (Ohayon et al., 1999). This suggests that depressive symptoms may be associated with SP at a correlational level, but depression alone may not be a robust standalone predictor.

There is also limited but noteworthy evidence for associations with broader psychiatric complexity. For example, SP has been found to be more common in individuals with co-morbid anxiety disorders than in those with a single anxiety disorder (Otto et al., 2006), and the number of fearful SP episodes has been positively related to the total number of anxiety and mood disorder diagnoses (Sharpless et al., 2010). One study also found bipolar disorder to be more common in individuals experiencing severe SP, defined as at least one episode per week (Ohayon et al., 1999). By contrast, psychiatric medication use has shown little consistent relationship with SP. Most studies have not found antidepressants, hypnotics, or anxiolytics to be reliably associated with SP

frequency (Ohayon et al., 1999, Otto et al., 2006; Sharpless et al., 2010), although one study reported higher anxiolytic use among those with weekly SP (Ohayon et al., 1999).

Substance Use

The role of lifestyle behaviours in SP has been the subject of sustained but inconsistent investigation. Research consistently indicates that the occurrence of SP is positively associated with the consumption of psychoactive substances, particularly alcohol nicotine and caffeine (Spanos, 2024). A study conducted by Munezawa et al. (2011) investigated SP prevalence and associated factors in a sample of 90,081 junior and senior high school students in Japan using three surveys of lifestyle habits (i.e alcohol, smoking, eating and sleeping). Their findings showed that students who had reported consuming alcohol in the past month also reported higher frequencies of SP (12.2%) compared to those who had not (7.1%). Additionally, the researcher found that participants who reported smoking at least once in the past month had a greater (15.3%) SP prevalence, compared to non-smokers (7.8%). This finding in particular aligns with the notion that nicotine's cholinergic effect can enhance REM-related dream vividness, thereby increasing susceptibility to intrusions of REM physiology (Hobson, 2000; Jaehne et al., 2015). However, the binary yes/no format of Munezawa et al. (2011) questionnaire limited the precision of their conclusions, as it did not account for the frequency or intensity of alcohol and tobacco use. To address this limitation, Wrobel-Knybel et al. (2022) employed a correlation-based approach to examine SP prevalence, frequency and characteristics in relation to smoking, alcohol intake, caffeine consumption, and other lifestyle behaviours of nurses/midwives, teachers, police offers and others. Their results demonstrated a positive association between the number of years smoking and the number of SP episodes reported in the past month, further reinforcing the role of smoking as a contributing factor. They also identified associations between SP and alcohol intake, physical activity and caffeine consumption.

Caffeine consumption has been implicated indirectly, particularly in relation to its impact on sleep quality. Kerpershoek et al. (2018) explored caffeine timing and frequency in a sample of 880 students, measuring intake across different periods of the day (morning, afternoon, evening and night). They found that evening consumption was significantly associated with poorer sleep quality, an outcome that is itself closely tied to increased SP vulnerability. The suggests that late-day caffeine consumption may elevate the risk of SP by disrupting sleep architecture.

SP in Tertiary Student Populations

Tertiary students are consistently identified as a population with elevated rates of SP relative to the general population. A large systemic review spanning five decades of international research estimated lifetime SP prevalence at approximately 28% among university students, markedly higher than general population estimates (Sharpless & Barber, 2011). Subsequent studies have reported even higher rates, often ranging between 32–41%, suggesting that SP is a relatively common experience within student populations across diverse cultural contexts (Lišková et al., 2016). One explanation for these elevated rates relates to the unique neurophysiological and behavioural characteristics of adolescence and young adulthood. Sleep regulation systems remain in a period of maturation during the late teenage years and early twenties, particularly mechanisms governing circadian timing, REM regulation, and sleep–wake transitions (Marcus et al., 2008). This developmental phase is marked by delayed circadian rhythms, increased eveningness, and greater variability in sleep–wake schedules, creating instability in the boundaries between REM sleep and wakefulness (Marcus et al., 2008). Concurrently, tertiary students are disproportionately exposed to behavioural and psychosocial factors known to disrupt sleep continuity, including academic stress, irregular schedules, late-night technology use, social obligations, and chronic sleep restriction (Hershner & Chervin, 2014). Together, these developmental and lifestyle influences may create a "perfect storm" in which biologically vulnerable sleep systems interact with environmental pressures, increasing susceptibility to REM dissociation phenomena such as SP.

Empirical studies of university populations have largely relied on cross-sectional survey designs using self-report questionnaires. Samples typically consist of convenience cohorts recruited through university mailing lists, lecture announcements, or online platforms, and often draw predominantly from psychology or health-related student groups. Research has been conducted across Europe, North America, and parts of Asia, with fewer studies emerging from other regions. These studies commonly assess lifetime SP prevalence, age of onset, frequency of episodes, phenomenological features, emotional responses, and associations with sleep and psychological variables. Across studies, SP episodes among students are most frequently reported as occurring several times per year, aligning with the understanding that isolated SP is common while recurrent episodes are less frequent. Age of onset typically clusters in mid-to-late adolescence, with mean onset around 16–18 years (Denis et al., 2018). This timing corresponds with developmental changes in REM regulation and supports the notion that neurophysiological maturation may contribute to vulnerability (Marcus et al., 2008). Associations between SP and psychological variables have also been examined. Research frequently reports relationships between SP and nightmares, dissociative tendencies, anxiety symptoms, and poorer subjective sleep quality (Denis, 2018; Wróbel-Knybel et al., 2022).

Nightmares in particular appear to be one of the strongest predictors of SP frequency. However, effect sizes are often small, likely reflecting the generally poor sleep quality and elevated stress levels characteristic of student populations more broadly. Despite valuable insights, several methodological limitations constrain interpretation of the current literature. Heavy reliance on retrospective self-report measures introduces recall bias and subjective misinterpretation of experiences. Many studies lack control groups, limiting comparisons between students with and without SP. Convenience sampling restricts generalisability, and sample sizes are often modest relative to population-level inference. Measurement tools also vary widely, with some instruments lacking cultural or linguistic validation, complicating cross-study comparisons. Furthermore, most research emphasises negative aspects of SP while underexploring neutral or positive experiences.

Within the Aotearoa New Zealand context, these gaps are particularly salient. Māori are disproportionately represented in sleep disorders, mental health difficulties, and broader determinants of sleep disruption, including socioeconomic stressors and shift-work patterns (Muller et al., 2023; Gibson et al., 2020). These factors are widely recognised as contributors to REM dysregulation and fragmented sleep, suggesting that Māori students may face heightened vulnerability to SP through both physiological and contextual pathways. At the same time, Māori conceptual frameworks grounded in *wairua* (spiritual interconnectedness) may shape the interpretation of SP-like experiences differently from Western biomedical models (Sullivan & Lindsay, 2026; Sullivan, 2023). Consequently, Māori students may be more likely to interpret SP through cultural or spiritual meanings rather than physiological explanations, influencing both emotional responses and help-seeking behaviours. Despite this, Māori perspectives and representation remain largely absent from international SP research, highlighting the need for culturally grounded investigation within New Zealand tertiary populations.

Summary and Research Objectives

From the research presented, SP is defined within Western biomedical literature as a REM-related parasomnia characterised by transient muscle atonia occurring at sleep-wake transitions, often accompanied by vivid hallucinations and intense fear. This definition situates SP primarily within a neurophysiological framework, viewing it as a benign but distressing intrusion of REM mechanisms into wakefulness. However, alternative definitions and interpretations can be seen across different cultures, where SP is understood through spiritual, supernatural, or ancestral frameworks rather than as a disorder. These interpretations demonstrate that SP is not only a biological event but also a culturally mediated experience embedded in local cosmologies. In Aotearoa NZ, this diversity of interpretation is especially relevant given the nations multicultural composition and the presence of

Māori worldviews that integrate physical, spiritual, and ancestral dimensions of wellbeing. Within *te ao Māori,* experiences resembling SP may be understood through the concepts of *wairua* (spirit) and *matakite* (spiritual insight), where communication with ancestors or unseen presences is considered a normal part of spiritual like rather than pathology. However, these perspectives are less commonly represented within the predominantly biomedical sleep literature, highlighting the importance of incorporating more culturally inclusive frameworks in future research. Recognising these cultural frameworks is crucial for developing more inclusive understandings of SP that reflect the lived experiences of all communities in Aotearoa NZ.

International research indicates that SP arises from a combination of physiological, psychological and behavioural factors. The primary causes are thought to involve disruptions to REM sleep regulation, in which the normal boundary between dreaming and wakefulness becomes blurred, leading to temporary paralysis while consciousness is regained. These neurophysiological mechanisms are frequently triggered or exacerbated by poor sleep quality, irregular sleep-wake schedules, elevated stress, and emotional distress. Tertiary students are particularly vulnerable to these risk factors due to academic demands, late-night study patterns, consumption psychoactive substances, and heightened psychosocial stress. Given that even transient sleep problems have been linked to elevated risks of anxiety, depression, and other psychological difficulties in this population, understanding and addressing the underlying contributors to poor sleep during the tertiary years is a critical priority for promoting student wellbeing. Despite strong international evidence connecting sleep quality, stress, and psychological health with SP, no research has yet examined the prevalence or correlates of SP within Aotearoa NZ, and little is known about how students in this context experience or interpret the phenomenon. in consideration of the above, the main research questions explored within the current student include:

1. What is the prevalence of SP among a sample of tertiary students in Aotearoa New Zealand?
2. What are the main phenomenological features of SP?
3. What are the associations between sleep quality, general mood and well-being, and the experience of SP among tertiary students?

Recognising that experiences like sleep paralysis can be underreported or conceptualised differently depending on individuals' worldviews and cultural frameworks, the study aimed to explore the diversity of SP experiences and their associations with factors such as mood and perceived stress among tertiary students.

Chapter Five: Method

This chapter outlines the methodological approach used in the current project as well as ethical considerations. The recruitment process is described and the demographic information pertaining to the participant sample is represented. The method employed and an in-depth description of the measures and analytic process is also outlined.

Research Design

The present study employed a quantitative research design using an online self-report survey administered to a tertiary student population. The survey incorporated standardised measures to assess sleep quality, psychological distress, and unusual sleep experiences, alongside open-ended items that allowed participants to describe their experiences in their own words. An online format was selected to enable efficient recruitment across multiple institutions, accommodate resource and time constraints, and facilitate anonymous participation, which was particularly important given the sensitive nature of SP experiences. In line with recommendations to consider both objective and subjective indicators of sleep (Léger et al., 2024), sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), with scores ≥ 5 indicating clinically significant sleep disturbance. Open-ended responses were used to capture the subjective and experiential dimensions of sleep and SP. This approach allowed for standardised quantitative analysis while also incorporating participants' individual interpretations and descriptions of their experiences.

Participants

Selection Criteria and Recruitment Process

To be eligible for participation, individuals were required to be between the ages of 18 and 30 years, currently enrolled at a tertiary institution, and residing within Aotearoa New Zealand. The age range was selected to capture young adulthood, a developmental period typically defined as spanning approximately 18 to 35 years (U.S. Census Bureau) and characterised by ongoing neurobiological maturation into the late twenties and early thirties (Arain et al., 2013), which may increase vulnerability to sleep disruption. All eligibility criteria were assessed via self-report within the online survey. While eligibility criteria did not require participants to have personally experienced sleep paralysis, the survey included measures to capture the occurrence and cultural nuances of such experiences should they arise.

Participants for the current project were recruited using a non-probability, convenience sampling approach (Golzar et al., 2022). Advertisements were shared online via LinkedIn and various Facebook groups specifically targeted at tertiary students enrolled at institutions across Aotearoa New

Zealand. (Appendix B) This method relied on volunteer self-selection, meaning that any individual who saw the advertisement and met the eligibility criteria had the opportunity to participate if they chose to do so. This approach was chosen due to its practicality and accessibility for reaching a wide range of participants within a limited timeframe. While convenience sampling can limit the generalisability of the findings due to potential sampling bias (Golzar et al., 2022), it was considered appropriate for an exploratory study seeking to gather closed and open-ended data responses on the prevalence and experiences of sleep paralysis within the New Zealand context.

Participant Demographics

The final sample consisted of 91 students enrolled at universities across Aotearoa New Zealand and different grades of study. Of the total sample, 73 participants identified as female (80.2%), 13 as male (11.4%) and 5 (2.5%) as other/prefer not to say. Participants ranged in age from 18 to 30 years. Reported ethnic backgrounds included New Zealand European (73.6%), Māori (8.8%) and other (17.6%). Sixty (63.3%) participants were enrolled in undergraduate programs, while 31 (36.7%) were enrolled in postgraduate. In terms of employment status, 39 (44.3%) participants reported working part time alongside their studies, 20 (22.8%) were employed full-time, 5 (5.1%) were self-employed, 21 (20.1%) were unemployed and 6 (5.1%) reported other work arrangements.

Procedure

Following approval from the Massey ethics committee, the web-based survey was available from June 2025 to August 2025. All survey responses were collected anonymously and securely stored on a password-protected Massey University OneDrive account, accessible only to the researcher and her supervisors. As outlined in the participant information sheet, individuals were informed prior to participation that all research data obtained would remain anonymous and that they retained the right to skip any questions they did not wish to answer. Participants were also advised that their de-identified data may be used in publications and could be made publicly available, and once their survey was submitted, withdrawal of their responses would not be possible due to the anonymous nature of the data. Informed consent was implied by participants choosing to commence the survey after reading the information sheet (Appendix A). To assess participants' sleep habits, general mood and wellbeing, and the prevalence of sleep paralysis and other unusual sleep experiences, an 87-item online questionnaire was developed using the Qualtrics survey platform. The average time taken to complete the survey was 10.2 minutes (SD = 3.1). This included a series of demographic questions designed to collect relevant background information such as age, gender, ethnicity, employment status and details of tertiary enrolment. Participants were also asked to provide an

overall rating of their general health status and to indicate whether they had received any formal diagnosis for physical, mental health or sleep-related conditions.

Measures

In addition to researcher-designed items, several standardised and widely validated scales were selected to gather information on key outcomes pertaining to mood, sleep quality and wellbeing. These instruments will be described in detail below.

Depression, Anxiety and Stress Scale - 21 (DASS-21)

The survey included the short-form version of the Depression, Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) to assess psychological distress. The DASS- is a 21-item self-report instrument designed to measure the emotional states of depression (e.g hopelessness, devaluation of life and loss of self-esteem), anxiety (e.g fear and anticipation of negative events) and stress (e.g persistent state of over arousal and low frustration tolerance) (Lovibond & Lovibond, 1995). The scale is divided into three subscales (DASS-D, DASS-A and DASS-S) with seven items each measuring depression, anxiety and stress respectively. Each item is rated on a 4-point Likert scale ranging from 0 ('Did not apply to me at all') to 3 ('Applied to me very much or most of the time'), with participants asked to indicate the extent to which each of the items applied to them over the past week. Subscale scores for depression, anxiety and stress are summed and multiplied by two to yield a total score between 0 and 42 for each subscale separately. Higher scores indicate greater severity of emotional distress. In addition to raw scores, the DASS-21 is often interpreted using established cut off scores that indicate the severity of depression, anxiety and stress, ranging from normal (< 3) to mild (scores 4-5), moderate (scores 6-7), severe (scores 8-9) and extremely severe (scores > 10) (Crawford & Henry, 2003; Lovibond & Lovibond, 1995).

This scale was included as part of the study's focus on exploring associations between general mood and Sleep Paralysis. The DASS-21 was chosen for the present study due to its robust psychometric properties and extensive validation across tertiary student populations. A recent literature review by Dwight et al. (2024) reported strong internal consistency coefficients for each subscale in adolescent and young adults samples: Depression (α = .72–.99), Anxiety (α = .75–.99), Stress (α = .70–.94), and Total (α = .80–.95). Similarly, reliability was observed in a sample of medical students, with Cronbach's alpha values of .81, .89 and .78 for the Depression, Anxiety and Stress subscales respectively. The scale has also demonstrated satisfactory discriminant validity and convergent validity when compared to other measures. The Depression subscale shows strong correlations with established depression measures, including the Center for Epidemiological Studies–Depression Scale (CES-D*; r = .86–.87*), and the Duke Health Profile Depression domain (*r = −.58*)(Brown

et al., 1997). The Anxiety subscale demonstrates moderate to strong convergent validity with anxiety measures, including the Generalised Anxiety Disorder screener (GAD-7; r = .50–.72) and the Anxiety domain of the Duke Health Profile (*r = −.50*)(Bibi et al., 2020). The Stress subscale demonstrates moderate correlations with related constructs, including anxiety (*r = −.50*), depression (*r = −.48*), and general health (r = −.47), consistent with its conceptualisation as a distinct dimension of psychological distress. The DASS-21 total score also demonstrates strong convergent validity, showing high correlations with global symptom measures such as the Langner Symptom Survey (*r = .76–.80*) and moderate associations with general and mental health indices (*r = −.63 to −.66*). These findings support the validity of the DASS-21 subscales and total score for assessing psychological distress in tertiary student populations.

Generalised Anxiety Disorder - 7 (GAD-7)

The Generalised Anxiety Disorder -7 item scale (GAD-7; Spitzer et al., 2006) is a brief self-report screening tool designed to identify and measure the symptoms of generalised anxiety disorder (GAD). The scale assesses the most prominent diagnostic features of GAD, as outlined in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition including excessive worry and anxiety occurring more days than not. The GAD-7 includes seven items reflecting common GAD symptoms: nervousness, inability to control worrying, excessive worry, restlessness, difficulty relaxing, irritability and fear that something awful might happen. Participants are asked to indicate how often they have been bothered by each symptom over the past two weeks, using a 4-point Likert scale ranging from 0 ('Not at all') to 3 ('Nearly every day). Total scores range from 0 to 21, with higher scores indicating greater symptom severity. Prior research has indicated that a cut off score of ≧ 10 has acceptable sensitivity and specificity for detecting GAD in the general population (Spitzer et al., 2006)

The GAD-7 was selected for this study due to its well-established psychometric properties across a range of populations, particularly within tertiary student populations. A recent study by White and Karr (2023) examined the psychometric properties of the GAD-7 among undergraduate students. Their results demonstrated excellent internal consistency of the GAD-7 with both Cronbach's alpha and McDonald's omega values reported at 0.91 and showed strong evidence for both convergent and discriminant validity (White & Karr, 2023). Additionally, measurement invariance testing indicated that the GAD-7 functions equivalently across gender, academic year, and ethnic identity, supporting its utility for making comparisons between diverse student groups (White & Karr, 2023). These findings align with prior research across a range of international settings (Spitzer et al.,

2006; Kroenke et al., 2007; Löwe et al., 2008). The GAD-7s strong psychometric performance made it an appropriate instrument for inclusion in the present study.

Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989) is a widely used self-report instrument designed to assess subjective sleep quality and disturbance in the past month. It comprises 24 items, of which 19 are self-rated by the participant. The initial five items gather information on habitual sleep patterns, including typical bedtime, sleep latency, wake-up time, hours of actual sleep, and total time spent in bed. From this data, sleep efficiency is calculated, defined as the proportion of time spent asleep relative to time spent in bed, typically expressed as a percentage (Buysse et al., 1989). The subsequent 14 items assess the frequency of common sleep difficulties (e.g trouble falling asleep within 30 minutes, waking during the night and nocturnal bathroom use), overall perceived sleep quality, use of sleep medication and daytime dysfunction. An additional five items are completed by a bed partner or roommate; however, these items do not contribute to the global score and are not required for scoring. These items were therefore omitted from the present study to reduce survey length, particularly given the online format and the broader set of measures included in the study. The 19 self-related items are rated on a scale from 0 ('Not during the past month) to 3 ('Three or more times a week') which are summed to reveal a score ranging from 0 to 21. The higher the score, the more sleep problems exist and thus, poorer sleep quality, with scores greater than 5 indicative of significant sleep difficulties (Buysse et al., 1989).

Since its development, the PSQI has been validated and applied in many different populations and samples and has consistently demonstrated good reliability and validity. Internal consistency, assessed by Cronbach's alpha, typically ranges between 0.70 and 0.85, indicating good reliability, though not exceeding the threshold of 0.90 (Buysse et al., 1989; Carpenter & Andrykowski 1989; Liu et el., 2021) Test-retest reliability showed correlation of coefficients above 0.70 in some studies, supporting temporal stability, however further research is needed to establish the optimal interval for retesting. In the original validation study, Buysse et al. (1989) demonstrated that the global score reliably distinguishes individuals with clinically significant sleep disturbance from good sleepers across multiple diagnostic groups, including individuals with sleep initiation or maintenance disorders, excessive daytime sleepiness, and depression. Using the conventional cut-off score of ≥ 5, the PSQI correctly identified between 84% and 97% of individuals with clinically relevant sleep difficulties, with reported sensitivity of approximately 90% and specificity of 87% (Buysse et al., 1989). This indicates that the global score has strong discriminative validity for identifying meaningful sleep disturbance. Convergent validity has also been established, with PSQI global scores showing moderate

to strong associations with sleep diary variables, subjective sleep complaints, and measures of psychological distress (Buysse et al., 1989). As such, the PSQI global score remains a valid and widely accepted index of overall sleep quality for population-based and non-clinical research, including studies of tertiary student samples such as the present study.

Unusual Sleep Experiences Questionnaire (USEQ)

The prevalence and phenomenology of participants' unusual sleep experiences, including sleep paralysis was assessed using the Unusual Sleep Experiences Questionnaire (USEQ, Paradis et al., 2009), a self-report instrument that captures the frequency, descriptive features and personal interpretations of these experiences. Participants were first asked whether they had ever experienced the hallmark feature of sleep paralysis, described as an episode upon falling asleep or awakening when they were unable to move their arms or legs or speak despite wanting to do so (Denis et al., 2018). In addition, participants were asked about various other sensations commonly associated with sleep paralysis, such as feeling smothered or sensing a presence. These items were rated on a 4-point Likert scale ranging from 1 = "Never" to 4 = "Always" with the exception of 2 items rated on a 5-point Likert scale ranging from 1 = "Not at all" to 5 = "A lot", consistent with the original measure design. These items assessed fear-related appraisals (e.g., concerns about physical or psychological harm) and were intentionally formatted differently by the original scale developers to capture gradations in perceived threat rather than frequency of occurrence. Those who indicated never to all of these screening questions were directed to the end of the survey, as further detailed questions were only relevant for those who had personally experienced sleep paralysis or related unusual sleep phenomena. Those who responded affirmatively were invited to complete additional items describing their most vivid episode in their own words and to provide further detail about the frequency, age of onset, duration and contextual factors surrounding the experience.

Several modifications were made to the original questionnaire battery. To ensure cultural relevance and inclusivity within the local NZ context, revisions were made to the original wording of selected USEQ items while preserving their original meaning and intent. Specifically, items assessing participants' interpretations of their experiences were expanded to include culturally relevant constructs through the use of te reo Māori terms which were added alongside existing Western response options. For example, response options referring to spiritual or supernatural explanations were expanded to include the Māori terms *kehua*, *hinonga rewera* and *tūtakitanga wairua* as consistent in the Māori culture. To minimise survey length, USEQ items judged to be redundant (i.e., overlapping content that did not add meaningful information beyond other retained items) were removed. In addition, one or more items that could be interpreted as unnecessarily pathologising or

distress-inducing were excluded (e.g., “Were you afraid of going crazy, insane or losing your mind?”). This decision was made to avoid framing SP experiences in a psychologically negative or clinical way, and to reduce the likelihood of triggering distress, while still capturing the core phenomenological features and interpretations central to the study aims.

To date, no published research has formally evaluated the psychometric properties of the USEQ, and no standardised or formal scoring system has been established for this measure. The original author and developer of the USEQ was contacted to enquire about a formal scoring procedure, however it was confirmed that no formal scoring system exists for this instrument. Despite the current lack of psychometric validation, the USEQ was selected over broader sleep disorder screening tools because of its specific focus on capturing the phenomenology of ‘isolated sleep paralysis’. General sleep disorder questionnaires, such as the Sleep Disorders Questionnaire (SDQ, Douglas et al., 1994) and the PSQI, do not directly assess sleep paralysis and would rely on participants spontaneously reporting such experiences within open-ended or “other” response options related to sleep disturbances. The USEQ’s targeted approach therefore allowed for a more detailed and conceptually appropriate assessment of sleep paralysis experiences, aligning with the specific aims of this research.

Data Analysis

Quantitative data were analysed using jamovi (version 2.7.17). Data screening procedures included inspection of missing data and assessment of normality using Shapiro-Wilk tests and visual inspection of histograms and Q-Q plots. Descriptive statistics were first computed to summarise demographic characteristics of the sample, as well as score distributions of mood and sleep quality measures. As several outcome variables deviated from normality, non-parametric statistical methods were applied.

Group comparisons between participants who reported experiencing SP and those who did not were conducted using Mann-Whitney U tests. SP status was determined using a single screening item adapted from the USEQ and consistent with prior research. Participants were asked whether they had ever experienced an episode in which, upon falling asleep or waking up, they were unable to move their arms, legs, or speak despite wanting to do so. This experience reflects the hallmark defining feature of SP as described in the literature (Denis et al., 2018). Participants who responded *yes* to this item were classified as having experienced SP, while those who responded *no* were classified as the non-SP comparison group. Participants who indicated uncertainty (*not sure*) were excluded from group-based analyses. This classification approach mirrors that used in previous epidemiological and phenomenological studies of sleep paralysis and allowed for clear group delineation based on the core

diagnostic feature of the phenomenon. Effect sizes for non-parametric comparisons were calculated using the rank-biserial correlation (*r)*. Associations between SP symptom count, psychological distress, and sleep quality were examined using Spearman's rank-order correlations. Binary logistic regression analysis was used to examine whether psychological distress and sleep quality were independently associated with the likelihood of reporting SP, with predictors entered simultaneously. Statistical significance was evaluated using an alpha level of .05.

Qualitative data were derived from free-text responses embedded within the survey, in which participants were invited to describe their sleep paralysis experiences in their own words, including the sensory features of episodes, perceived antecedents, emotional responses, and personal interpretations of the experiences. Responses were analysed using content analysis (Forman & Damschroder, 2007). All responses were first read in full to achieve familiarisation with the data. Initial codes were then generated with categories informed both by recurring patterns in the qualitative data and by the most frequently endorsed symptoms identified in the quantitative symptom list. In this way, the qualitative and quantitative components of the study were conceptually aligned, with phenomenological categories reflecting commonly reported features in past literature such as fear, sensed presence, physical sensations, and heightened realism. Coding was data-driven rather than theory-led, allowing categories to emerge from participants' own language. Codes were subsequently reviewed, compared, and refined, with conceptually similar codes grouped into higher-order categories representing common phenomenological features and interpretive frameworks. Throughout the process, categories were checked against the original data to ensure they accurately reflected participants' responses. The resulting categories were used to describe patterns within the qualitative data and to compliment the quantitative findings.

Ethics

A review and subsequent approval for the current research project was acquired by the Massey University Human Ethics Ohu Matatika 1, Application OM1 25/22. To minimise potential distress associated with participation in the online survey, contact details for relevant mental health and support services were provided both at the beginning and end of the survey. All participants were briefed about the study's objectives, procedures and significance. Participants were informed of their right to withdraw from the survey at any point or to skip any questions they preferred not to answer. No identifying information was collected to ensure participant anonymity and protect participant confidentiality. To support cultural appropriateness, cultural guidance was sought from an internal cultural advisor at Massey University to ensure that the research was conducted in a manner that is respectful and appropriate when engaging with Māori and other indigenous participants. This

consultation informed decisions regarding the wording and framing of survey items, particularly those relating to participants' interpretations of unusual sleep experiences. Care was taken to avoid deficit-based or pathologising language, and to ensure that spiritual and cultural explanations were presented as valid and meaningful interpretations rather than framed as abnormal. Te reo Māori terms were incorporated alongside Western explanatory constructs where appropriate.

Chapter Six: Results

This chapter presents the findings of the study and is organised into two main sections: quantitative results and qualitative findings. The chapter begins with a description of the sample demographics, followed by quantitative analyses examining psychological distress, sleep quality, and the prevalence and correlates of SP. These analyses include descriptive statistics and inferential tests assessing associations between mood, sleep quality, and the prevalence of sleep paralysis symptoms. The second section presents the qualitative findings derived from open-ended responses, focusing on the phenomenological characteristics of participants experiences of sleep paralysis and their interpretations of these experiences.

Demographics

In total, 137 participants undertook the online survey. Of these, 41 participants did not complete one or more core outcome measures and were therefore excluded from inferential analyses. Specifically, some participants discontinued the survey prior to completing standardised measures of sleep quality, psychological distress, or the screening item required to classify the presence or absence of SP symptoms. As these measures were central to the study aims and required for group classification and statistical analyses, cases with missing data on these key variables could not be meaningfully included. Missing data were not replaced or imputed as incomplete responses reflected survey discontinuation rather than isolated item-level missingness, and imputing values for standardised psychological measures would risk introducing bias (Kang, 2013). Data from 91 participants who completed the relevant core measures were retained for analysis. These participants had a mean age of 26 years (SD = 3.18, Range = 18 – 30) and the majority (80.2%) were female and of New Zealand European ethnicity (73.6%). Full demographic characteristics of the sample and key variables can be found in Table 1.

Table 1

Demographic Characteristics of Participants (n=91)

Characteristic	Category	N (%)
Gender	Female	73 (80.2)
	Male	13 (11.4)
	Non-binary/Third gender	3 (2.5)
	Prefer to self-describe	1 (1.3)
	Prefer not to say	1 (1.3)
Age	18-24	46 (50.5)

	25-30	45(49.5)
Ethnicity	New Zealand European	67(73.6)
	Māori	8 (8.8)
	Other	16(17.6)
Living Situation While Studying	Sharing a house/flat with others	41 (40.5)
	Living at home with family	36 (40.5)
	Other	14 (17.7)
Level of Study	Undergraduate	60 (63.3)
	Postgraduate	31 (36.7)
Employment Status	Working part-time	39(44.3)
	Working full-time	20(22.8)
	Self-employed/contractor	5 (5.1)
	Unemployed	21(20.2)
	Other	6 (5.1)

Prevalence of SP among tertiary students in Aotearoa NZ

Of the participants who completed the USEQ, 39 participants (42.9%) reported having had an experience whereby upon going to sleep or waking up, they were unable to move their arms, legs or speak even though they wanted to do so. Forty-three participants (47.3%) of participants responded "no" and nine (9.9%) reported they were not sure. For the purpose of this analysis, participants who responded "yes" to this item were classified as having experienced SP, while those who responded "no" were classified as the non-SP group. Participants who reported uncertainty were excluded from analyses. his classification approach was guided by the core definitional criteria for SP outlined in current literature (Sharpless, 2016), which emphasises conscious awareness accompanied by transient muscle atonia. Participants who indicated uncertainty were excluded from group-based analyses.

Table 2

Frequency of Sleep Paralysis Characteristics and Demographics

Variable	Category	N	%
SP Classification	Yes	38	42.9
	No	43	47.3
	Unsure	9	9.9

SP episode frequency (past year)	1 – 4 episodes	15	16.5
	5-20 episodes	5	5.5
	Not in the past year	1	1.1
	Unsure	17	18.7
Age of first SP episode	<10 years	11	12.1
	11-20 years	17	18.7
	21-30 years	2	2.2
	Unsure	8	8.8
Gender (SP group only)	Female	30	76.9
	Male	6	15.4
	Other	2	5.2

The sensory symptoms associated with SP are summarised in Figure 1. To aid interpretation, responses of always, frequently, and occasionally were collated to indicate that a symptom had been experienced, while response of never indicate that the symptom had not been experienced. The most reported SP symptoms were an inability to speak or call out despite trying (63.7%), sensing a presence in the room (63.7%), and hearing unusual sounds (63.7%).

Table 3

Percentages of Sensory Symptoms Reported During SP

Symptom	Yes	No
Pressure on chest or other parts of your body	59.3	40.7
Feelings of being smothered	28.6	71.4
Heard unusual sounds	63.7	36.3
Felt like might die	46.1	53.8
Felt numbness, vibrations or tingling sensations	60.4	53.8
Felt that had temporarily left body	50.5	49.5
Felt as if were looking at own body from outside it	30.8	69.2
Smelt an unusual odour	13.2	69.2
Felt like were being strangled	17.6	82.4
Felt that body was spinning or turning rapidly	45.1	54.9
Felt like were being physically touched	46.2	53.8
Unable to open eyes	53.8	45.1
Unable to speak or call out even is tried	63.7	36.3

Felt a presence in the room	63.7	36.3
Experienced erotic feelings	61.5	38.5

Psychological Symptoms

Descriptive statistics for all psychological measures are presented in Table 5. Across the full sample (n = 91), mean scores on the DASS-21 subscales with a mean anxiety score of 11.4 (SD = 8.63), mean depression score of 12.7 (SD = 10.2), and mean stress score of 18.3 (SD = 9.26). The mean GAD-7 score was 10.3 (SD = 4.82), indicating clinically relevant anxiety symptoms on average.

Table 4

Descriptive Statistics for Psychological Distress Measures (n=91)

	Mean (SD)	Median	Minimum	Maximum
DASS Anxiety	11.4(8.63)	10	0	34
DASS Depression	12.7(10.2)	10	0	38
DASS-Stress	18.3(9.26)	18	2	42
GAD 7	10.3(4.82)	10	0	21

Prior to inferential analyses, assumptions of normality were assessed for psychological distress measures using Shapiro–Wilk tests and visual inspection of distributions. Shapiro–Wilk tests indicated significant deviations from normality for DASS-Anxiety ($W = .935$, $p < .001$), DASS-Depression ($W = .908$, $p < .001$), and DASS-Stress ($W = .967$, $p = .019$). GAD-7 scores did not significantly deviate from normality ($W = .980$, $p = .184$). Given the non-normal distribution of multiple outcome variables, non-parametric statistical tests were used for subsequent analyses involving psychological distress measures.

Descriptive statistics for psychological distress measures across demographic groups are presented in Table 6. As distributions deviated from normality, scores are summarised using medians and interquartile ranges. Participants who responded “unsure” to the SP screening item were excluded from group-based analyses. In addition, participants who selected “prefer to self-describe,” “prefer not to say,” or non-binary gender categories were excluded from demographic comparisons due to insufficient group sizes for meaningful statistical analysis.

Table 5

Median (Interquartile Range) Scores on Psychological Distress Measures by Demographic Characteristics (n = 77)

Variable		Anxiety	Depression	Stress	GAD
		Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
Gender	Female	10.0 (6.0 - 18.0)	10.0(4.0-16.0)	18.0(12.0-25.5)	10.0(8.0-14.0)
	Male	9.0 (3.50-12.0)	15.0 (7.50-23.0)	12.0 (6.0-20.5)	7.0 (4.0 - 10.0)
Age	18-24	10.0 (6.0 - 17.5)	10.0 (6.0 - 19.5)	18.0 (12.0 - 23.5)	9.5 (7.0 - 13.0)
	25-30	10.0 (4.0 - 16.0)	10.0 (4.0 - 18.0)	18.0 (8.0 - 26.0)	10.0 (8.0 - 14.0)
Level of study	Undergraduate	10.0 (6.0 - 16.0)	12.0 (6.0-20.0)	18.0 (12.0-26.0)	9.0(7.0-13.0)
	Postgraduate	8.0 (3.0 - 17.0)	6.0(3.0-16.0)	18.0 (8.0-24.0)	10.0(7.0-14.0)
Employment status	Working part-time	10.0 (6.0 - 18.0)	10.0 (4.0 - 20.0)	26.0 (8.0 - 22.0)	11.0 (8.0 - 14.0)
	Working full-time	9.0 (4.0 - 14.0)	12.0 (4.0-16.5)	18.0 (10.0 - 24.0)	9.0 (7.0 - 13.0)
	Other	9.0 (6.0 - 17.5)	8.0 (5.0 - 15.5)	18.0 (13.5 - 26.0)	9.5 (9.0 - 11.0)
	Unemployed	11.0 (5.5 - 16.5)	11.0 (4.0 - 15.5)	22.0 (12.0 - 30.0)	10.5 (8.0 - 14.8)
Sleep quality	Good Sleep Quality	6.0 (2.5 - 8.0)	4.0 (0.5 - 6.0)	15.0 (8.0 - 18.0)	7.5 (4.0 - 11.5)
	Poor Sleep Quality	12. (6.0-18.0)	12.0 (6.0 - 20.0)	20.0 (12.0 - 28.0)	10.0 (8.0 - 14.0)
SP Group	SP Group	10.0 (5.0 - 16.0)	12.0 (8.0 - 20.0)	20.0 (13.0 - 26.0)	9.0 (7.0 - 13.0)
	Non-SP Group	8.0 (4.0 - 14.0)	8.0 (2.0 - 19.0)	14.0 (8.0 - 22.0)	10.0 (7.0 - 13.0)

A Mann–Whitney U test indicated that depression scores differed significantly by level of study, with undergraduates reporting higher depression scores than postgraduates (U = 591, p = .031, r = .286). No other significant differences were observed across anxiety, stress, or generalised anxiety scores by age group, gender, or level of study (all ps > .05). Chi-square tests of independence were conducted to examine whether the proportion of participants meeting criteria for elevated stress, depression, or anxiety differed according to SP status. No statistically significant associations were observed between SPs status and binary indicators of stress, depression, or anxiety (all ps > .05). Although a greater proportion of participants in the sleep paralysis group met criteria for elevated stress compared to those without sleep paralysis (75.7% vs 57.1%), this difference did not reach statistical significance, $\chi^2(1, N = 79) = 3.00$, p = .083.

Table 6

Chi-Square Goodness of-Fit Tests for Normal vs Non-Normal Scores Across DASS Subscales (n=79)

Subscale	SP group (%)	Non-SP group (%)	$X^2(df)$	p	Effect Size
Anxiety	27	52	0.07(*1*)	.785	.031
Depression	35	44	2.37(*1*)	.123	.173

Stress	31	48	3.00(*1*)	.083	.195

Note. Values represent the percentage of participants within each sleep paralysis group meeting criteria for elevated symptoms. None of the associations reached statistical significance at α = .05.

Sleep Quality

Descriptive statistics for sleep quality are presented in Table 3. In this sample of tertiary students, participants reported a bedtime of 23:25 (Median = 22:00) and an average rise time of 7:45 (Median = 7:00), with a mean sleep duration of 6.44 hours per night. Average sleep efficiency (i.e time in bed spent asleep) was 64.8%. Only 2.53% of the participants considered their overall sleep quality "very good", 17.72% considered their sleep quality "fairly good" overall, 35.44% rated their overall sleep quality "average", compared to 32.91% who considered their quality of sleep to be "fairly bad" and 10.13% rated "very bad". The mean global PSQI score was 9.62(*SD = 3.85,* Median = 9.5), with observed scores ranging from 2 to 19. Based on the conventional PSQI cut off of ≥ 5 indicating clinically significant sleep disturbance, 91.14% of participants identified as "poor sleepers" whereas only 7 participants (8.86%) scored below this threshold.

Table 7

Descriptive Statistics for PSQI Components

Variable	Mean (SD)	Median	Range
Bedtime	23.40 (10.7)	22.0	0.0 - 23.5
Rise time	7.76 (2.14)	7.50	0.0 - 13.0
Sleep duration (hours)	6.75 (1.2)	7.0	4.0 - 10.0
Sleep Efficiency (%)	64.8 (10.2)	64.0	0.0-90.0
PSQI Global	9.62 (3.85)	9.50	2.0 - 19.0

Table 8

Spearman's rank-order correlations between sleep quality (PSQI) and psychological distress measures (n=91)

Psychological Measure	Spearman's ρ	p
DASS-Anxiety	.545	< .001
DASS-Depression	.424	< .001
DASS-Stress	.461	< .001
GAD-7	.443	< .001

Spearman's rank-order correlations were conducted to examine associations between sleep quality and psychological distress. As shown in Table X, poorer sleep quality (higher PSQI global scores) was significantly and positively correlated with all measures of psychological distress. PSQI scores were moderately associated with anxiety (DASS-Anxiety: ρ = .545, $p < .001$), depression (DASS-Depression: ρ = .424, $p < .001$), and stress (DASS-Stress: ρ = .461, $p < .001$). A similar moderate association was observed between PSQI global scores and generalised anxiety symptoms as measured by the GAD-7 (ρ = .443, $p < .001$).

Is SP related to sleep quality or psychological distress?

To determine whether the experience of SP was associated with differences in psychological distress (DASS-21; GAD) or sleep quality (PSQI), three sets of analyses were conducted. Prior to comparing participants with and without reported SP, assumptions of normality for psychological distress and sleep quality measures were assessed using Shapiro–Wilk tests and visual inspection of distributions. Several outcome variables showed departures from normality (ps < .05). Accordingly, non-parametric Mann–Whitney U tests were used for group comparisons between participants with and without SP. A detailed description of the normality assessments and data screening procedures is provided later in this chapter. Three sets of analyses were conducted: (1) descriptive comparisons between participants who reported experiencing SP and those who did not, (2) Mann–Whitney U tests comparing psychological distress and sleep quality between these groups, and (3) a binomial logistic regression examining whether sleep quality and psychological variables predicted the likelihood of reporting SP.

Group differences in psychological distress and sleep quality by SP status

Descriptive statistics for sleep quality and psychological distress by SP group are presented in Table X. Given violations of normality, outcomes are summarised using medians and interquartile ranges. Overall, participants who reported SP demonstrated higher median scores on measures of depression, anxiety, stress, and poorer sleep quality compared to those who did not report SP. Formal group comparisons were examined using Mann–Whitney U tests, reported below.

Table 9

Descriptive statistics and Mann–Whitney U test results by sleep paralysis group (n = 82)

	SP group (n=38)	Non-SP group (n = 43)	*U*	*p*	*r*
DASS Anxiety	10.4 (4.0 - 18.0)	8.0 (2.0 - 14.0)	750	.412	0.106
DASS Depression	12.0 (6.0 - 20.0)	8.0 (4.0 - 16.0)	664	.104	0.209

DASS Stress	20.0 (12.0 - 28.0)	14.0 (8.0 - 22.0)	617	.040	0.264
GAD Total	9.0 (6.0 - 14.0)	10.0 (5.0 - 14.0)	838	.996	0.001
PSQI Global	9.0 (7.0-13.0)	9.0 (6.0-11.0)	739	.355	0.119

Note. Values are median (interquartile range).

As shown in table 2, participants who reported SP demonstrated significantly higher stress scores than those who did not report sleep paralysis, as indicated by a Mann–Whitney U test (U = 617, *p = .040*). No statistically significant group differences were observed for depressive symptoms (U = 664, *p = .104*), anxiety symptoms (U = 750, *p = .412*), generalised anxiety (U = 838, *p = .996*), or sleep quality as measured by the PSQI (U = 739, *p = .355*).

Associations between SP symptoms count, sleep quality, and psychological distress

Spearman's rank-order correlations were conducted within the SP group (n = 39) only to examine whether the number of symptoms experienced during SP episodes (SP symptom count) were associated with psychological distress and sleep quality. Symptom count was defined as the total number of phenomenological features reported by participants who reported paralysis and was not calculated for participants who had never experienced paralysis.

Table 10

Spearman's rank-order correlations between SP symptom count, psychological distress and sleep quality (n = 39)

Outcome Measure	Spearman's p	p
DASS-Anxiety	.252	.121
DASS-Depression	.227	.165
DASS-Stress	.122	.458
GAD 7	.326*	.043
PSQI Global score	.242	.138

Note. Values represent Spearman's rho. $p < .05$,

As shown in Table 3, greater SP symptom count was significantly associated with higher levels of generalised anxiety, as measured by the GAD-7 $r(37) = .33$, *p = .043,* indicating that participants who reported a greater number of SP-related symptoms also reported higher levels of generalised anxiety. In contrast, associations between SP symptom count and depressive symptoms, $r(37) = .23$, *p = .165*, anxiety symptoms, $r(37) = .25$, *p = .121*, stress, $r(37) = .12$, *p = .458*, and global sleep

quality, $r(37) = .24$, $p = .138$, were not statistically significant. Additionally, moderate to strong positive correlations were observed among measures of psychological distress, including between stress and generalised anxiety, $r(37) = .65$, $p < .001$, and between anxiety symptoms and sleep quality, $r(37) = .43$, $p = .006$.

Spearman's rank-order correlations were further conducted to examine associations between individual sleep paralysis symptoms and measures of psychological distress and sleep quality among participants who reported experiencing sleep paralysis. As shown in Table 4, several specific symptoms were significantly associated with higher levels of psychological distress and poorer sleep quality. Experiencing a sensed presence was significantly correlated with higher stress, $r(37) = .35$, $p = .049$, greater generalised anxiety, $r(37) = .34$, $p = .036$, and poorer sleep quality, $r(37) = .40$, $p = .013$. Hearing unusual sounds was significantly associated with higher anxiety, $r(37) = .39$, $p = .015$, and higher depressive symptoms, $r(37) = .36$, $p = .026$. Somatic threat-related symptoms were also associated with distress. Sensations of being strangled were significantly correlated with higher stress, $r(37) = .45$, $p = .004$, and greater generalised anxiety, $r(37) = .42$, $p = .009$. Smothering sensations were associated with poorer sleep quality, $r(37) = .35$, $p = .047$, while tingling sensations were also significantly correlated with higher PSQI global scores, $r(37) = .38$, $p = .019$. Finally, olfactory hallucinations were significantly associated with anxiety, $r(37) = .36$, $p = .026$, and depressive symptoms, $r(37) = .38$, $p = .017$. No other correlations between individual sleep paralysis symptoms and measures of psychological distress or sleep quality reached statistical significance.

Predictors of SP

A binary logistic regression was conducted to examine whether psychological distress, sleep quality, age and level of study were independently associated with SP status. SP status (yes/no) was entered as the dependent variable, with DASS-Stress, DASS-Depression, DASS-Anxiety, and PSQI global sleep quality score entered simultaneously as predictors. Age and level of study were included as covariates as they were the only demographic variables that could be meaningfully represented as binary variables for analysis; however, it is acknowledged that these variables were not significant at the bivariate level and were included primarily for exploratory control rather than based on prior significance. Gender was not included in the regression model due to small cell sizes in non-binary categories, which violated assumptions for reliable estimation. The GAD-7 was also not included in the logistic regression model alongside DASS-Anxiety to avoid multicollinearity, as both measures assess overlapping anxiety-related constructs. DASS-Anxiety was retained due to its conceptual alignment with the broader DASS framework used in the study and its inclusion alongside depression and stress subscales.

Table 11

Binary logistic regression predicting SP status (n = 82)

Predictor	B	SE	z	p	OR	95% Cl for OR
Intercept	-1.000	0.699	-1.43	.153	0.37	[0.09, 1.45]
DASS-Anxiety	-0.009	0.040	-0.21	.830	0.99	[0.92,1.07]
DASS-Stress	0.051	0.035	1.46	.144	1.05	[0.98,1.13]
DASS Depression	0.004	0.027	0.17	.867	1.00	[0.95,1.06]
PSQI Global	0.007	0.073	0.09	.925	1.01	[0.87, 1.16]
Age (18-24 vs 25-30)	-1.247	0.572	-2.18	.029	0.29	[0.09, 0.88]
Study-level (Postgrad vs Undergrad)	0.870	0.624	1.39	.163	2.39	[0.70, 8.11]

The overall logistic regression model was not statistically significant, $\chi^2(df = 6, N = 82) = 10.00$, $p = 0.12$, and explained a modest proportion of the variance in SP status (McFadden $R^2 = .088$). As shown in Table 4, age category emerged as the only significant independent predictor, with participants aged 25-20 demonstrating significantly lower odds of reporting SP compared to those aged 18 – 24 *(p = .029).* None of the psychological distress variables, sleep quality, or study level independently predicted SP status when entered simultaneously into the model (all *ps* > .05).

Summary

The quantitative analyses indicated that SP was common within this sample of NZ tertiary students, with just under half of participants reporting at least one experience of paralysis during sleep or awakening. Descriptive analyses showed that participants who reported SP tended to report poorer sleep quality and higher levels of psychological distress compared to those without such experiences, although these differences were not uniformly statistically significant across all outcome measures.

Group comparisons revealed that participants who reported SP demonstrated significantly higher stress scores than those who did not, while no significant group differences were observed for depressive symptoms, anxiety symptoms, generalised anxiety, or global sleep quality. Correlational analyses conducted within the sleep paralysis group showed that a greater number of reported sleep paralysis symptoms was associated with higher levels of generalised anxiety, although associations with depression, stress, anxiety symptoms, and sleep quality did not reach statistical significance. Examination of individual sleep paralysis symptoms revealed that specific phenomenological features were differentially associated with psychological distress and sleep quality. Symptoms involving

perceived threat or intrusion, such as sensing a presence, were associated with higher levels of anxiety, stress, depressive symptoms, and poorer sleep quality. In contrast, many other sensory or motor features showed no significant associations with mood or sleep outcomes. Although bivariate analyses demonstrated meaningful associations between sleep paralysis experiences, psychological distress, and sleep quality, these relationships did not remain significant in a multivariable logistic regression model. None of the psychological distress or sleep quality measures independently predicted sleep paralysis status when entered simultaneously, and the overall model accounted for only a small proportion of variance in sleep paralysis occurrence. Collectively, these findings suggest that SP in tertiary students is associated with elevated stress and anxiety-related features at a bivariate level, particularly in relation to specific symptom characteristics, however no single psychological or sleep variable, that were included in this research, was found to independently predict the presence of SP.

Having established the prevalence of SP within the sample, its associations with sleep quality and psychological distress, and the distribution of specific symptoms in the quantitative analyses, it is also important to represent how participants subjectively experienced these episodes. Quantitative symptom checklists capture the presence or absence of features but cannot fully convey how such experiences were perceived, interpreted, or emotionally processed by those who encountered them, and may not capture all associated features The following qualitative section therefore draws on participants' open-ended responses to provide a richer account of the lived experience of sleep paralysis among tertiary students.

Qualitative Content Analysis

Qualitative data were collected through a series of open-ended questions within the USEQ, which invited participants to describe their experiences of SP in their own words. For the purposes of the qualitative analysis, only responses from participants who answered "yes" to the screening item assessing lifetime experience of SP (i.e., inability to move or speak upon falling asleep or awakening) were included. This resulted in a qualitative subsample of 39 participants, ensuring that the analysis was grounded exclusively in first-hand experiences of SP. Response length varied substantially, ranging from brief comments to more detailed narrative accounts of up to approximately 250 words, with an average response length of around 40–45 words. The qualitative findings are presented thematically, and the analytic approach employed was qualitative content analysis. Figure X presents a hierarchical display of categories and associated subcategories, illustrating the frequency of coded phenomenological features identified across responses.

Figure 1

Frequency of coded phenomenological features reported by participants with SP (n=39)

Figure 1 illustrates how the coded qualitative data were distributed across overarching categories and specific features of sleep paralysis experiences. Phenomenological characteristics were the most prominent category, accounting for nearly half of all codes (49.8%), with inability to move (17.8%) and fear (16.4%) being the most frequently reported features, followed by sensed presence (6.4%). Support sought (18.3%) and psychological attributions (11.4%) were also common, with participants most often reporting seeking support from friends (6.8%) and family (5.5%), and identifying stress (7.8%) as a key explanatory factor. Coping strategies (8.2%) were less frequently reported, with behavioural approaches (5.0%) more common than cognitive strategies (2.3%), while physiological (5.9%) and spiritual attributions (6.4%) were least represented overall.

The qualitative findings are organised into three broad sections. The first focuses on the phenomenological characteristics of the experience itself, describing what participants perceived and felt during episodes of sleep paralysis. The second section examines how participants interpreted

these experiences, including physiological, psychological, and spiritual explanations. The final section explores participants' experiences of support-seeking, including disclosure to others and the responses received. Together, these sections provide a structured overview of participants' subjective accounts, complementing the quantitative findings and offering insight into how sleep paralysis is experienced, understood, and managed within this population.

Phenomenological Characteristics

Fear

Fear emerged as one of the most central and defining feature of participants' experiences of SP. Accounts conveyed an immediate and intense emotional reaction, with participants using words such as "terrified," "petrified," and "scared," alongside phrases like "I was freaking out," to describe the intensity of their reactions. For many, this fear appeared to arise abruptly and with considerable force, frequently preceding any clear understanding of what was occurring. One participant explained, "I just bolted straight away to my sister's room and bawled [sic] my eyes out because I was so terrified," (Participant 8, Female, 24) while another described that "the whole time I was strangely petrified and unbelievably panicked." (Participant 15, Female, 29). Fear was not limited to the experience itself but extended into participants' broader relationship with sleep. One participant described anticipatory anxiety about going to bed, noting, "I am terrified to go to sleep at night, and often delay it until I feel sleepy, which then makes me panic." (Participant 18, Non-binary, 29). Four participants noted that their first episode was the most frightening, and two described lingering anxiety about going to sleep and reported long-term behavioural changes following an initial episode, such as avoiding particular sleep positions or sleeping with lights on. One respondent wrote,

For months afterwards I would never sleep before 5am. This episode still affects me to this day too, I never wear my hair in a ponytail at night and I never sleep on my side or back (stomach only), and I keep a lamp on every night. (Participant 8, Female, 24)

For one participant, this sense of fear persisted even outside the context of the episode, emerging as a heightened sense of unease in the bedroom environment: "I cannot sleep or even turn the light off without feeling uneasy and slightly panicked." (Participant 32, Female, 22). Such accounts highlight the extent to which fear shaped both the phenomenological experience of sleep paralysis and its broader psychosocial consequences.

Although fear was overwhelmingly the predominant affective response, participants also frequently described accompanying anxiety. Not all participants experienced their episodes as

frightening. Four participants described more neutral or even positive emotional responses, indicating that the phenomenon did not universally evoke fear and, for some, may have been reframed over time. One participant noted, “It’s actually kind of fun now to just see freaky/weird stuff sometimes!” (Participant 3, Female, 28) and another saying, “I found it funny/entertaining” (Participant 83, Female, 25). Another experienced it as emotionally comforting, reporting sentiments such as, “I felt euphoric sensations as I felt I was being lifted from the middle of my chest,” (Participant 75, Male, 21) and “I didn't feel fear. I found it comforting and spiritual.” (Participant 23, Female, 24). One participant reported an initial startle or brief fear response that quickly resolved, as illustrated by the account: “Scary in the moment, but fine afterwards. You have to remind yourself it's not real for a while until you calm down again” (Participant 28, Female, 24). Another participant characterised their response more matter-of-factly, stating, “It’s just sleep paralysis, it’s nothing dangerous.” (Participant 3, Female, 28)

In summary, this theme illustrates that fear was a dominant feature of SP for most participants, characterised by intense emotional reactions, anticipatory anxiety and long-term behavioural changes related to sleep. The language used in participant’s accounts was notable for its extremity and urgency, suggesting that fear was experienced as overwhelming and difficult to regulate in the moment. Quotes describing crying, fleeing to another room, or avoiding sleep altogether were selected because they exemplify how this fear extended beyond the episode itself and influenced participant’s ongoing emotional responses to sleep. At the same time, a small subset of participants described more neutral or positive emotional reactions, indicating that fear was not universally experienced. These contrasting accounts were included to reflect the full range of emotional responses reported and to demonstrate variability within the sample. Together, these findings show that while fear was the predominant emotional feature of SP, emotional responses varied in intensity and affect.

A Sensed Presence

A second major phenomenological feature described by participants was the perception of a sensed presence or figure situated somewhere within the sleep environment. Three (7.7%) participants reported an ambiguous or indistinct presence, frequently referring to a dark shadow or figure that they could sense but not fully see. As one participant noted, “I abruptly woke up while sleeping alone as I knew someone was watching me. There was no one there physically, but I sensed an unseen entity or spirit.,” (Participant 1, Female, 28) while another described “getting a sense of a presence that I couldn’t see in the room with me.” (Participant 14, AMAB - non-binary, 25), and

another describing “[I] felt like I could sense someone walking around in the bedroom and out in the hallway” (Participant 91, Female, 21)

In many other cases, the presence took a more distinct or recognisable form. Human-like figures were reported by five participants (12.8%), with one participant recalling, “There’s a strange middle aged man who approaches me in the dream.” (Participant 77, Female, 22), another describing “a young Victorian girl in a white dress about age 16 looking at me in the mirror” (Participant 84, Female, 22) and others describing “shadow that looked like a person moving at the end of the bed” (Participant 56, Female, 28), and “the face of a scary old woman appeared right in front of me like she was watching me sleep” (Participant 21, Female, 22). Another reported auditory or sensory indicators of a human presence, such as “often hear people that aren't there or feel presences of people.”(Participant 61, Male, 21). For five (12.8%) respondents, the sensed presence was distinctly non-human or supernatural, taking the form of monsters, creatures, or animal-like entities. These figures were often vividly described such as “a huge green hag-like creature with bubbly rough skin and huge long green pointy fingers,” (Participant 8, Female, 24) “a scary elderly person, a puppet, a lizard type humanoid” (Participant 83, Female, 25). Some participants reported intrusive or behavioural interactions with these entities, including one who explained, “I felt a cat jump onto my bed, walk across me and sit directly by my chest,” (Participant 15, Female, 29), another who described, “a doll sitting on me and run off the end of my bed but I couldn't move.” (Participant 61, Male, 21) and another who said:

I occasionally get a feeling like something trying to possess me. I’ll try desperately to scream out or move, and it’s like I’m being thrashed about without my body moving. I’ll hear a whispering (without words – like a feeling) urging me to just stop resisting and let it happen. (Participant 65, Non-binary, 26)

Two (5.1%) participants described ambiguous shapes and lights rather than identifiable beings. These visual phenomena ranged from subtle distortions to bright or shifting forms, such as “orange spot with speckledy flashing coloured tiny dots on it,” (Participant 2, Female, 30) or “blurred light, shifting in the corner of the room.” (Participant 23, Female, 24). Although less clearly personified, these perceptual anomalies were interpreted by participants as meaningful and often linked to the sense that another presence was nearby. Most participants were able to describe the appearance or form of the presence in vivid detail, suggesting that these experiences were typically perceived at a visual and multisensory level and often contributed to the intense fear associated with the episode.

Physical Sensations

Participants reported a wide range of bodily sensations accompanying their SP episodes. While descriptions varied in intensity and form, three subthemes appeared consistently across the dataset: Inability to Move, Physical Touch, and Vestibular–Motor Experiences. These are described in further detail below.

Inability to Move

All participants reported an inability to move their physical body during their experiences despite a clear awareness of being awake. Many participants described feeling completely immobilised, using terms such as “paralysed” and referring to profound restrictions in voluntary movement. One participant explained “[I] felt completely unable to move, paralysed in bed,” (Participant 5, Female, 30), while another noted being “unable to move arms or legs upon waking up in the middle of the night.” (Participant 14, Prefer to self-describe, 25). Two participants described partial immobility or difficulty initiating movement, such as, “I felt like I couldn't move but was awake. I couldn't open my eyes properly. I had to really force myself to even see a tiny bit." (Participant 15, Female, 29) and “I had an experience where I dreamt, I was lying in bed and could move my eyes but not my body” (Participant 81, Male, 22).

Five participants also reported an inability to speak or make sound, despite attempts to do so. Illustrative examples included: “[I] couldn’t move my body or scream even if I tried really hard,” (Participant 19, Female, 21) and “I couldn’t wake up or move my arms and legs at all, and I was screaming but no sound was being made.” (Participant 41 Female, 30). Feelings of entrapment were common across accounts, with one respondent summarising their experience as, “being trapped and not being able to move despite waking up,” (Participant 30, Female, 25) and another recalling, “I was ‘awake’ but couldn’t move.” (Participant 39, Female, 27). These accounts illustrate the profound sense of bodily disconnection and loss of control that characterised participants’ episodes and highlight paralysis as a defining phenomenological component of their experiences.

Physical Touch

Physical touch sensations formed another prominent feature of participants’ experiences. Seven participants reported the perception of being touched, held, or physically manipulated by an unseen figure or entity. One participant recalled, “I woke up to a tugging pressure on my ponytail where it felt like my ponytail was being yanked,” (Participant 8, Female, 24) while another reported, “I had an episode where I felt like my body was pressed down into the mattress.” (Participant 23, Female, 24). For some, these tactile sensations involved the perception of being physically moved, as

illustrated by the account, “I could see a dark figure/shadow out of the corner of my eye that came down and had the sensation of it pulling me out of my bed by my feet” (Participant 39, Female, 27). A number of accounts involved direct tactile interaction with human-like figures. One participant described “suddenly this [middle aged man] hands are all over me. He then tickles under my arms, and it’s so awful and uncomfortable that I squirm but can’t move.” (Participant 77, Female, 22), Others experienced chest pressure or suffocation sensations, such as, “Felt suffocated and a heavy weight on my chest,” (Participant 5, Female, 30) and “Once I was drifting off to sleep and felt pressure on my chest like someone was kneeling on my chest.” (Participant 71, Female, 27). Another described “[My] chest [felt] heavy like a massive pressure” (Participant 87, Female, 25). These tactile hallucinations were typically experienced as intensely real and often contributed to the high levels of fear reported in earlier themes.

Vestibular-Motor Experiences

In addition to tactile and motor symptoms, participants frequently described disturbances in balance, movement, and bodily orientation, hallmarks of vestibular-motor hallucinations. One participant described an out-of-body sensation saying, “[I] regularly feel like I'm leaving body when in that state of half-awake half asleep.” (Participant 2, Female, 30). Another participant reported a combination of motion and bodily distortion, including one participant who wrote, “I had an episode where, my head was spinning, and I got the sensation as if I was out of my body looking down at myself.” (Participant 23, Female, 24). Sensations of falling or passing through physical surfaces were also noted, with one respondent describing, “I occasionally will have the feeling like I'm falling or falling through my bed.” (Participant 24, Female, 29). Another described a vivid disembodiment experience, stating, “I then felt as though I was watching this happen to me from above, like I was floating above my body, watching someone kneel on my chest and myself trying to scream for help.” (Participant 71, Female, 27). While less prevalent than other SP features, vestibular-motor experiences were distinctly represented in participants’ accounts. These episodes involved disruptions to embodied self-location and spatial orientation, including floating, spinning, falling, and out of body sensations. Such descriptions align with prior models of vestibular-motor hallucinations, reflecting transient alternations in bodily self-perception and perceived control during dissociated sleep-wake states.

Sense of Realism

For many participants, the SP experience was marked by an overwhelming sense of realism, blurring the boundary between dreaming and wakefulness. Accounts frequently emphasised how

vividly and convincingly the episodes unfolded, with five participants noting that, in the moment, the experience was indistinguishable from reality. This was expressed through direct statements such as, “The dream felt real, like it was really happening to me and I began to cry in my dream and real life,” (Participant 28, Female, 24) and “I find it soooo difficult to believe it was a dream because of how real it was.” (Participant 8, Female, 24). The same participant described an absence of the usual cues that accompany dreaming or waking transitions. For example, “I didn’t have sensations of waking up or opening my eyes after I could move… It felt incredibly real and unlike any dream,” (Participant 8, Female, 24) highlighting the collapse of perceptual distinctions normally used to differentiate states of consciousness. For two participants, the vividness of the experience sustained emotional reactions long after the episode had ended recalling, “I thought the experience was real and was genuinely angry and upset towards the person who had been horrible towards me in my dream,” (Participant 28, Female, 24) while another described waking with lingering physiological responses: “I woke up and felt really sick.” (Participant 64, Female, 23)

One participant described an episode in which dream phenomena carried over seamlessly into waking awareness, creating a state where dream content felt fully embodied. As illustrated in the following account:

Out of body dreams—dreams where it feels so real as if I'm awake but I'm not awake, cause then I actually wake up and realise it was a dream. But the dream is like reality, everything is the same and I can't tell the difference until I wake up. (Participant 70, Female, 29)

These blurred boundaries contributed to a lasting uncertainty about the nature of the experience itself. One participant reflected, “Sometimes I cannot distinguish if my experience is sleep paralysis or nightmares and severe anxiety and fear of sleep due to PTSD.” (Participant 18, Non-binary, 29). Not all participants remained overwhelmed by this realism over time. Two participants described a process of cognitive reframing that helped reduce distress, using rational awareness to reinterpret the experience while it was happening. One participant explained,

Whenever it happens now… I’ve always known, even while it’s happening, that it is sleep paralysis and just kind of wait for it to end/ignore what's going on/go along for the ride,

because I logically know it's nothing to be concerned about. (Participant 3, Female, 28)

Another similarly described maintaining partial insight: “I am highly aware of this and the fact that it is a dream but I cannot wake myself from it or stop/change what is happening in the dream.”

(Participant 4, Female, 26). Collectively, these accounts highlight the compelling, immersive, and sometimes indistinguishable-from-waking quality of the experiences, underscoring the powerful sense of realism that shaped participants' emotional and cognitive responses. This heightened sense of realism provided an important context within which participants attempted to understand and explain their experiences, forming the basis for the interpretive accounts described in the following section.

Interpretations

Participants offered a wide range of interpretations for their SP experience drawing upon multiple explanatory frameworks to make sense of what had occurred. Three overarching interpretive orientations emerged: physiological explanations, which were the most common; psychological explanations, particularly those linked to trauma and emotional distress; and spiritual or supernatural interpretations, reported by a smaller subset of participants. These frameworks shaped not only how participants understood the origin of their SP experience but also how threatening, meaningful, or controllable the experiences felt.

Physiological abnormality

The first main theme and set of related themes were related to the perceptions, thoughts and feelings of participants who conceptualised their experience in terms of physiological abnormality. These individuals attributed their experiences to factors such as elevated stress levels and poor sleep quality, viewing their episodes purely as physiological in nature. When interpreting the experience as a form of bodily dysfunction, the data suggested that participants understood the event as one of limited meaning or purpose, arising from disruptions to normal sleep or bodily regulation.

Poor sleep quality

Four participants perceived their experiences to be precipitated by sleep-related factors. Poor sleep quality, irregular sleep timing, and fatigue were commonly described as contributing to the onset of their episodes. Participants linked their experiences to disrupted or insufficient sleep with brief statements such as "night shifts," (Participant 30, Female, 25) "staying up too late on social media," (Participant 18, Non-binary, 29) "bad sleep," (Participant 77, Female, 22) and "Maybe being over tired" (Participant 15, Female, 29) commonly used to summarise the perceived cause. Two individuals described their episodes occurring when sleep patterns were irregular or fragmented, noting, "I get sleep paralysis dreams more in daytime if I sleep longer."(Participant 47, Female, 28) and "Typically, it happens when I nap during the day, especially if I sleep on my back or if I overheat

in my sleep" (Participant 39, Female, 27). Two participants identified specific physiological states as the direct cause of their episode, particularly overheating and illness, with one individual noting "[It only happens] when I am sick and having a fever" (Participant 90, Female, 23)and another explaining "That I had become overheated and it was a physical response to this." (Participant 67, Female, 28). One participant described the experience as arising during a transitional state between wake and sleep, stating, "I wouldn't call it a dream, but more of an in-between where your brain is awake, but body is not." (Participant 61, Male, 21). Another participant attributed their episodes to autonomic features associated with a broader condition, stating, "I think it's related to dysautonomia, which I also have other symptoms of." (Participant 25, Female, 22). Across accounts, poor or irregular sleep was not described as a consequence of SP experiences but as a primary factor influencing both their occurrence and recurrence.

Medications

Three participants attributed their experiences to medication effects or disruptions in their medication routine. One participant reflected, "It's happened a lot more on nights where I forget to take my Venlafaxine." (Participant 65, Non-binary, 26) while one other stated their experiences were associated with "medication changes" (Participant 83, Female, 25). Others identified supplements as potential triggers, with one participant noting that episodes "happens more frequently if I take magnesium at night." (Participant 62, Female, 26)

Psychological and Life-context Factors

Past Trauma

Approximately eight participants linked their episodes to either past physical or sexual trauma, particularly trauma involving interpersonal harm. Several participants referenced PTSD directly, linking their episodes to trauma reminders or emotionally triggering situations. Participants identified causes such as "Complex PTSD," (Participant 5, Female, 30) "PTSD," (Participant 30, Female, 25) "reminders of trauma," (Participant 77, Female, 22) and situations involving their abuser, including one participant who wrote, "Yes, seeing the abuser that caused my PTSD, being triggered by victim-blaming or invalidating conversations or experiences related to the trauma." (Participant 18, Non-binary, 29). Loss-related trauma also appeared in one account reflected in this comment: "Nightmares were often to do with the death of my father (when I was five years old) and featured recurring dreams of him or other family members dying." (Participant 23, Female, 24). Some participants described trauma as exacerbating pre-existing sleep disturbances, with one noting, "My sleep-related issues happened prior to my trauma but it definitely made it worse." (Participant 56,

Female, 28). Collectively, these accounts indicate that for some individuals, trauma histories played a central role in shaping both the onset and interpretation of their SP experiences.

Stress

Seventeen participants identified stress as a psychological factor they believed contributed to their SP experiences. Participants frequently identified heightened stress or emotional overload as a precursor to their experiences. They described episodes occurring during periods of "Stress from study," (Participant 9, Female, 25) "stress and tiredness from university " (Participant 89, Female,22) , "periods of high stress and anxiety," (Participant 14, Prefer to self-describe, 25), or general feelings of being "stressed or worried/overwhelmed" (Participant 15, Female, 29). Several participants explicitly noted a pattern in which increased stress coincided with more frequent episodes, with participants noting: "I think it is when I am feeling stressed that these types of sleep experiences tend to happen," (Participant 40, Female, 30), "any additional stress" (Participant 56, Female, 28), "Sometimes when I'm more stressed than usual I get more experiences" (Participant 21, Female, 22) and "Stress increases them." (Participant 64, Female, 23). These accounts depict stress as an activator of episodes, reinforcing the view that the experience was rooted in physiological or emotional dysregulation rather than external forces. Three participants attributed their episodes to emotionally charged or transitional periods in their lives. These included "Lifestyle changes" (Participant 14, Prefer to self-describe, 25), "periods of uncertainty" (Participant 62, Female, 26) and "Sometimes life-changing events." (Participant 47, Female, 28). These accounts suggest that participants viewed emotionally charged or transitional periods as moments of increased vulnerability to SP.

Spiritual Perspective

Seven participants interpreted their SP experiences through a spiritual or supernatural framework. These interpretations were most common among individuals who reported vivid hallucinations of figures, shadows, or sensed presences. One participant stated directly, "I would call it a spirit," (Participant 23, Female, 24) while another described the presence as "human-like — a spirit." (Participant 68, Female, 29). Six participants selected one or more of these three options when responding to the questionnaire item assessing how they currently explain their experiences, indicating that they conceptualised their episodes as involving ghosts or cultural entities (e.g., *ghost/kehua*), demonic forces/*hinonga rewera*, or spiritual encounters/*tūtakitanga wairua.* One participant described recounting the experience to a friend as "a demon episode," noting, "My friend .... came and sat with me after my demon episode." (Participant 41, Female, 30)

In some cases, participants contextualised their interpretations within broader cultural or spiritual belief systems. One individual reported seeking guidance from traditional healers, explaining,

"I've spoken to matekite and tohunga more generally and we agreed they are spiritual experiences or a view into the unseen/invisible." (Participant 1, Female, 28). Another participant who consulted an Elder was told "Spiritually, something is watching me to protect me" (Participant 87, Female, 25). Another participant reflected on the influence of religious upbringing, stating, "I figured it might be related to religious trauma and fears about going to hell." (Participant 65, Non-binary, 26) another attributed their experience to "Bad omen" and that they "had to use spiritual cleansing onto house and room" (Participant 87, Female, 25). These accounts suggest that prior spiritual worldviews, cultural frameworks, and personal histories shaped the meaning participants assigned to their experiences. Although spiritual interpretations were less frequent than physiological or psychological explanations, they formed a coherent pattern: participants who perceived a vivid figure, shadow, or sensed presence were far more likely to explain the episode in supernatural terms. This interpretive framework played a significant role in determining whether the experience was viewed as threatening, meaningful, or spiritually significant.

Support Sought and Social Responses

This section describes themes relating to support-seeking in the context of SP focusing on how participants sought reassurance, validation, and understanding of their experiences, particularly after distressing episodes. Participants described drawing on a range of support sources, including family members, friends, healthcare professionals, and online resources. These interactions often served to normalise the experience, reduce fear, or a space to share distress. While the quantitative data captured the prevalence of SP experiences and their associations with sleep quality and psychological distress, support-seeking behaviours were not assessed quantitatively and therefore emerged as a theme unique to the qualitative free-text responses.

Family and Whānau

Family members were often the first point of disclosure, particularly when SP began in childhood or adolescence with participants reporting "Because it started when I was young, I spoke to my mum about it" (Participant 6, Female, 27) and "I told my family as a child" (Participant 15, Female, 29) . Others reflected simple disclosure to family members, reporting conversations with "Mum", "my sister", "my father" and "mother and sisters" Four participants also discussed experiences with partners saying, "I've spoken to partners and family about it"(Participant 56, Female, 28). These accounts highlight family as a primary support network for emotional regulations and security following SP episodes.

In several cases, family members responded by sharing similar experiences, which appeared to normalise the phenomenon. Participants described relatives who had experienced comparable nocturnal events, including visions or paralysis-like episodes, for example: “My mother has the same experiences,” (Participant 3, Female, 28), “Yes, my brother frequently experienced a woman hovering over him when he woke up and found he couldn’t move.” (Participant 6, Female, 27) and “A lot of my mums family (Samoan ancestry) and dads family (Māori ancestry) talk about being watched in the corner, feeling scratches and its a sign” (Participant 87, Female, 25). Some familial responses included personal interpretations, often benign or stress-based, such as, “[My mum] said that it was stress related, they would dream about work stress,” (Participant 9, Female, 25). Four participants reported that relatives had never heard of such experiences, noting, “Talked to my mum about it and she said she’s never heard of it,” ‘(Participant 25, Female, 22) or “I haven’t heard of anyone having any like me.” (Participant 65, Non-binary, 26)

Friends

Friends represented another significant source of social support. Participants commonly described sharing their experiences with peers to explore whether others had encountered something similar. Many simply stated reaching out to “My friends” or “I’ve talked to all my friends”, “Just to friends etc to see if it happens to anyone else” (Participant 89, Female,22) and “My friends and I are very open about such experiences so have discussed with them.” (Participant 1, Female, 28). Participants also reported that friends validated their experiences by sharing their own: “Yes—several friends have had similar experiences,” (Participant 73, Female, 30) and “I have had friends describe sleep paralysis” (Participant 18, Non-binary, 29). Another participant described discovering, through broad disclosure, just how many peers had similar experiences: “I spoke to everyone and anyone who would listen… I learnt that a lot of people have experienced the same thing as I did.” (Participant 39, Female, 27). One participant received supernatural interpretations from a peer, as in, “She was convinced her house was haunted and had sleep paralysis where she saw things.” (Participant 4, Female, 26)

However, others found that their peers had no comparable experiences saying, “Nobody else to their knowledge and mine has experienced it,” (Participant 77, Female, 22) and “I know a handful of insomniacs but nobody that has had vivid hallucinations like me” (Participant 21, Female, 22). These mixed reactions suggest that friendship networks served as both as a source of comfort and as a reality-checking mechanism for making sense of the experience.

Professional and Cultural Sources of Support

Some participants sought professional support from therapists, counsellors, or general practitioners. Clinical input was often used to clarify whether the experience reflected a medical or psychological concern, or to assist in managing associated anxiety. Participants described seeking guidance from “A therapist”, “Talked to a counsellor”, “My ACC counsellor” and “My therapist and my GP”.

Participants who sought assistance from healthcare professionals received responses that differed markedly from those offered by family and friends. Clinicians predominantly framed the experiences within Western psychological or medical models, commonly attributing episodes to trauma, anxiety, or sleep-related difficulties. Several participants reported that their clinicians explicitly linked the phenomenon to “Trauma,” “PTSD,” “Sexual trauma,” or “Trauma and poor sleep hygiene”. For some, these explanations were experienced as validating, with one participant stating, “After talking to my therapist I learned it was nightmares and anxiety from PTSD” (Participant 18, Non-binary, 29), but for others they felt dismissive or misaligned with the lived experience. One participant described an invalidating experience saying:

“I went to a sleep consultant, I had a sleep test, and they told me "It seems like you are choosing to go to bed late" which felt invalidating as I am not in control of my anxiety or PTSD regarding sleep” (Participant 18, Non-binary, 29)

while another recounted more serious medical concern with their GP noting, “My GP said she was concerned I had a physical complication in my brain and sent me for an MRI.” (Participant 21, Female, 22). Healthcare professionals also frequently offered treatment advice. Participants reported being encouraged to improve sleep routines saying, “Better sleep habits, manage stress”(Participant 77, Female, 22) and “create a safe space and atmosphere, breathing exercise, physical exercise before sleep” (Participant 87, Female, 25) or to engage in psychological interventions such as therapy, mindfulness-based strategies such as meditating, or trauma-focused approaches. Others were advised to trial pharmacological options, including sleeping medication, although not always with positive outcomes; as one participant noted, “Zopiclone… made it worse.” (Participant 5, Female, 30). Across accounts, healthcare responses tended to pathologise the experience and situate it within established clinical frameworks, offering structured but sometimes imperfect avenues for support.

Four participants sought guidance outside Western medicine, consulting a traditional healer or elder. The response they received contrasted sharply with clinical interpretations. One participant reported that no treatment was prescribed, describing “Nothing, it’s not an issue or problem” (Participant 1, Female, 28) as the healer they consulted attributed the experience to ““spiritual experiences or a view into the unseen/invisible.” Another participant was advised that “Spiritually, something is watching

me to protect me." In response, they described engaging in culturally meaningful practices, including having "cleansed [the] room and put a picture of my great grandmother up at the door." (Participant 87, Female, 25). This account represents the only instance in the dataset where SP was not positioned as a dysfunction requiring treatment, but rather as a spiritually significant experience that prompted ritual or protective responses.

Online Media

A number of participants also engaged in independent information-seeking online. Participants reported they "had just read/seen things about sleep paralysis etc", (Participant 42, Female, 25); "I had watched a YouTube video about sleep paralysis" (Participant 14, AMAB - non-binary, 25) and "I googled the daylights out of it after my first experience" (Participant 39, Female, 27) . Others sought community support through platforms such as Facebook saying, "Facebook support groups for PTSD" (Participant 18, Non-binary, 29). These accounts demonstrate that online information served as an accessible and immediate form of psychoeducation.

Coping Strategies and Symptom Management

Participants described a range of strategies used to reduce the frequency, intensity, or emotional impact of sleep paralysis episodes. These coping responses varied considerably, ranging from deliberate psychological techniques and behavioural modifications to the absence of any active management strategy. Importantly, coping efforts were largely self-directed and developed through personal experimentation rather than formal guidance.

Psychological and Cognitive Strategies

Several participants described using cognitive or psychological techniques aimed at reducing anxiety, regulating arousal, or reframing the experience. These strategies primarily targeted fear and anticipatory anxiety associated with sleep paralysis rather than the physiological symptoms themselves. Some participants reported deliberately minimising cognitive engagement with the experience, attempting to avoid rumination or catastrophic thinking. For example, one participant stated, "I try not to think too deeply about the hag or that I think I'll have a sleep paralysis episode." (Participant 8, Female, 24). Mindfulness-based practices were also reported, including meditation and grounding techniques. One participant noted simply, "Mindfulness," while another described a structured cognitive ritual used at sleep onset: "I say a mantra every time I'm falling asleep – that I'm safe, I'm grounded, and I'm in control." (Participant 77, Female, 22). These approaches appeared to serve as tools for emotional regulation and reassurance. One participant expressed

interest in professional psychological support, particularly following distressing experiences, even if they had not yet accessed it saying, “I do however recognise that I’m very traumatised from the hag experience and would LOVE to try therapy or hypnosis to help with my sleeping fears due to it.” (Participant 8, Female, 24). Others reported engagement with therapy or medication more generally, noting “Therapy and medication.” (Participant 30, Female, 25)

Behavioural and Environmental Strategies

Behavioural strategies were the most commonly reported coping responses and focused largely on modifying sleep position, bedtime routines, and the sleep environment. Avoidance of the supine sleeping position was repeatedly emphasised. Participants frequently stated, “Don’t sleep on my back,” (Participant 3, Female, 28) “I never sleep on my back, even subconsciously, and I avoid sleeping on my side as well” (Participant 8, Female, 24) and “I don’t fall asleep on my back. I never wake up on my back, so this works for me.” (Participant 25, Female, 22). One participant extended this avoidance to other bodily configurations, such as, “I never wear my hair in a ponytail when I go to bed.” (Participant 8, Female, 24). Environmental adjustments were also common. Participants described sleeping with lights on, such as “I keep a night light on,” (Participant 8, Female, 24) or sleeping with another person for reassurance: “Sleeping with partner to feel safe and protected.” (Participant 32, Female, 22). One participant attempted to increase perceived control over sleep episodes, particularly daytime sleep, by setting alarms: “Turn on alarm for sleeping during day so I can control not getting stuck in sleep paralysis dream.” (Participant 47, Female, 28). Many participants reported efforts to improve general sleep hygiene and reduce pre-sleep arousal. These included winding down before bed, limiting technology use, and establishing calming routines. Examples included, “I try to wind down before bed as best as I can,” “No phone before bed,” (Participant 32, Female, 22) and “I try to develop calming and regulating bedtime routines with tea, no phone, reading calm books, listening to music, playing YouTube bedtime stories taking magnesium etc.” (Participant 21, Female, 22). Substance-related adjustments were also described. Some participants reported using herbal or nutritional supplements, such as “Drinking chamomile tea and using herbal sleep supplements before bed” (Participant 14, Prefer to self-describe, 25) while others discontinued substances they perceived as exacerbating symptoms: “Happens more frequently if I take magnesium at night so I stopped,” (Participant 62, Female, 26) and “No more opiates for pain management.” (Participant 56, Female, 28)

Absence of Active Coping

One participant reported not engaging in any specific coping strategies, due to perceiving the experience as benign. These responses framed sleep paralysis as a known but non-threatening phenomenon, exemplified by the statement, "No methods. It's just sleep paralysis, it's nothing dangerous" (Participant 3, Female, 28). Such accounts suggest that for some individuals, familiarity with the experience may reduce distress and the perceived need for active management.

Content Analysis Summary

The qualitative findings reveal SP as a highly immersive and emotionally salient experience for tertiary students, most commonly characterised by intense fear, vivid perceptual disturbances, and a compelling sense of realism. Participants frequently described sensed presences, chest pressure, and hallucinatory figures that felt indistinguishable from waking reality, which amplified distress and contributed to anticipatory anxiety around sleep. For many, fear extended beyond the episode itself, shaping ongoing sleep-related behaviours and emotional responses. Although fear was the predominant affective response, a smaller subset of participants reported neutral, manageable, or even positive experiences, suggesting variability in emotional impact and adaptation over time.

Participants interpreted their experiences through multiple explanatory frameworks, most commonly physiological and psychological, with stress, poor sleep quality, fatigue, and trauma frequently identified as contributing factors. A smaller but coherent group drew on spiritual or supernatural explanations, particularly when episodes involved vivid presences or culturally meaningful imagery. Support-seeking was typically informal, involving family, friends, or online resources, while professional support was sought primarily by those with trauma histories. Coping strategies were largely self-directed and pragmatic, focusing on behavioural modifications (e.g., sleep position avoidance, bedtime routines) and anxiety regulation rather than prevention of episodes. Overall, these findings underscore that SP in young adults is not only a neurophysiological phenomenon but also a deeply subjective experience shaped by emotional state, interpretation, and social context, complementing the quantitative associations observed in this study.

Chapter Seven: Discussion

The research objectives of the present study were to describe the describe the prevalence of SP among a sample of tertiary students in Aotearoa NZ, as well as to characterise the main phenomenological features of SP. This included describing the frequency of SP experiences and identifying common experiential features using both quantitative measures and qualitative content analysis. A third objective was to examine associations between SP, sleep quality, and psychological variables in a sample of tertiary students. Specifically, the study aimed to investigate whether individuals reporting experiences of SP differed from those without such experiences in terms of sleep quality and symptoms of psychological distress.

Summary of findings

Across the present sample, participants reported levels of psychological distress that were elevated relative to establishes normative ranges (Buysse et al., 1989; Spitzer et al., 2006; Lovibond & Lovibond, 1995). Mean scores on the DASS-21 subscales indicated moderate levels of anxiety, depression, and stress. Severity categorisation of GAD-7 scores indicated that over half of the sample reported moderate to severe anxiety symptoms, suggesting that psychological distress was common within this tertiary student cohort. These levels appear higher than those typically reported in general population samples, where mean DASS-21 scores tend to fall within the normal to mild range (Lovibond & Lovibond, 1995), and where the majority of individuals score in the minimal to mild range on the GAD-7 (Spitzer et al., 2006). However, the elevated levels observed in the present study are consistent with research indicating that university students often report higher levels of psychological distress compared to the general population (Stallman, 2010; Auerbach et al., 2016). Sleep quality was generally poor across the sample. Participants reported an average sleep duration of 6.44 hours per night, which falls below the recommended 7–9 hours of sleep per night for healthy adults (Scott et al., 2024). Average sleep efficiency (i.e., the percentage of time spent asleep while in bed) was also low (64.8%) and below the commonly accepted threshold of 85% or higher, considered indicative of healthy sleep-in adults (Watson et al., 2015). Consistent with these indicators, the broader sample displayed high levels of sleep disturbance, with a mean PSQI global score of 9.62 and 91.14% of participants meeting the conventional criterion for “poor sleepers” (PSQI ≥ 5) reflecting a high overall burden of self-reported sleep difficulties within the sample. The high proportion of poor sleepers in the present sample exceeds rates reported in previous studies of university student sleep patterns. For example, Li et al. (2020) reported 62.4% poor sleep quality among university students, while

Becker et al. (2018) found that approximately 60% of college students scored above clinical cut-offs. Together, these findings indicate that the sample was characterised by high levels of anxiety and widespread sleep disturbance, providing important context for interpreting the observed associations between SP experiences, psychological distress, and sleep quality.

An area of interest for this thesis was to describe the prevalence of SP among a sample of tertiary students in Aotearoa NZ. In the present sample, 42.9% participants reported having experienced at least one episode of SP, defined as a temporary inability to move or speak when falling asleep or upon awakening despite the intention to do so. The frequency of SP in the present sample was higher (42.9%) than global prevalence estimates but was consistent with rates commonly reported in student populations. Recent meta-analytic evidence indicates that the global prevalence of SP is approximately 30% when data across diverse populations, including the general population, psychiatric samples, and students, are combined (Hefnawy et al., 2024). However, higher prevalence rates have been observed among university-based samples (approximately 34%) compared with the general population (Hefnawy et al., 2024). The prevalence observed in the current study therefore falls within the upper range of estimates reported for tertiary samples, suggesting that SP was particularly common among young adults in NZ tertiary settings. Among those reporting SP, experiences were often recurrent, with nearly half reporting more than 20 episodes in the past year. Age of onset varied, though many participants (55%) were unsure of age of onset.

A second key focus of this study was to describe the phenomenological features of SP. The most commonly reported characteristics were intense fear, an inability to speak or call out despite attempts to do so, and the perception of a sensed presence, often experienced as either a human or non-human entity. Participants also frequently described hearing unusual sounds or voices during episodes and attributed these to the presence they saw or felt. These findings closely align with prior phenomenological accounts of SP, which describe the experience as a state of waking awareness combined with muscle atonia, vivid sensory imagery, and a powerful sense of presence (e.g., Cheyne, 2002; Cheyne et al., 1999; Solomonova, 2018). Consistent with this literature, the sensory content reported by participants in the current study was highly realistic and often indistinguishable from waking perceptions, a feature that has been widely documented as central to the distress associated with SP episodes. Importantly, the qualitative accounts corroborated the quantitative symptom profile. The same features that were most frequently endorsed on the symptom checklist, particularly paralysis with inability to speak, and the perception of a presence accompanied by unusual sounds, were also the most salient in participants' narrative descriptions. This convergence is also useful interpretively, because it suggests participants' narratives were not simply descriptive of sensations but embedded within coherent explanatory frameworks that likely shape both distress

during episodes and the kinds of behavioural changes participants adopt afterwards (e.g., safety behaviours and sleep avoidance). In this way, the qualitative data provided contextual depth for why these particular symptoms stood out: participants often described them as vivid, threatening, and difficult to rationalise while the episode was occurring.

Previous studies have repeatedly identified paralysis, sensed presences, and auditory or tactile hallucinations as hallmark features of SP episodes (Hefnawy et al., 2024). The high endorsement rates of sensing a presence in the room and hearing unusual sounds observed in the current sample align closely with this literature, which has emphasised the salience of threat-related perceptual experiences during SP. These findings support the notion that SP episodes frequently involve multisensory distortions rather than being limited to motor inhibition alone. Beyond these core features, participants reported a range of additional somatic, perceptual, and emotional experiences. These included chest pressure, breathing difficulty, vibrations or numbness, difficulty opening the eyes, erotic sensations, and vestibular experiences such as floating or leaving the body. Although more extreme experiences (such as sensations of being smothered, strangled, or fearing death), were less frequently reported, their presence underscores the potential intensity and emotional salience of SP episodes for some individuals. Importantly, fear emerged as the dominant emotional response, mirroring previous findings that panic and distress are the most prevalent affective states during SP and are amplified by REM-related autonomic arousal (Solomonova, 2018). Fear and distress have been widely reported as central aspects of SP, with some studies suggesting that fear may be the most memorable or distressing element of the experience (Sharpless & Grom, 2014; Fukuda, 2005). It is therefore unsurprising that many participants described subsequent changes to their sleep behaviour and environment, such as avoiding the supine position, keeping lights on, sleeping with others, or modifying bedtime routines, as attempts to prevent recurrence. Consistent with this, existing literature (Jalal, 2016; Sharpless & Doghramji 2015) suggests that individuals commonly adopt behavioural and cognitive strategies to manage SP, including modifying sleep position, improving sleep hygiene, and seeking reassurance or psychoeducation to reduce fear and misinterpretation of episodes. Beyond the strategies reported by participants, more structured approaches have been proposed elsewhere in the literature. These include cognitive–behavioural strategies and relaxation-based techniques aimed at reducing distress and improving coping during SP episodes; however, these remain largely untested in controlled trials (Jalal, 2016). These behavioural adaptations appear to function as self-protective strategies aimed at reducing vulnerability to future episodes, highlighting how the phenomenological intensity of SP can extend beyond the episode itself to shape ongoing sleep practices and perceptions of safety around sleep.

The symptom profile observed in this sample suggests that SP is typically experienced as a multifaceted event involving paralysis, perceptual distortions, and affective threat responses. The co-occurrence of motor inhibition with sensory and perceptual anomalies indicates that SP episodes may be experienced as disorganising and difficult to interpret, particularly during vulnerable sleep–wake transitions when cognitive control is reduced. The prominence of perceived presences and auditory experiences suggests that SP frequently involves misattribution of internally generated sensations to external sources, which may help explain why episodes are often interpreted as threatening (Cheyne & Girard, 2007). The prominence of perceived presences alongside auditory phenomena in the present data is consistent with established models of SP, particularly the intruder framework described in prior research (e.g., Cheyne et al., 1999; Cheyne & Pennycook, 2013). Notably, participants frequently attributed sounds, such as yelling, whispering, or movement, to the figures or presences they perceived in the room. In several free-text responses, the presence was not merely sensed but described as actively speaking, touching, or interacting with the participant. This pattern supports existing interpretations that internally generated sensory experiences during REM intrusion may be experienced as externally caused and attributed to a coherent entity (Cheyne & Girard, 2007) . The current findings therefore align with the literature in suggesting that the integration of auditory, tactile, and visual phenomena into a single perceived external entity may contribute to the heightened realism and threat associated with SP episodes (Cheyne & Girard, 2007).

When paralysis is combined with sensations such as chest pressure, numbness, or tingling; individuals may experience a heightened sense of bodily vulnerability, reinforcing interpretations of danger or loss of control (Cheyne & Girard, 2007). These findings imply that distress during SP may arise not solely from the inability to move, but from the interaction between paralysis and ambiguous sensory input that is difficult to contextualise while consciousness is partially restored. Experiences involving altered bodily awareness such as difficulty opening the eyes further suggest that SP disrupts normal integration of sensory and proprioceptive information (Cheyne & Girard, 2007). Such disruptions may intensify confusion regarding the boundary between dreaming and waking, increasing the likelihood that episodes are experienced as real and personally threatening (Cheyne & Girard, 2007). For some individuals, particularly those experiencing sensations of smothering or strangulation, SP may involve extreme threat-related bodily experiences that could plausibly condition fear of sleep or anticipation of recurrence. Importantly, the observed variability in symptom profiles provides context for findings elsewhere in the study indicating that SP showed some associations with psychological outcomes when examined as a continuous measure of symptom burden, rather than solely as a binary yes/no classification.

Participants' interpretive frameworks, as assessed through a tick-box attribution item and free-text responses, were also broadly consistent across the quantitative and qualitative data. For example, in the questionnaire item assessing how participants currently explain their experiences, physiological and psychological explanations were most common, while a smaller subset endorsed spiritual or cultural explanations. The qualitative responses reflected the same pattern: most free-text accounts framed SP as linked to sleep disruption, stress, medication changes, or trauma-related arousal, whereas fewer explicitly described supernatural interpretations (e.g., spiritual encounters or cultural entities). The present study findings were broadly consistent with patterns reported in previous literature (Denis, 2018; Wróbel-Knybel et al., 2022; Liskova et al., 2016) . With the increasing dominance of neurophysiological and biomedical explanations of SP; most participants in the current sample attributed their experiences to factors such as sleep disruption, stress, medication, illness or trauma-related arousal. However, this pattern was not universal. A small subset of participants *(n = 7)* attributed their experiences to spiritual or culturally based explanations. These participants were more often Māori or from non-European backgrounds highlighting that interpretive frameworks are influenced by, but not determined by, cultural identity. This finding aligns with existing research suggesting that individuals draw upon available cultural resources to make sense of SP, with spiritually oriented interpretations more likely among those embedded within belief systems that accommodate non-material explanations (Jalal & Ramachandran, 2017; Spanos et al., 1995). Importantly, the coexistence of both explanatory models within the sample supports broader findings that, while SP may involve core invariant features across cultures, the meaning attributed to these experiences remains shaped by cultural context and individual belief systems (Jalal & Hinton, 2015).

The third research objective was to examine the associations between sleep quality, general mood and wellbeing, and the prevalence of experiencing SP among tertiary students. Overall, the results provide partial support for the hypothesis that SP was linked to psychological distress and sleep disruption. Group-based analyses indicated that participants reporting SP demonstrated significantly higher stress scores than those without SP, a finding that aligns with previous research identifying stress as a key factor associated with SP occurrence (Bhat et al., 2025; Jalal et al., 2020; Sharpless & Grom, 2016). However, no statistically significant group differences were observed for anxiety, depression, generalised anxiety, or global sleep quality. Importantly, median scores on all of these measures were higher in the SP group, suggesting a consistent trend in the expected direction. The absence of statistical significance for these variables may reflect limited statistical power or sample size constraints rather than a complete lack of association. The significant association between stress and SP suggests that stress may be a particularly salient correlate of SP in this sample,

potentially reflecting a bidirectional or mutually reinforcing relationship. One possibility is that tertiary students experience elevated baseline levels of physiological and cognitive arousal due to academic pressures, and broader lifestyle stressors associated with tertiary study, which may increase vulnerability to SP episodes (Gumbis et al., 2025). Alternatively, individuals who experience SP may already have heightened baseline arousal or stress reactivity, irrespective of student status, with the demands of tertiary study compounding this pre-existing vulnerability (Wróbel-Knybel et al., 2022). In turn, the distressing and fear-inducing nature of SP episodes may further amplify stress levels through anticipatory anxiety, sleep avoidance, and ongoing sleep disruption. The qualitative findings lend greater support to the former interpretation by identifying stress and trauma-related factors as common perceived antecedents of episodes. Accounts provided in the free-text responses linking SP to PTSD, triggers, or past interpersonal trauma are consistent with the broader quantitative pattern which is further discussed below.

When SP was conceptualised dimensionally via symptom burden (i.e the number of SP symptoms experienced), greater SP symptom count was significantly and positively correlated with generalised anxiety (as measured by the GAD), but not with other measures of psychological distress or sleep quality. This suggests that individuals who reported a broader range of SP symptoms tended to report higher levels of generalised anxiety, however, this relationship was not consistently observed across the DASS-21 anxiety, depression, stress subscales. This pattern aligns with the view that SP may be particularly relevant for individuals who experience more intense, frequent, or multifaceted episodes (e.g., episodes involving fear, perceived presences, and physical sensations), rather than those who have experienced an episode of paralysis (Cheyne & Girard, 2007) . In other words, distress appears to scale with the depth and breadth of the SP experience.

When examining associations at the level of individual symptoms, the findings indicated that specific SP features, particularly those involving perceived threat or intrusion, were selectively associated with higher psychological distress and poorer sleep quality. Experiences such as sensing a presence, hearing unusual sounds, and somatic threat-related sensations (e.g., being strangled or smothered) were linked to elevated stress, anxiety, and depressive symptoms, whereas other features showed no significant associations. This pattern suggests that it is not the presence of SP per se, but the qualitative nature of the experience, particularly its threat-related and perceptually vivid components, that may be most relevant to psychological distress. These findings are broadly consistent with existing literature, which has identified fear, perceived presence, and threatening hallucinations as central to the distressing nature of SP episodes (Cheyne et al., 1999; Cheyne & Girard, 2007; Solomonova, 2014). In particular, the “intruder” and “incubus” dimensions of SP, characterised by sensed presence, auditory hallucinations, and chest pressure or breathing difficulty, have been

repeatedly associated with heightened fear and panic responses (Cheyne et al., 1999). The present findings extend this work by demonstrating that these specific symptom clusters are also differentially associated with broader indices of psychological distress and sleep disruption within a tertiary student sample. However, the absence of consistent associations across all symptoms and outcome measures suggests that the relationship between SP phenomenology and psychological functioning is selective rather than uniform. Together, these results support the view that distress during SP is driven primarily by the interaction between paralysis and threat-related perceptual experiences, rather than by motor inhibition alone, and highlight the importance of considering symptom-level variation when examining the psychological impact of SP.

Building on these findings, the phenomenological patterns observed in the present study provide insight into the mechanisms underlying SP-related distress. The prominence of threat-related features suggests that SP episodes may engage cognitive and affective systems involved in threat detection at a time when individuals have limited capacity to contextualise internally generated sensations (Akhtar, 2025; Fukuda, 2005; Khan et al., 2024). This interpretation aligns with cognitive models proposing that distress during SP is amplified by the misattribution of internally generated experiences as externally caused or dangerous (Cheyne & Girard, 2007; Wróbel-Knybel et al., 2020). The present findings therefore support theoretical accounts that position cognitive appraisal and affective response as central mechanisms linking SP to distress, rather than viewing SP as a purely physiological event.

The count of SP symptoms was also not significantly associated with poorer sleep quality. One likely reason for this incongruence with previous literature is that sleep disturbance was elevated (with 91.4% of participants meeting the criteria for "poor sleep") across the full sample, reducing sensitivity for detecting group differences. When sleep disturbance is common across the full sample, it becomes more difficult to detect differences between group. In other words, when poor sleep is common in both groups, severity-based indicators (symptom burden) may be more informative than a binary SP classification for capturing meaningful sleep-related vulnerability. In addition, poorer sleep quality was significantly associated with higher levels of psychological distress across all measures, with moderate positive correlations observed between PSQI global scores and anxiety, depression, stress, and generalised anxiety. This is consistent with existing literature highlighting the close interrelationship between emotional wellbeing and sleep disturbance (Vandekerckhove & Wang, 2017; Hamilton et al., 2007; Freitag et al., 2017).

The qualitative findings provide additional insight into the potential mechanisms underlying the observed associations between SP, stress and psychological distress. Although perceived causes cannot establish directionality, the content provided by participants provide a plausible contextual

mechanism: heightened arousal and threat sensitivity, whether driven by ongoing stress or trauma-related hypervigilance, may increase vulnerability to disruptive sleep–wake transitions and amplify distress during episodes. This convergence across qualitative and quantitative data supports the view that SP is most psychologically consequential for individuals experiencing greater symptom complexity alongside elevated stress and sleep disruption. Importantly, the non-significant findings for depression, anxiety, and generalised anxiety in the group comparisons do not indicate an absence of relationships; rather, they suggest that the relationship between SP and broader mood symptoms may be more nuanced than a simple group difference based on whether or not the individual experienced muscle paralysis.

The limited pattern of associations observed in the present study also has methodological implications for how SP is operationalised. SP status, defined in the current study by a single screening item assessing whether paralysis had ever been experienced, captures a heterogeneous group that may include individuals with a single, mild episode as well as those with recurrent or more multifaceted experiences. In the current sample, nearly half (49%) of participants in the SP group reported more than 20 episodes in the past year, whereas others reported substantially fewer episodes, illustrating considerable variability within the binary classification. Collapsing these individuals into one category reduces sensitivity and can obscure associations that are evident when SP is measured dimensionally. The results therefore imply that the psychological significance of SP may depend less on whether an individual has ever experienced SP and more on the frequency and symptom profile of their episodes. Despite no significant association found between SP symptom count and sleep quality, this suggests that the relationship between SP and sleep disturbance may be more apparent when SP is conceptualised as a dimensional phenomenon. Individuals who report a greater number of SP-associated symptoms may be those with more fragmented sleep patterns, poorer sleep continuity, or heightened arousal at sleep–wake transitions, which may in turn increase vulnerability to SP episodes. Although the present study relied on self-report measures of sleep quality, this interpretation provides a foundation for future research to examine these mechanisms using objective methodologies For example, polysomnography and actigraphy could be used to assess REM fragmentation, sleep efficiency, and micro-awakenings, while physiological monitoring (e.g., heart rate variability or autonomic indices) could explore whether heightened arousal at sleep–wake boundaries predict greater symptom breadth. By integrating subjective reports with objective sleep metrics, future studies could clarify whether symptom burden reflects underlying neurophysiological vulnerability, heightened stress reactivity, or other sleep-related processes not detectable through questionnaire data alone. However, the observed positive correlations between PSQI scores and all psychological distress measures indicate that poorer sleep quality was meaningfully related to mood

and anxiety symptoms in this cohort. Within this context of broadly elevated sleep disruption, SP symptom burden may represent an additional marker of vulnerability for those at the more severe end of sleep-related difficulties.

Binary logistic regression analyses revealed that, when examined simultaneously in a multivariable model, age was the only factor that independently predicted SP status. With younger participants (18–24 years) being significantly more likely to report sleep paralysis than those aged 25–30. This finding is consistent with previous literature indicating that SP is most prevalent in adolescence and early adulthood, a developmental period characterised by heightened sleep instability, irregular sleep schedules, and ongoing maturation of sleep–wake regulatory systems (Hershner & Chervin, 2014; Denis et al., 2018). In contrast, psychological distress variables and sleep quality did not independently predict categorical sleep paralysis status once the demographic variables were controlled for. This finding suggests that psychological distress and sleep quality do not uniquely distinguish SP status when considered concurrently, likely because these predictors share substantial variance with one another. Additionally, the observed pattern of associations suggests that SP may exist within a broader network of sleep–arousal–emotion interactions.

Rather than being driven by a single psychological or sleep-related factor, SP appears to emerge within a context of overlapping vulnerabilities, including heightened stress, emotional dysregulation, and disrupted sleep. This interpretation helps explain why no single variable uniquely predicted SP status in the regression analysis and supports theoretical frameworks that emphasise shared variance and interacting risk factors in sleep-related phenomena (Riaz et al., 2022, Denis et al., 2018; Liskova et al., 2016). In the present data, psychological distress measures were moderately to strongly intercorrelated and were also correlated with sleep quality. When predictors overlap to this extent, multivariable models often yield non-significant unique effects even when bivariate associations are present, because the shared variance is partialled out (Hazra & Gogtay, 2017). In the context of the study aims, the regression findings imply that SP status may be influenced by a combination of sleep and psychological factors rather than a single unique predictor. Equally, they may indicate that SP status is too broad an outcome variable to be predicted reliably by general measure of distress and global sleep quality in a non-clinical sample. Importantly, demographic and developmental factors may play a more central role in vulnerability to sleep paralysis onset, whereas psychological and sleep-related factors may influence the intensity, frequency, and distress associated with episodes once they occur.

Theoretical and Practical Implications

The findings of the present study contribute to existing theoretical accounts of sleep paralysis by integrating subjective descriptions of SP experiences with empirical evidence of their associations with sleep quality and psychological distress. Traditional models of SP have largely focused on neurophysiological mechanisms, particularly the intrusion of rapid eye movement (REM)–related muscle atonia into wakefulness (Bhalerao et al., 2024). While such models provide a well-supported explanation for the motor and perceptual features of SP; the present findings suggest that these mechanisms do not, on their own, fully account for the variability in how distressing SP experiences are for individuals. In other words, understanding how SP occurs at a biological level does not necessarily explain why some individuals experience episodes as profoundly frightening and disruptive, whereas other report them as euphoric, non-threatening or benign.

The integration of quantitative and qualitative findings in this study highlights the importance of adopting a more person-centred perspective that consider subjective meaning, emotional response, and contextual factors alongside neurophysiological processes. Participants' free-text accounts demonstrated that the emotional intensity of SP was closely tied to perceived threat, prior stress or trauma, and individual interpretations of the experience. This suggests that while REM-related mechanisms may initiate the episode, the lived impact of SP is shaped by cognitive appraisal, personal history, and the broader psychosocial context in which the experience occurs. Accordingly, rather than positioning neurophysiological and experiential explanations as competing accounts, the present findings support a more integrative framework. Neurobiology may explain the *mechanism* of SP, whereas person-centred and contextual approaches help explain its *meaning*, variability, and psychological consequences

A key theoretical implication of the present study was the distinction between categorical presence of SP and dimensional symptom burden, which raises questions about how SP should be defined and operationalised. In the current study, SP status was determined based on the self-reported experience of paralysis/muscle atonia, consistent with prior epidemiological approaches (Paradis et al. 2009). However, the findings suggest that this binary classification (yes/no) may obscure meaningful variation in the experience of SP. In particular, individuals who met criteria for SP based on paralysis alone varied widely in the number, type, and intensity of accompanying symptoms. It was this broader symptom burden, rather than paralysis, that showed the strongest and most consistent associations with psychological distress and sleep disruption. These findings invite consideration of whether the defining feature of SP should be the presence of paralysis itself or the broader experience of REM-related muscle atonia accompanied by perceptual, emotional, and somatic symptoms. While paralysis or muscle atonia is often treated as the core criterion, the present results suggest that

paralysis alone may be insufficient to capture the clinical and psychological relevance of SP. Individuals who experience isolated or brief paralysis without associated fear, hallucinations, or bodily threat sensations may differ substantially from those whose episodes involve intense affective and perceptual disturbances. From this perspective, SP may be better conceptualised as a spectrum of experiences characterised by varying degrees of motor inhibition, sensory intrusion, and emotional threat, rather than a discrete condition defined solely by the presence or absence of paralysis.

A key methodological consideration concerns the absence of a formal scoring framework for the USEQ (Paradis et al., 2009) used in this study. As the scale does not provide established scoring metrics, it was necessary to assign analytic metrics within the context of this thesis. Accordingly, this thesis should be understood as foundational work in identifying and organising potentially meaningful phenomenological elements. The present findings highlight which features may warrant closer empirical attention; however, a full psychometric evaluation of the scale is necessary. Future research should prioritise formal scale validation, including reliability testing, factor analysis, and the development of a shorter, psychometrically robust version with clearly defined scoring procedures and coding guidelines. Such refinement would strengthen both theoretical clarity and practical applicability in future investigations.

This distinction between binary classification of SP (presence vs absences of paralysis) and dimensional conceptualisations of SP (e.g symptom frequency, complexity, and emotional impact) has important implications for both research and practice. Reliance on binary SP classification may contribute to inconsistent findings across studies and limit the ability to identify individuals for whom SP is distressing or functionally impairing. Dimensional approaches that incorporate symptom frequency, complexity, and emotional impact may provide a more sensitive and theoretically coherent framework for understanding SP and its associations with psychological wellbeing. Such an approach aligns with broader trends in sleep and psychopathology research that emphasise severity and experiential variability over categorical diagnosis (Insel et al., 2010; Jalal, 2016), and it may help reconcile discrepancies between prevalence estimates, correlational findings, and clinical relevance observed in the SP literature.

From a practical perspective, the findings of the present study have important implications for how sleep paralysis is understood and addressed in non-clinical populations. First, the high prevalence of SP in a young adult student sample underscores the need for greater awareness and normalisation of SP experiences especially within cohorts where elevated stress is known to occur (i.e. students). Many may experience SP without seeking professional support, particularly if episodes are interpreted as unusual, frightening, or difficult to explain. Providing information about the nature of SP may help reduce fear, confusion, and catastrophic interpretations associated with episodes. In

the present study, psychological distress showed limited and selective associations with both SP status and SP symptom count. Rather than suggesting that one operationalisation is inherently superior to the other, these findings indicate that the relationship between SP and psychological wellbeing is likely to be complex and influenced by multiple interacting factors. Both the occurrence of SP (whether an individual has experienced paralysis during a sleep–wake transition) and the qualitative features of episodes (e.g., fear, sensed presence, bodily sensations) may be relevant when considering perceived impact and support needs. Interventions targeting sleep hygiene, stress management, and emotional regulation may reduce the severity or distress associated with SP even if they do not eliminate episodes entirely (Wang et al., 2025). For example, psychoeducation about sleep–wake transitions, relaxation strategies, and techniques to reduce anticipatory anxiety around sleep may help individuals feel more prepared and less threatened when SP occurs. However, these approaches may not be universally applicable particularly within culturally diverse contexts such as Aotearoa New Zealand. For some individuals, including Māori and Tongan participants, SP-like experiences may be interpreted through spiritual or relational frameworks (e.g., wairua or ancestral presence)(Haami et al., 2026), and interventions grounded solely in biomedical or psychological explanations may be perceived as invalidating or ineffective. As such, culturally responsive approaches that acknowledge and incorporate diverse explanatory models of SP are essential. Previous research also supports the use of tailored psychoeducational and cognitive–behavioural approaches in reducing SP-related distress (Sharpless & Doghramji, 2015), highlighting the importance of both evidence-based and culturally sensitive intervention strategies.

In clinical and educational settings, these findings support the inclusion of SP in broader discussions of sleep and mental health, particularly among young adults experiencing high levels of stress or sleep disturbance. Importantly, the present results caution against interpreting SP as inherently pathological. Instead, they suggest that SP becomes clinically relevant primarily when episodes are frequent, distressing, or embedded within broader patterns of psychological and sleep-related difficulties. This distinction may help prevent unnecessary pathologisation while still acknowledging the genuine distress experienced by some individuals.

Limitations and Future Research

Several limitations should be considered when interpreting the findings of the present study. First, although the USEQ (Paradis et al., 2009) was useful for gathering detailed information about SP experiences, associated symptoms, and participants' interpretations of these experiences within broader personal and cultural contexts, there is currently limited published evidence regarding its psychometric properties and no formally established scoring system. The absence of formal reliability

and validity data for the USEQ means that interpretations of participants' responses should be made with some caution. While the measure has been used in prior research to capture SP-related phenomena (Khan et al., 2024; Colombo & Cellini, 2024), the lack of established psychometric evaluation may limit confidence in the precision with which symptom frequency and severity were assessed. However, its use in the present study allowed for the capture of rich, phenomenological and interpretive aspects of SP that are often not represented in standardised measures, highlighting the value of such tools in exploratory research. Future research should aim to retain these qualitative strengths by developing and validating a standardised SP measure that incorporates both symptom-based scoring and phenomenological domains, allowing for more precise, comparable, and conceptually comprehensive assessment of SP experiences.

A second limitation relates to the operational definition of SP and the resulting sample size. For the purposes of analysis, only participants who self-reported experiencing paralysis were classified as having experienced SP and included in SP-specific analyses. This decision was made to maintain conceptual clarity and align with core definitions of SP as involving transient motor paralysis during sleep–wake transitions (Knybel et al., 2018; Olunu et al. 2018). However, there is currently no universally agreed-upon criterion regarding whether paralysis must be explicitly endorsed for an experience to be classified as SP, and some individuals may report SP-like experiences characterised by fear, perceptual disturbances, or a sensed presence without clearly identifying paralysis as was noted in the current study. As a result, this definitional decision may have excluded participants who experienced related phenomena but did not label them as paralysis, thereby reducing the effective sample size for SP analyses. This approach may have limited statistical power and reduced sensitivity to the full spectrum of SP-related experiences. Furthermore, while the reliance on a single screening item to classify SP status us consistent with prior research (Paradis et al., 2009) and allowed for clear group comparisons, it may have resulted in a heterogeneous SP group that included individuals with vastly different frequencies and intensities of SP experiences. This may partly explain why categorical SP status was not independently predicted in multivariable analyses and underscores the limitations of binary classifications in capturing the complexity of SP experiences. Future research should build on the present findings by further refining the measurement and conceptualisation of SP. Given the observed importance of symptom burden over categorical SP status, future studies would benefit from adopting dimensional assessment approaches that capture the frequency, intensity, and phenomenological complexity of SP experiences. There is a clear need for the development and validation of a standardised SP measure with established psychometric properties, including reliability, validity, and a formalised scoring system. Such a measure would enable more precise assessment of SP severity, improve comparability

across studies, and strengthen confidence in conclusions drawn about associations between SP, psychological distress, and sleep quality.

A further limitation relates to the integration of survey and free-text methods. Because open-ended responses were embedded within the same survey that included structured symptom checklists and interpretation options, participants may have been primed by the preceding closed ended items to focus on particular symptoms (e.g., sensed presence, inability to speak, chest pressure) or explanatory frames (e.g., stress, sleep quality, spiritual causes). As a result, qualitative responses should not be interpreted as arising entirely independent of the survey context. While this design still captures participants' lived experience, it may have increased the likelihood that they described the most salient or recently cued aspects of SP rather than providing an unrestricted narrative. Future work is recommended using interviews or free-form narratives collected separately from symptom checklists would help confirm whether the same themes emerge without item-driven prompting. More broadly, adopting mixed-method approaches that clearly separate or sequence qualitative and quantitative components may allow for a more robust examination of how subjective interpretations of SP relate to symptom patterns, while minimising potential priming effects inherent in survey-based designs.

A further methodological limitation relates to the measurement of sleep quality. An additional response option ("average") was inadvertently included in the PSQI item assessing overall subjective sleep quality. Because this option is not part of the standard PSQI scoring system and does not directly contribute to the global PSQI score, responses selecting "average" required recording using an assigned midpoint value (1.5) to allow inclusion in the global score. While this deviation applied to a single item within the PSQI, the use of a continuous global score meant that sleep quality was still captured along a continuum of experience, reducing the likelihood that this issue substantially changed the overall distribution or pattern of results. This deviation from the standard scoring procedure may nevertheless have affected the psychometric properties of the PSQI within the present sample, including the reliability and comparability of the global sleep quality scores. As a result, findings involving subjective sleep quality and PSQI global scores should be interpreted with caution. More broadly, the reliance on self-report measures represents an additional limitation, as subjective accounts of sleep may differ from objective indicators of sleep behaviour. Future research would benefit from incorporating objective measures such as actigraphy or polysomnography alongside self-report instruments to provide a more comprehensive assessment of sleep and its relationship with SP.

The demographic composition of the sample also represents a limitation. The sample was predominantly female and primarily identified as New Zealand European, which may limit the

generalisability of the findings to the broader New Zealand tertiary student population, which although itself is characterised by a higher proportion of female and New Zealand European/Pākehā students, it includes greater ethnic diversity that represented in the present sample (Ministry of Education, 2023). Previous research suggests that SP prevalence and phenomenology may vary across gender and cultural groups (Sharpless & Barber, 2011); therefore, the demographic skew observed in the present study may have influenced prevalence estimates and experiential patterns. As such, the findings may not fully capture the diversity of SP experiences within more ethnically and culturally representative samples. Although efforts were made to ensure the survey wording was culturally appropriate, further steps could be taken to better engage Māori and other underrepresented groups, individuals from lower socioeconomic backgrounds, and male participants, given the female-skewed nature of the present sample. Strategies such as incorporating culturally relevant language in recruitment materials, and partnering with Māori communities or institutions may improve engagement and participation. Future research should aim to recruit more demographically diverse samples, particularly with respect to gender and ethnicity, to improve the generalisability of findings. More culturally responsive approaches may also help capture a broader range of interpretations and experiences, providing deeper insight into how sociocultural context shapes both the phenomenology and psychological impact of SP.

In addition, the use of a cross-sectional, self-report survey design limits the ability to draw conclusions about temporal or causal relationships between sleep paralysis, psychological distress, and sleep quality. While significant associations were observed, particularly between SP symptom burden and psychological variables, these findings cannot establish whether psychological distress contributes to SP experiences, whether SP contributes to increased distress, or whether both are influenced by shared underlying factors such as stress or sleep disruption. Qualitative responses provided some insight into this relationship, with participants commonly attributing their SP experiences to stress, trauma or PTSD, poor sleep, medication or illness, and, in some cases, spiritual or supernatural causes, suggesting that individuals may draw on multiple explanatory frameworks to make sense of their experiences. Future research using longitudinal designs would be valuable in clarifying the directionality of these relationships and determining whether changes in sleep or psychological functioning precede or follow SP experiences. Prospective studies could examine whether changes in stress, anxiety, or sleep disruption predict subsequent changes in SP symptom frequency or severity, or whether recurrent SP experiences contribute to worsening psychological or sleep-related outcomes over time. Such designs would help address questions of directionality that cannot be resolved using cross-sectional data.

Finally, the sample size, while adequate for correlational analyses, may have limited statistical power for detecting smaller effects in multivariable regression models, particularly when controlling for multiple interrelated predictors. This may have contributed to the non-significant findings observed in the logistic regression analyses and suggests that some associations may have been underestimated. Future research using larger samples would improve statistical power and allow for more robust multivariable modelling. In addition, applied research examining intervention and education strategies would be valuable. Given the observed associations between SP symptom burden, psychological distress, and poor sleep quality, future studies could evaluate whether interventions targeting sleep hygiene, stress management, or psychoeducation reduce symptom severity or associated distress, and whether addressing these factors can mitigate the impact of SP even when episodes persist.

Chapter Eight: Conclusion

The present study provides one of the first detailed examinations of SP within a tertiary student population in Aotearoa New Zealand, with a specific focus on its relationship with sleep and mental health. By integrating quantitative and qualitative methods, this research offers a novel and more comprehensive account of SP experiences in a population that is both underrepresented in the literature and known to experience elevated levels of stress and sleep disruption. In doing so, the study moves beyond simple prevalence estimates to capture not only how often SP occurs, but how it is experienced, interpreted, and related to psychological functioning.

Overall, the findings indicate that SP is a relatively common experience within this population and is frequently characterised by vivid, immersive, and distressing features. A key quantitative finding was that participants who reported SP also reported significantly higher levels of stress compared to those who did not report SP. This pattern was strongly supported by the qualitative data, where participants frequently attributed their experiences to stress, trauma, or heightened emotional strain. This convergence across methods strengthens confidence in the interpretation that stress plays a meaningful role in the occurrence or perception of SP within this group. A second important finding was that when SP was conceptualised dimensionally, greater symptom burden was significantly associated with higher levels of generalised anxiety. Notably, this relationship was not consistently observed across other measures of psychological distress or sleep quality, suggesting that the association between SP and psychological functioning is selective rather than global. Taken together, these findings highlight an important conceptual distinction: the psychological relevance of SP appears to depend less on whether an individual has experienced SP, and more on the frequency and complexity of symptoms they report. This supports the value of dimensional approaches to SP, which may be more sensitive to individual differences in distress than binary classifications.

The qualitative findings further deepen this interpretation. Participants consistently described SP episodes as highly realistic and often indistinguishable from waking perception, a feature that has been widely linked to the distress associated with these experiences. Paralysis with inability to speak, sensed presence, and unusual auditory phenomena were not only the most frequently endorsed symptoms, but also the most prominent features in participants' narrative accounts. Importantly, these accounts were not merely descriptive, but reflected coherent explanatory frameworks, with participants attempting to make sense of their experiences in ways that shaped both their emotional responses and subsequent behaviours. Reports of fear, threat, and confusion were common, and in some cases were linked to changes in sleep-related behaviour, such as avoidance or increased vigilance. The convergence between quantitative symptom endorsement and qualitative narratives

reinforces the validity of the symptom profile identified and highlights the central role of interpretation in shaping the impact of SP.

While the study is subject to several methodological limitations, including reliance on self-report measures, a cross-sectional design, and a relatively specific sample, these limitations also point to clear directions for future research. In particular, the findings support the use of longitudinal designs to clarify temporal relationships, as well as the integration of objective sleep measures and culturally informed frameworks to better capture the full complexity of SP experiences in the New Zealand context. Importantly, the findings also carry practical implications. The high prevalence of SP, together with its observed associations with stress and generalised anxiety, suggests that SP should be considered within broader discussions of student mental health. Increasing awareness and understanding of SP may help reduce fear and misinterpretation, particularly given the vivid and often threatening nature of these experiences. Providing information about the common features, prevalence, and nature of SP may help normalise the experience, reduce associated fear and uncertainty, and support individuals in better understanding their experiences. In addition, stress management strategies may be beneficial for supporting overall psychological wellbeing. More broadly, promoting good sleep hygiene remain and important component of student health, although further research is needed to determine whether improving sleep quality influences the occurrence or distress associated with SP.

In summary, this study advances current understanding of SP by demonstrating that SP is both common and psychologically relevant within a New Zealand tertiary student population. By highlighting the importance of symptom burden, emotional context, and subjective interpretation, the findings challenge overly simplistic conceptualisations of SP and instead position it as a complex, multifaceted experience embedded within broader patterns of sleep and mental health. These insights provide a strong foundation for future research and offer a more nuanced framework for understanding and responding to SP in both research and applied settings.

References

Abdalqader, M. A., Ariffin, I. A., Ghazi, H. F., AboBakr, M. F., & Fadzil, M. A. (2018). Prevalence of insomnia and its association with social media usage among university students in Selangor, Malaysia, 2018. *Folia Medica Indonesiana, 54*(4), 289-293.

Ableidinger, S., & Holzinger, B. (2023). Sleep paralysis and lucid dreaming—between waking and dreaming: a review about two extraordinary states. *Journal of Clinical Medicine, 12*(10), 3437.

Abrams, M. P., Mulligan, A. D., Carleton, R. N., & Asmundson, G. J. (2008). Prevalence and correlates of sleep paralysis in adults reporting childhood sexual abuse. *Journal of Anxiety Disorders, 22*(8), 1535-1541.

Adler, S. R. (2011). *Sleep paralysis: Night-mares, nocebos, and the mind-body connection*. Rutgers University Press.

Aina, O. F., & Famuyiwa, O. O. (2007). Ogun Oru: a traditional explanation for nocturnal neuropsychiatric disturbances among the Yoruba of Southwest Nigeria. *Transcultural Psychiatry, 44*(1), 44-54.

Alhola, P., & Polo-Kantola, P. (2007). Sleep deprivation: Impact on cognitive performance. *Neuropsychiatric Disease and Treatment, 3*(5), 553-567.

Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., ... & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment*, 449-461.

Ashworth, B., & Jellinek, E. (2001). KINNIER WILSON AND HIS BOOKS. *Twentieth Century Neurology: The British Contribution*, 115.

Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G., ... & Bruffaerts, R. (2016). Mental disorders among college students in the World Health Organization world mental health surveys. *Psychological Medicine, 46*(14), 2955-2970.

Beattie, H. (1918). Traditions and legends. Collected from the Natives of Murihiku.(Southland, New Zealand.) Part VIII.(Continued). *The Journal of the Polynesian Society, 27*(3 (107), 137-161.

Becker, S. P., Jarrett, M. A., Luebbe, A. M., Garner, A. A., Burns, G. L., & Kofler, M. J. (2018). Sleep in a large, multi-university sample of college students: sleep problem prevalence, sex differences, and mental health correlates. *Sleep Health, 4*(2), 174-181.

Best E. *Spiritual and Mental Concepts of the Maori* (No. 2). Wellington, New Zealand: Dominion Museum, 1922.

Bhalerao, V., Gotarkar, S., Vishwakarma, D., Kanchan, S., & BHALERAO, V. (2024). Recent insights into sleep paralysis: mechanisms and management. *Cureus, 16*(7).

Bhat, R., Shetty, S. J., & Shabaraya, A. R. (2025). Association Between Sleep Quality and Sleep Paralysis Among College Students: A Cross-Sectional Study. *Sleep, 3*, 03.

Bibi, A., Lin, M., Zhang, X. C., & Margraf, J. (2020). Psychometric properties and measurement invariance of Depression, Anxiety and Stress Scales (DASS-21) across cultures. *International Journal of Psychology, 55*(6), 916-925.

Borbély, A. A. (1982). A two process model of sleep regulation. *Hum Neurobiol, 1*(3), 195-204.

Brooks, P. R., Girgenti, A. A., & Mills, M. J. (2009). Sleep patterns and symptoms of depression in college students. *College Student Journal, 43*(2), 464-473.

Brown, T. A., Chorpita, B. F., Korotitsch, W., & Barlow, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy, 35*(1), 79-89.

Buysse, D. J. (2014). Sleep health: can we define it? Does it matter?. *Sleep, 37*(1), 9-17.

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

Carpenter, J. S., & Andrykowski, M. A. (1998). Psychometric evaluation of the Pittsburgh sleep quality index. *Journal of Psychosomatic Research, 45*(1), 5-13.

Chaput, J. P., Gray, C. E., Poitras, V. J., Carson, V., Gruber, R., Olds, T., ... & Tremblay, M. S. (2016). Systematic review of the relationships between sleep duration and health indicators in school-aged children and youth. *Applied Physiology, Nutrition, and Metabolism, 41*(6), S266-S282.

Chavda, V., Chaurasia, B., Umana, G. E., Tomasi, S. O., Lu, B., & Montemurro, N. (2022). Narcolepsy—a neuropathological obscure sleep disorder: a narrative review of current literature. *Brain Sciences, 12*(11), 1473.

Cheyne, J. A. (2002). Situational factors affecting sleep paralysis and associated hallucinations: position and timing effects. *Journal of Sleep Research, 11*(2), 169-177.

Cheyne, J. A. (2003). Sleep paralysis and the structure of waking-nightmare hallucinations. *Dreaming, 13*(3), 163-179.

Cheyne, J. A. (2005). Sleep paralysis episode frequency and number, types, and structure of associated hallucinations. *Journal of Sleep Research, 14*(3), 319-324.

Cheyne, J. A., & Girard, T. A. (2007). Paranoid delusions and threatening hallucinations: a prospective study of sleep paralysis experiences. *Consciousness and Cognition, 16*(4), 959-974.

Cheyne, J. A., Newby-Clark, I. R., & Rueffer, S. D. (1999). Relations among hypnagogic and hypnopompic experiences associated with sleep paralysis. *Journal of Sleep Research, 8*(4), 313-317.

Cheyne, J. A., & Pennycook, G. (2013). Sleep paralysis postepisode distress: Modeling potential effects of episode characteristics, general psychological distress, beliefs, and cognitive style. *Clinical Psychological Science, 1*(2), 135-148.

Cheyne, J. A., Rueffer, S. D., & Newby-Clark, I. R. (1999). Hypnagogic and hypnopompic hallucinations during sleep paralysis: neurological and cultural construction of the night-mare. *Consciousness and Cognition, 8*(3), 319-337.

Cholombo, C., & Cellini, N. (2024). Lifetime prevalence and characteristics of sleep paralysis in Italian university students population. *Sleep Medicine, 122*, 106-112.

Consensus Conference Panel, Watson, N. F., Badr, M. S., Belenky, G., Bliwise, D. L., Buxton, O. M., ... & Tasali, E. (2015). Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. *Journal of Clinical Sleep Medicine, 11*(6), 591-592.

Crawford, J. R., & Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology, 42*(2), 111-131.

Crowley, S. J., Acebo, C., & Carskadon, M. A. (2007). Sleep, circadian rhythms, and delayed phase in adolescence. *Sleep Medicine, 8*(6), 602-612.

Dahlitz, M., & Parkes, J. D. (1993). Sleep paralysis. *The Lancet, 341*(8842), 406-407.

De Jong, J. T. (2005). Cultural variation in the clinical presentation of sleep paralysis. *Transcultural Psychiatry, 42*(1), 78-92.

De Sá, J. F., & Mota-Rolim, S. A. (2016). Sleep paralysis in Brazilian folklore and other cultures: A brief review. *Frontiers in Psychology, 7*, 1294.

Denis, D. (2018). Relationships between sleep paralysis and sleep quality: current insights. *Nature and Science of Sleep*, 355-367.

Denis, D., French, C. C., & Gregory, A. M. (2018). A systematic review of variables associated with sleep paralysis. *Sleep Medicine Reviews, 38*, 141-157.

Denis, D., French, C. C., Schneider, M. N., & Gregory, A. M. (2018). Subjective sleep-related variables in those who have and have not experienced sleep paralysis. *Journal of Sleep Research, 27*(5), e12650.

Direksunthorn, T. (2025). Sleep and cardiometabolic health: a narrative review of epidemiological evidence, mechanisms, and interventions. *International Journal of General Medicine*, 5831-5843.

Douglass, A. B., Bomstein, R., Nino-Murcia, G., Keenan, S., Miles, L., Zarcone Jr, V. P., ... & Dement, W. C. (1994). The sleep disorders questionnaire I: creation and multivariate structure of SDQ. *Sleep, 17*(2), 160-167.

Dwight, A. R., Briesch, A. M., Hoffman, J. A., & Rutt, C. (2024, October). Systematic review of the psychometric evidence supporting use of the depression anxiety stress scales, short form (DASS-21) with youth. In *Child & Youth Care Forum* (Vol. 53, No. 5, pp. 1235-1250). New York: Springer US.

Fontana, S. A., Raimondi, W., & Rizzo, M. L. (2014). Quality of sleep and selective attention in university students: descriptive cross-sectional study. *Medwave, 14*(8), e6015.

Forman, J., & Damschroder, L. (2007). Qualitative content analysis.

Freitag, L., Ireland, J. L., & Niesten, I. J. (2017). Exploring the relationship between sleep quality, emotional well-being and aggression levels in a European sample. *Journal of Aggression, Conflict and Peace Research, 9*(3), 167-177.

Fukuda, K. (1993). One explanatory basis for the discrepancy of reported prevalences of sleep paralysis among healthy respondents. *Perceptual and Motor Skills, 77*(3), 803-807.

Fukuda, K. (2005). Emotions during sleep paralysis and dreaming. *Sleep and Biological Rhythms, 3*(3), 166-168.

Fukuda, K., Ogilvie, R. D., Chilcott, L., Vendittelli, A. M., & Takeuchie, T. (1998). The prevalence of sleep paralysis among Canadian and Japanese college students. *Dreaming, 8*(2), 59-66.

Fuller, P. M., Gooley, J. J., & Saper, C. B. (2006). Neurobiology of the sleep-wake cycle: sleep architecture, circadian regulation, and regulatory feedback. *Journal of Biological Rhythms, 21*(6), 482-493.

Gangdev, P. (2004). Relevance of sleep paralysis and hypnic hallucinations to psychiatry. *Australasian Psychiatry, 12*(1), 77-80.

Garlow, S. J., Rosenberg, J., Moore, J. D., Haas, A. P., Koestner, B., Hendin, H., & Nemeroff, C. B. (2008). Depression, desperation, and suicidal ideation in college students: results from the American Foundation for Suicide Prevention College Screening Project at Emory University. *Depression and Anxiety, 25*(6), 482-488.

Gaultney, J. F. (2010). The prevalence of sleep disorders in college students: impact on academic performance. *Journal of American College Health, 59*(2), 91-97.

Gibson, R., Gander, P., Kepa, M., Moyes, S., & Kerse, N. (2020). Self-reported sleep problems and their relationship to life and living of Māori and non-Māori in advanced age. *Sleep Health, 6*(4), 522-528.

Gibson, R., Lowe, H., Korohina, E., & Rolleston, A. (2024). Māori perspectives on sleep and aging. *Frontiers in Sleep, 3*, 1410856.

Gilstrap, S. R., Hobson, J. M., Dark, H. E., Gloston, G. F., Cody, S. L., Goodin, B. R., & Thomas, S. J. (2023). Disordered sleep and its association with academic performance and functioning. *Sleep and Biological Rhythms, 21*(1), 113-123.

Golzar, J., Noor, S., & Tajik, O. (2022). Convenience sampling. *International Journal of Education & Language Studies, 1*(2), 72-77.

Golzari, S. E., Khodadoust, K., Alakbarli, F., Ghabili, K., Islambulchilar, Z., Shoja, M. M., ... & Ansarin, K. (2012). Sleep paralysis in medieval Persia–the Hidayat of Akhawayni (?–983 AD). *Neuropsychiatric Disease and Treatment*, 229-234.

Gumbis, G., Puteikis, K., & Mameniškienė, R. (2025). Sleep Paralysis Among Higher Education Students: A Possible Role of Antidepressant and Recreational Stimulant Use. *Medicina, 61*(10), 1844.

Haami, D., Gibson, R., Lindsay, N., & Tassell-Matamua, N. (2025). Kei te moe te tinana, kei te oho te wairua–As the body sleeps, the spirit awakens: exploring the spiritual experiences of contemporary Māori associated with sleep. *Kōtuitui: New Zealand Journal of Social Sciences Online, 20*(1), 116-136.

Haile, Y. G., Alemu, S. M., & Habtewold, T. D. (2017). Insomnia and Its Temporal Association with Academic Performance among University Students: A Cross-Sectional Study. *BioMed Research International, 2017*(1), 2542367.

Hamilton, N. A., Nelson, C. A., Stevens, N., & Kitzman, H. (2007). Sleep and psychological well-being. *Social Indicators Research, 82*(1), 147-163.

Harris, S. F., & Thorpy, M. J. (2012). *Diagnosis and Treatment of Parasomnias*.

Hastings, N. E., Abdi, K. E., Bibi, F., Aslam, B., Nuñez, M. R., Sherani, M. T. R., ... & Sadat, S. H. (2025). Narcolepsy: Pathophysiology, Diagnosis, Management, and Future Directions, a Narrative Review. *Brain and Behavior, 15*(12), e71116.

Hazra, A., & Gogtay, N. (2017). Biostatistics series module 10: brief overview of multivariate methods. *Indian Journal of Dermatology, 62*(4), 358-366.

Hefnawy, M. T., Amer, B. E., Amer, S. A., Moghib, K., Khlidj, Y., Elfakharany, B., ... & Arafeh, M. W. A. (2024). Prevalence and clinical characteristics of sleeping paralysis: a systematic review and meta-analysis. *Cureus, 16*(1).

Hershner, S. D., & Chervin, R. D. (2014). Causes and consequences of sleepiness among college students. *Nature and Science of Sleep*, 73-84.

Hinton, D. E., Hufford, D. J., & Kirmayer, L. J. (2005). Culture and sleep paralysis. *Transcultural Psychiatry, 42*(1), 5-10.

Hinton, D. E., Pich, V., Chhean, D., & Pollack, M. H. (2005). 'The ghost pushes you down': sleep paralysis-type panic attacks in a Khmer refugee population. *Transcultural Psychiatry, 42*(1), 46-77.

Hinton, D. E., Pich, V., Chhean, D., Pollack, M. H., & McNally, R. J. (2005). Sleep paralysis among Cambodian refugees: association with PTSD diagnosis and severity. *Depression and Anxiety, 22*(2), 47-51.

Hishikawa, Y. (1978). Characteristics of REM sleep accompanied by sleep paralysis and hypnagogic hallucinations in narcoleptic patients. *Waking & Sleeping*.

Hishikawa, Y., & Kaneko, Z. (1965). Electroencephalographic study on narcolepsy. *Electroencephalography and Clinical Neurophysiology, 18*(3), 249-259.

Hobson, J. A. (2009). REM sleep and dreaming: towards a theory of protoconsciousness. *Nature Reviews Neuroscience, 10*(11), 803-813.

Hsieh, S. W., Lai, C. L., Liu, C. K., Lan, S. H., & Hsu, C. Y. (2010). Isolated sleep paralysis linked to impaired nocturnal sleep quality and health-related quality of life in Chinese-Taiwanese patients with obstructive sleep apnea. *Quality of Life Research, 19*(9), 1265-1272.

Hufford, D. (1992, June). Awakening paralyzed in the presence of a ''strange visitor''. In *Alien discussions: Proceedings of the abduction study conference, Massachusetts Institute of Technology* (pp. 348-353).

Hufford, D. J. (2005). Sleep paralysis as spiritual experience. *Transcultural Psychiatry, 42*(1), 11-45.

Hufford, D. J. (2014). Sleep Paralysis, Lucid Dreams, and the Non-physical. In *Lucid Dreaming: New Perspectives on Consciousness in Sleep* [2 volumes], 255.

Ibrahim, F. M., Salmi, R. N., Saif, M. A., & Mohammed, A. (2024). Sleep disorders' prevalence and impact on academic performance among undergraduate nursing students in a selected university, United Arab Emirates. *SAGE Open Nursing, 10*, 23779608241274229.

Insel, T. R., & Wang, P. S. (2010). Rethinking mental illness. *JAMA, 303*(19), 1970-1971.

Jaehne, A., Unbehaun, T., Feige, B., Cohrs, S., Rodenbeck, A., Schütz, A. L., ... & Riemann, D. (2015). Sleep changes in smokers before, during and 3 months after nicotine withdrawal. *Addiction Biology, 20*(4), 747-755.

Jalal, B. (2016). How to make the ghosts in my bedroom disappear? Focused-attention meditation combined with muscle relaxation (MR therapy)—a direct treatment intervention for sleep paralysis. *Frontiers in Psychology, 7*, 28.

Jalal, B. (2018). The neuropharmacology of sleep paralysis hallucinations: serotonin 2A activation and a novel therapeutic drug. *Psychopharmacology, 235*(11), 3083-3091.

Jalal, B. (2021). “Men Fear Most What They Cannot See.” sleep paralysis “Ghost Intruders” and faceless “Shadow-People”—The role of the right hemisphere and economizing nature of vision. *Medical Hypotheses, 148*, 110521.

Jalal, B., & Hinton, D. E. (2015). Sleep paralysis among egyptian college students: Association with anxiety symptoms (PTSD, trait anxiety, pathological worry). *The Journal of Nervous and Mental Disease, 203*(11), 871-875.

Jalal, B., Moruzzi, L., Zangrandi, A., Filardi, M., Franceschini, C., Pizza, F., & Plazzi, G. (2020). Meditation-relaxation (MR therapy) for sleep paralysis: a pilot study in patients with narcolepsy. *Frontiers in Neurology, 11*, 922.

Jalal, B., & Ramachandran, V. S. (2017). Sleep paralysis,“the ghostly bedroom intruder” and out-of-body experiences: the role of mirror neurons. *Frontiers in Human Neuroscience, 11*, 92.

Jenni, O. G., & Carskadon, M. A. (2007). Sleep behavior and sleep regulation from infancy through adolescence: Normative aspects. *Sleep Medicine Clinics, 2*(3), 321-329.

Johnson, C. (2023). Sleep paralysis: a brief overview of the intersections of neurophysiology and culture. *American Journal of Psychiatry Residents' Journal, 18*(4), 2-5.

Kelly, W. E., Kelly, K. E., & Clanton, R. C. (2001). The relationship between sleep length and grade-point average among college students. *College Student Journal, 35*(1), 84-86.

Kennedy, V., Cram, F., Paipa, K., Pipi, K., & Baker, M. (2015). Wairua and cultural values in evaluation. *Evaluation Matters—He Take Tō Te Aromatawai, 1*, 83-111.

Kerpershoek, M. L., Antypa, N., & Van den Berg, J. F. (2018). Evening use of caffeine moderates the relationship between caffeine consumption and subjective sleep quality in students. *Journal of Sleep Research, 27*(5), e12670.

Khan, A. A., Abid, A., Nawaz, M., Bakhsh, R. M. M., Riaz, M., Fayyaz, M., & Ashraf, D. A. (2024). Experiences and beliefs related to sleep paralysis among the general population of the twin cities: A cross-sectional study. *Sleep Medicine, 124*, 146-153.

Kroenke, K., Spitzer, R. L., Williams, J. B., Monahan, P. O., & Löwe, B. (2007). Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine, 146*(5), 317-325.

Leger, D., Ferini-Strambi, L., Han, F., Poyares, D., Uchiyama, M., & Zee, P. C. (2024). Novel perspective of ‘poor sleep’in public health: a narrative review. *BMJ Public Health, 2*(2).

Li, Y., Bai, W., Zhu, B., Duan, R., Yu, X., Xu, W., ... & Kou, C. (2020). Prevalence and correlates of poor sleep quality among college students: a cross-sectional survey. *Health and Quality of Life Outcomes, 18*(1), 210.

Lišková, M., Janečková, D., Klůzová Kráčmarová, L., Mladá, K., & Bušková, J. (2016). The occurrence and predictive factors of sleep paralysis in university students. *Neuropsychiatric Disease and Treatment*, 2957-2962.

Lindsay, N., Brough, N., Gibson, R., O'Sullivan, L., & Tassell-Matamua, N. (2025). “Outside the matrix.” Dreaming after near-death experiences: A qualitative analysis. *Psychology of Consciousness: Theory, Research, and Practice*.

Liu, D., Kahathuduwa, C., & Vazsonyi, A. T. (2021). The Pittsburgh Sleep Quality Index (PSQI): Psychometric and clinical risk score applications among college students. *Psychological Assessment, 33*(9), 816.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*(3), 335-343.

Lu, J., Sherman, D., Devor, M., & Saper, C. B. (2006). A putative flip–flop switch for control of REM sleep. *Nature, 441*(7093), 589-594.

Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. *Journal of Adolescent Health, 46*(2), 124-132.

Ma, S., Wu, T., & Pi, G. (2014). Sleep paralysis in Chinese adolescents: a representative survey. *Sleep and Biological Rhythms, 12*(1), 46-52.

Marcus, C., Carroll, J. L., Donnelly, D., & Loughlin, G. M. (Eds.). (2008). *Sleep in children: developmental changes in sleep patterns*. CRC Press.

Mark, G. T., & Lyons, A. C. (2010). Maori healers' views on wellbeing: The importance of mind, body, spirit, family and land. *Social Science & Medicine, 70*(11), 1756-1764.

McCleese, K. (2019). The effects of culture on sleep paralysis experiences. *The Omnipedia Review, 1*(1), 5.

Mellman, T. A., Aigbogun, N., Graves, R. E., Lawson, W. B., & Alim, T. N. (2008). Sleep paralysis and trauma, psychiatric symptoms and disorders in an adult African American population attending primary medical care. *Depression and Anxiety, 25*(5), 435-440.

Ministry of Education. (2007). *The New Zealand curriculum*.

Muller, D., Paine, S. J., & Signal, T. L. (2023). The role of sleep in health and health inequities in early childhood in Aotearoa New Zealand. *Journal of the Royal Society of New Zealand, 53*(5), 570-586.

Munezawa, T., Kaneita, Y., Osaki, Y., Kanda, H., Ohtsu, T., Suzuki, H., ... & Ohida, T. (2011). Nightmare and sleep paralysis among Japanese adolescents: a nationwide representative survey. *Sleep Medicine, 12*(1), 56-64.

Ngata, R. S. (2014). *Understanding matakite: A Kaupapa Māori study on the impact of matakite/intuitive experiences on wellbeing: A thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Māori Studies at Massey University, Papa-i-ōea, Aotearoa* (Doctoral dissertation, Massey University).

NiaNia, W., Bush, A., & Epston, D. (2019). Huarahi Oranga: An introduction to Māori concepts informing a Māori healing and psychiatry partnership. *Australasian Psychiatry, 27*(4), 334-336.

Ohayon, M. M., & Pakpour, A. H. (2022). Prevalence, incidence, evolution and associated factors of sleep paralysis in a longitudinal study of the US general population. *Sleep Medicine, 98*, 62-67.

Ohayon, M. M., Zulley, J., Guilleminault, C., & Smirne, S. (1999). Prevalence and pathologic associations of sleep paralysis in the general population. *Neurology, 52*(6), 1194-1194.

Olunu, E., Kimo, R., Onigbinde, E. O., Akpanobong, M. A. U., Enang, I. E., Osanakpo, M., ... & Fakoya, A. O. J. (2018). Sleep paralysis, a medical condition with a diverse cultural interpretation. *International Journal of Applied and Basic Medical Research, 8*(3), 137-142.

Orben, A., & Przybylski, A. K. (2019). The association between adolescent well-being and digital technology use. *Nature Human Behaviour, 3*(2), 173-182.

Otto, M. W., Simon, N. M., Powers, M., Hinton, D., Zalta, A. K., & Pollack, M. H. (2006). Rates of isolated sleep paralysis in outpatients with anxiety disorders. *Journal of Anxiety Disorders, 20*(5), 687-693.

Paradis, C. M., Friedman, S., & Hatch, M. (1997). Isolated sleep paralysis in African Americans with panic disorder. *Cultural Diversity and Mental Health, 3*(1), 69.

Paradis, C., Friedman, S., Hinton, D. E., McNally, R. J., Solomon, L. Z., & Lyons, K. A. (2009). The assessment of the phenomenology of sleep paralysis: the Unusual Sleep Experiences Questionnaire (USEQ). *CNS Neuroscience & Therapeutics, 15*(3), 220-226.

Parker, J. D., & Blackmore, S. J. (2002). Comparing the content of sleep paralysis and dream reports. *Dreaming, 12*(1), 45-59.

Pascoe, M. C., Hetrick, S. E., & Parker, A. G. (2020). The impact of stress on students in secondary school and higher education. *International Journal of Adolescence and Youth, 25*(1), 104-112.

Patel, M., Mendpara, A., Satapathy, S. K., Thumar, M., Patel, R., & Mohapatra, R. (2024, December). Sleep Stages Classification Based on Diverse Resting-State Multi-Channel EEG Using Deep Learning. In *2024 IEEE 8th International Conference on Information and Communication Technology (CICT)* (pp. 1-6). IEEE.

Phillips, A. J., Clerx, W. M., O'Brien, C. S., Sano, A., Barger, L. K., Picard, R. W., ... & Czeisler, C. A. (2017). Irregular sleep/wake patterns are associated with poorer academic performance and delayed circadian and sleep/wake timing. *Scientific Reports, 7*(1), 3216.

Piro, R. S., Alhakem, S. S. M., Azzez, S. S., & Abdulah, D. M. (2018). Prevalence of sleep disorders and their impact on academic performance in medical students/University of Duhok. *Sleep and Biological Rhythms, 16*(1), 125-132.

Ramsawh, H. J., Raffa, S. D., White, K. S., & Barlow, D. H. (2008). Risk factors for isolated sleep paralysis in an African American sample: a preliminary study. *Behavior Therapy, 39*(4), 386-397.

Riaz, M., Rabbani, M. H., Sabir, M. J., Khan, M. A., Manzoor, N., & Chaudhry, M. N. (2022). Predictors of sleep paralysis and relationship of sleep paralysis with sleep quality in university students of Islamabad. *J Pak Med Assoc, 72*(3), 448-451.

Sardar, H., Goldstein-Piekarski, A. N., & Giardino, W. J. (2023). Amygdala neurocircuitry at the interface between emotional regulation and narcolepsy with cataplexy. *Frontiers in Neuroscience, 17*, 1152594.

Sateia, M. J. (2014). International classification of sleep disorders. *Chest, 146*(5), 1387-1394.

Schlarb, A. A., Friedrich, A., & Claßen, M. (2017). Sleep problems in university students–an intervention. *Neuropsychiatric Disease and Treatment*, 1989-2001.

Scott, H., Biello, S. M., & Woods, H. C. (2019). Social media use and adolescent sleep patterns: cross-sectional findings from the UK millennium cohort study. *BMJ Open, 9*(9), e031161.

Scott, Hannah, Ganesh Naik, Bastien Lechat, Jack Manners, Josh Fitton, Duc Phuc Nguyen, Anna L. Hudson et al. (2024). Are we getting enough sleep? Frequent irregular sleep found in an analysis of over 11 million nights of objective in-home sleep data. *Sleep Health, 10*(1), 91-97.

Shah, A. S., Pant, M. R., Bommasamudram, T., Nayak, K. R., Roberts, S. S., Gallagher, C., ... & Pullinger, S. A. (2025). Effects of sleep deprivation on physical and mental health outcomes: an umbrella review. *American Journal of Lifestyle Medicine*, 15598276251346752.

Sharpless, B. A., & Barber, J. P. (2011). Lifetime prevalence rates of sleep paralysis: a systematic review. *Sleep Medicine Reviews, 15*(5), 311-315.

Sharpless, B. A., & Doghramji, K. (2015). *Sleep paralysis: historical, psychological, and medical perspectives*. Oxford University Press.

Sharpless, B. A., & Grom, J. L. (2016). Isolated sleep paralysis: fear, prevention, and disruption. *Behavioral Sleep Medicine, 14*(2), 134-139.

Simard, V., & Nielsen, T. A. (2005). Sleep paralysis-associated sensed presence as a possible manifestation of social anxiety. *Dreaming, 15*(4), 245.

Sing, C. Y., & Wong, W. S. (2010). Prevalence of insomnia and its psychosocial correlates among college students in Hong Kong. *Journal of American College Health, 59*(3), 174-182.

Singh, A., Soni, R., Kaloiya, G. S., Chakrawarty, A., Tripathi, M., Sharma, R., ... & Kaloiya, G. S. (2025). Association of Poor Sleep Efficiency With Decreased Executive Function and Impaired Episodic Memory in Older Adults. *Cureus, 17*(8), e90061.

Singh, G., Singh, H., Gill, V. S., Batish, R., & Sagar, M. (2025). An Assessment of Sleep Quality and Its Socio-Demographic Correlates Among the General Population of Punjab: A Cross-Sectional Study. *European Journal of Cardiovascular Medicine, 15*, 745-750.

Solomonova, E. (2018). 31 Sleep Paralysis: Phenomenology, Neurophysiology, and Treatment. In *The Oxford handbook of spontaneous thought: Mind-wandering, creativity, and dreaming*, 435.

Spanos, N. P., McNulty, S. A., DuBreuil, S. C., Pires, M., & Burgess, M. F. (1995). The frequency and correlates of sleep paralysis in a university sample. *Journal of Research in Personality, 29*(3), 285-305.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine, 166*(10), 1092-1097.

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist, 45*(4), 249-257.

SZKLO-COXE, M. A. R. I. A. N. A., Young, T., Finn, L., & Mignot, E. (2007). Depression: relationships to sleep paralysis and other sleep disturbances in a community sample. *Journal of Sleep Research, 16*(3), 297-312.

Sullivan, F. (2023). *Phenomenology and interpretations of sleep paralysis: an Aotearoa New Zealand sample: a thesis presented in partial fulfilment of the requirements for the degree of Master of Science in Psychology at Massey University, Manawatū, New Zealand* (Doctoral dissertation, Massey University).

Takeuchi, T., Miyasita, A., Sasaki, Y., Inugami, M., & Fukuda, K. (1992). Isolated sleep paralysis elicited by sleep interruption. *Sleep, 15*(3), 217-225.

Taitimu, M., Read, J., & McIntosh, T. (2018). Ngā Whakāwhitinga (standing at the crossroads): How Māori understand what Western psychiatry calls “schizophrenia”. *Transcultural Psychiatry, 55*(2), 153-177.

Taylor, D. J., & Bramoweth, A. D. (2010). Patterns and consequences of inadequate sleep in college students: substance use and motor vehicle accidents. *Journal of Adolescent Health, 46*(6), 610-612.

Taylor, D. J., Vatthauer, K. E., Bramoweth, A. D., Ruggero, C., & Roane, B. (2013). The role of sleep in predicting college academic performance: is it a unique predictor?. *Behavioral Sleep Medicine, 11*(3), 159-172.

Thorleifsdottir, B., Björnsson, J. K., Benediktsdottir, B., Gislason, T. H., & Kristbjarnarson, H. (2002). Sleep and sleep habits from childhood to young adulthood over a 10-year period. *Journal of Psychosomatic Research, 53*(1), 529-537.

Thomée, S., Eklöf, M., Gustafsson, E., Nilsson, R., & Hagberg, M. (2007). Prevalence of perceived stress, symptoms of depression and sleep disturbances in relation to information and communication technology (ICT) use among young adults–an explorative prospective study. *Computers in Human Behavior, 23*(3), 1300-1321.

Thorpy, M. J. (2002). Classification of sleep disorders. *Continuum, 8*(6), 11-26.

Timoti, P., Lyver, P. O. B., Matamua, R., Jones, C. J., & Tahi, B. L. (2017). A representation of a Tuawhenua worldview guides environmental conservation. *Ecology and Society, 22*(4).

Wang, Y. A., Li, Q., Zhong, Z., Ouyang, Q., Zou, X., Yue, K., & Yao, D. (2025). Sleep Paralysis: Pathogenesis, Clinical Manifestations, and Treatment Strategies. *Journal of Integrative Neuroscience, 24*(8), 38979.

White, A. E., & Karr, J. E. (2023). Psychometric properties of the GAD-7 among college students: Reliability, validity, factor structure, and measurement invariance. *Translational Issues in Psychological Science*.

Wróbel-Knybel, P., Flis, M., Rog, J., Jalal, B., Wołkowski, L., & Karakuła-Juchnowicz, H. (2022). Characteristics of sleep paralysis and its association with anxiety symptoms, perceived stress, PTSD, and other variables related to lifestyle in selected high stress exposed professions. *International Journal of Environmental Research and Public Health, 19*(13), 7821.

Wróbel-Knybel, P., Karakuła-Juchnowicz, H., Flis, M., Rog, J., Hinton, D. E., Boguta, P., & Jalal, B. (2020). Prevalence and clinical picture of sleep paralysis in a Polish student sample. *International Journal of Environmental Research and Public Health, 17*(10), 3529.

Yang, C. M., Wu, C. H., Hsieh, M. H., Liu, M. H., & Lu, F. H. (2003). Coping with sleep disturbances among young adults: a survey of first-year college students in Taiwan. *Behavioral Medicine, 29*(3), 133-138.

Yeung, A., Xu, Y., & Chang, D. F. (2005). Prevalence and illness beliefs of sleep paralysis among Chinese psychiatric patients in China and the United States. *Transcultural Psychiatry, 42*(1), 135-145.

Appendix A Study Information Sheet

Information: Sleep Habits and Wellbeing of Tertiary Students Online Survey Information Sheet

Kia ora, my name is Bianca Hayes. I am a Masters student at Massey University and I am interested in understanding the relationship between sleep and wellbeing among tertiary students. This research forms part of my Masters thesis under the supervision of Drs Nicole Lindsay and Rosemary Gibson.

What is this research about?
The demanding nature of tertiary study, combined with academic pressures, social obligations, and irregular schedules, has the potential to influence overall health and daily functioning. The need to balance coursework, jobs, and social activities often results in disrupted sleep patterns and habits. These factors, alongside the high levels of stress and anxiety common among students, can contribute the onset or exacerbation of sleep related phenomena such as insomnia, as well as episodes of unusual dreaming or experiences commonly known as 'sleep paralysis' in Western societies. The features of sleep paralysis include a temporary inability to move or speak upon sleep onset or waking; a sensed presence or intruder; and unusual bodily sensations such as chest pressure, among others. This research involves a short, online survey to help gain a better understanding of the sleep status and factors associated with unusual sleep experiences among tertiary students.

What will I be asked to do? We are seeking adults aged 18 to 30 years old living in New Zealand and attending a New Zealand tertiary institution, to participate in this online survey. The survey is in English and takes 20-25 minutes to complete. The survey includes questions about your current living and working situation, your sleep and wake routine, as well as how you have been feeling in your general life. There are also opportunities for you to write about your sleep experiences in more detail. If answering these questions raises any concerns or creates distress, there are links for further information and contacts on sleep and mental health below and at the conclusion of the survey.

What will happen to my Information? The information you provide will be combined with that from others to help us understand the prevalence of unusual sleep experiences and how the lifestyle as a tertiary student is impacting sleep and wellbeing. You will not be asked to provide your name, family name or any identifying place names, so you will not be personally identifiable in any reports. All study data will remain strictly confidential and will be stored securely on a password-protected Massey University OneDrive account, accessible only to the research team. Data security will adhere to the Massy University Code of Responsible Research Conduct. Anonymity and confidentiality of all participants will be upheld throughout the research process. In addition, to support transparency and enable future research, anonymised data will be archived indefinitely in the Dryad Digital Repository, where it may be accessed and reused by other researchers. No identifying information will be included, and all data will remain anonymous. Submission of the completed survey will be taken as an indication of informed consent. Due to the anonymous nature of the study, it will not be possible to withdraw your data once your responses have been submitted.

<u>Your rights:</u>
You are under no obligation to accept this invitation to be involved in the online survey. Consent to participate is implied by completing the survey. If you decide to participate, you have the right to:

- Stop answering questions at any time
- Ask any questions about the study at any time during participation
- Skip or not answer questions you do not want to

Please consider this information carefully before deciding whether you would like to participate. If you have any questions or would like to receive further information regarding this research, please feel free to contact us using the details below.

Bianca Hayes
School of Psychology
Massey University
[redacted]

Associate Professor Rosie Gibson
School of Psychology
Massey University
R.Gibson@massey.ac.nz
043835789

Senior Lecturer Nicole Lindsay
School of Psychology
Massey University
N.Lindsay1@massey.ac.nz
+6469517967

If you would like to receive a summary of the research findings, you will be directed to a separate page at the end of the survey where you can enter your contact email address. This page is not linked to your survey responses in any way, ensuring that your participation remains completely confidential

This project has been reviewed and approved by the Massey University Human Ethics Ohu Matatika 1, Application OM1 25/22. If you have any concerns about the conduct of this research, please contact the Chairperson, Massey University Human Ethics Ohu Matatika 1, email humanethics1@massey.ac.nz

If you wish to participate in this online survey, please click the arrow button below to continue to the questions.

Links to further information
https://www.sleephealthfoundation.org.au/sleep-disorders/common-sleep-disorders
https://www.sleepwake.ac.nz/projects/adult-sleep-disorders-and-sleep-services/

Need to talk? Free call or text 1737 any time.
Talk to a trained counsellor or call:
Depression helpline – 0800 111 757
Alcohol drug helpline – 0800 787 797
Healthline – 0800 611 116 – to get help from a registered nurse 24/7
Lifeline – 0800 543 354
Samaritans – 0800 726 666

Appendix B Social Media Advertisement

Online Survey

LET'S TALK ABOUT SLEEP

We are seeking people...

- Aged between 18 and 30 years
- Currently residing in New Zealand
- Currently enrolled at a New Zealand tertiary institution

Our research team invites you to participate in a completely annonymous online survey that will take approxiametly 20-25 minutes to finish

What will I do?

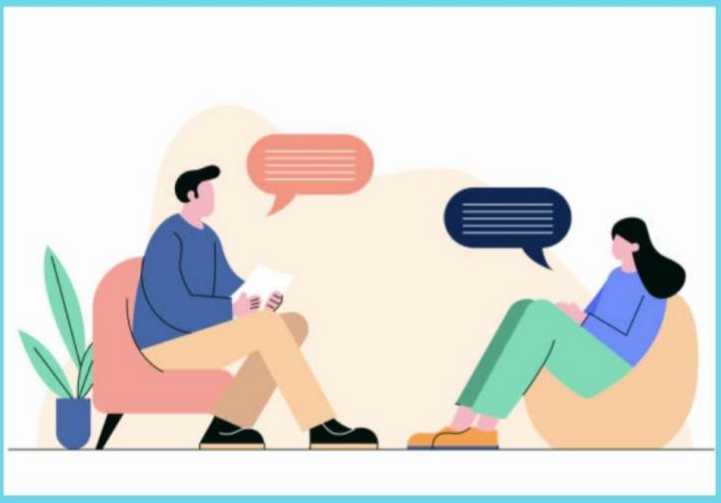
If you agree to participate you will be asked questions about yourself, your general health and mood as well as your sleep experiences, including any sleep disturbances and related sensitive topics.

How do I participate?

Please click on the link below. A full description of the research will be avaliable before you begin the survey. *Please note, the survey will be in English*

https://massey.au1.qualtrics.com/jfe/form/SV_6J4NNov9CfZvFAO

Please use the link or QR code below to access the survey



This project has been reviewed and approved by the Massey University Human Ethics Ohu Matatika 1, Application OM1 25/22. If you have any concerns about the conduct of this research, please contact the Chairperson, Massey University Human Ethics Ohu Matatika 1, email humanethics1@massey.ac.nz."

Appendix C Email Template

Subject: Support Requested: Research Survey on Sleep and Mental Health in NZ Tertiary Students

Kia ora,

My name is Bianca Hayes, and I am a Master of Science (Psychology) Student in at Massey University. I am currently undertaking research for my master's thesis under the supervision of Dr Nicole Lindsay and Dr Rosemary Gibson. I'm reaching out to kindly request your support in sharing an online survey with your student community through your student union networks, via social media, email newsletters or online noticeboards.

We're conducting a study on the associations between mood, stress and sleep-related phenomena, like sleep paralysis, in New Zealand tertiary students. University life brings unique challenges, and disrupted sleep can affect your health, mood and academic performance. This study aims to better understand these experiences and how they impact sleep experiences of students. As part of this research, I have developed a short, confidential online survey aimed at students aged 18-30 years who are currently enrolled in a New Zealand tertiary institution. The survey takes approximately 20-25 minutes to complete and asks questions about general health, sleep patterns, academic stress and unusual sleep experiences.

Given that student wellbeing and mental health are important and widely shared concerns, I would be extremely grateful if you would consider circulating the attached advertisement poster through your student union networks, to help us reach a diverse range of student voices. All data collected is anonymous and securely stored, and the study has been reviewed and approved by the Massey University Human Ethics Committee (Application OM1 25/22).

If you have any questions or require further information, please don't hesitate to get in touch.

Thank you very much for your time and support.

Ngā mihi nui,

Bianca Hayes
Master of Science (Psychology) Candidate
School of Psychology, Massey University
[redacted]

Supervisors:
Assoc. Prof. Rosemary Gibson – R.Gibson@massey.ac.nz | 04 383 5789
Dr Nicole Lindsay – N.Lindsay1@massey.ac.nz | 06 951 7967

Appendix D Survey Questionnaire

QS1 **This first section asks about you and your current study and employment obligations**.

Q1 *What is your gender?*

- Female
- Male
- Non-binary/third gender
- Prefer to self-describe:
- Prefer not to answer

Q2 *What year were you born (yyyy)*

Q3 *To which ethnic group(s) do you belong?*

- New Zealand European
- Māori
- Cook Island Māori
- Samoan
- Chinese
- Tongan
- Niuean
- Indian
- Other:

Q4 *Which best describes the qualification you are currently enrolled in?*

- Certificate
- Diploma
- Bachelors degree
- Graduate certificate
- Postgraduate certificate
- Graduate diploma
- Postgraduate diploma
- Bachelor Honors degree
- Master's degree
- Doctoral degree

Q5 *Do you study full time or part time?*

- Full-time
- Part-time

Q6 *Which best describes your living situation while studying?*

- Living at home with family
- Living on campus residence
- Sharing a house or flat with others
- Living alone
- Other (please specify)

Q7 *Are you also working while studying?*

- Yes

- No

If no, skip to Section 2
If yes, proceed to question 8

Q8 *Which best describes your employment status?*
- Working full-time
- Working part-time
- Self-employed/contractor
- Volunteer
- Other (please specify)
- Prefer not to answer

Q9 *What is your average working hours per week?*

Q10 *What is your usual work pattern?*
- Daytime with no shifts
- Rotating shifts with nights
- Rotating shifts without nights
- Permanent nights
- Irregular or variable work pattern
- Other work pattern (please specify)
- Not applicable

QS2 **The following questions are about your general health.**

Q11 *In general, would you say your health is*
- Poor
- Fair
- Good
- Very good
- Excellent

Q12 *Have you ever been diagnosed with a chronic disease (e.g heart condition, diabetes, cancer)*
- Yes
- No
- Don't know
- Prefer not to answer

Q13 *If yes, what was the diagnosis?*

Q14 *What treatment, if any, have you used for this*?

Q15 *Have you ever been diagnosed with a mental illness (e.g depression, anxiety, bipolar)*
- Yes
- No
- Don't know
- Prefer not to answer

Q16 *If yes, what was the diagnosis?*

Q17 *What treatment, if any, have you used for this?*

Q18 *Have you ever been diagnosed with a sleep disorder (e.g sleep apnea, chronic insomnia, restless legs)*

- Yes
- No
- Don't know
- Prefer not to answer

Q19 *If yes, what was the diagnosis?*

Q20 *What treatment, if any, have you used for this?*

Q21 *Is there any additional information you would like to tell us about who you are, your situation or general health?*

QS3 The following questions are from the Generalized Anxiety Disorder – 7 (GAD-7). Please read each statement carefully and choose the one that best applies to you over the past two weeks. There are no right or wrong answers.

Q22 Over the last two weeks, how often have you been bothered by the following problems?

a) Feeling nervous, anxious or on edge

Not at all
Several days
More than half the days
Nearly every day

b) Not being able to stop or control worrying

Not at all
Several days
More than half the days
Nearly every day

c) Worrying too much about different things

Not at all
Several days
More than half the days
Nearly every day

d) Trouble relaxing

Not at all
Several days
More than half the days
Nearly every day

e) Being so restless that it is hard to sit still

Not at all

Several days
More than half the days
Nearly every day

f) Becoming easily annoyed or irritable
Not at all
Several days
More than half the days
Nearly every day

g) Feeling afraid, as if something awful might happen
Not at all
Several days
More than half the days
Nearly every day

QS4 The following questions are from the Generalized Anxiety Disorder – 7 (GAD-7). Please read each statement carefully and select the one that best reflects how you were feeling over the past week. There are no right or wrong answer

Q23
a) I found it hard to wind down
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

b) I was aware of dryness of my mouth
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

c) I couldn't seem to experience any positive feeling at all
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

d) I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

e) I found it difficult to work up the initiative to do things
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time

Applied to me very much or most of the time

f) I tended to over-react to situations
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

g)I experienced trembling (e.g. in the hands)
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

h)I felt that I was using a lot of nervous energy
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

i)I was worried about situations in which I might panic and make a fool of myself
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

j)I felt that I had nothing to look forward to
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

k)I found myself getting agitated
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

l)I found it difficult to relax
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

m)I felt down-hearted and blue
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

n)I was intolerant of anything that kept me from getting on with what I was doing
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

o) I felt I was close to panic
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

p) I was unable to become enthusiastic about anything
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

q)I felt I wasn't worth much as a person
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

r) I felt that I was rather touchy
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

s)I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

t)I felt scared without any good reason
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

u) I felt that life was meaningless
Did not apply to me at all
Applied to me to some degree, or some of the time
Applied to me to a considerable degree or a good part of the time
Applied to me very much or most of the time

QS5 **Sleep and wake routine: The following questions relate to your usual sleep habits during the past month only. Please answer as accurately as possible for the majority of days and nights in the past 4 weeks**.

Q24 During the past month, what time have you usually gone to bed at night?

Q25 During the past month, how long (in minutes) has it usually taken you to fall asleep each night

Q26 During the past month, what time have you usually gotten up in the morning?

Q27 During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed)

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

Q28 During the past month, how often have you had trouble sleeping because you…

h) Cannot get to sleep within 30 minutes

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

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

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

j) Have to get up to use the bathroom

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

k) Cannot breathe comfortably

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

l) Cough or snore loudly

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

m) Feel too cold

Not during the past month
Less than once a week

Once or twice a week
Three or more times a week

n) Feel too hot

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

o) Had bad dreams

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

p) Have pain

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

q) Other reason(s), please describe…

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

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

Q29 During the past month, how would you rate your current sleep quality overall?

- Very good
- Fairly good
- Average
- Fairly bad
- Very bad

Q30 During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter"?)

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

Q31 During the past month, how often have you had trouble staying awake while driving, eating, meals or engaging in social activity?

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

Q32 During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

Not during the past month
Less than once a week
Once or twice a week
Three or more times a week

QS6 **The following set of questions asks about common emotions and/or sensations you may have experienced in relation to sleeping. Please read each question carefully and answer as honestly as possible.**

Q33 Some people have had the experience upon going to sleep or waking up, when they are unable to move their arms, legs or speak even though they wanted to do so. Have you ever had this experience?

Q34 a) Have you ever had a sleep experience during which you felt a pressure on your chest or other parts of your body?
Never
Occasionally
Frequently
Always

Q34 b) If so, did it feel like:
A weight pressing down
A person or entity sitting on my chest
Other (Explain)

Q35 Have you ever had a sleep experience during which you felt that you are being smothered?
Never
Occasionally
Frequently
Always

Q36 Have you ever had a sleep experience during which you heard unusual sounds?
Never
Occasionally
Frequently
Always

Q36 a) If so, would you describe the sound as:
Background noises (hard to specify)
Sounds of movement such as footsteps
Voices
Other (Explain)

Q37 Have you ever had a sleep experience during which you felt like you might die?
Never
Occasionally

Frequently
Always

Q38 Have you ever had a sleep experience during which you felt numbness, vibrations or tingling sensations?
Never
Occasionally
Frequently
Always

Q39 Have you ever had a sleep experience during which you felt that you had temporarily left your body?
Never
Occasionally
Frequently
Always

Q40 Have you ever had a sleep experience during which you felt as if you were looking at your own body from outside it?
Never
Occasionally
Frequently
Always

Q41 Have you ever had a sleep experience during which you smelt an unusual odor?
Never
Occasionally
Frequently
Always

Q42 Have you ever had a sleep experience during which you felt like you were being strangled?
Never
Occasionally
Frequently
Always

Q43 Have you ever had a sleep experience during which you felt that your body was spinning or turning rapidly?
Never
Occasionally
Frequently
Always

Q44 Have you ever had a sleep experience during which you felt like you were being physically touched?
Never
Occasionally
Frequently
Always

Q45 Have you ever had a sleep experience during which you were unable to open your eyes?
Never
Occasionally
Frequently
Always

Q46 Have you ever had a sleep experience during which you were unable to speak or call out even if you tried?
Never
Occasionally
Frequently
Always

Q47 Have you ever had a sleep experience during which you felt a presence in the room i.e sense that there is something in the room with you even though you may not actually be able to see or hear anything?
Never
Occasionally
Frequently
Always

Q48 Have you ever had a sleep experience during which you experienced erotic feelings?
Never
Occasionally
Frequently
Always

Q49 Please think about and describe your most vivid sleep experience during which you experienced one of the sensations asked about previously or a temporarily inability to move or speak upon sleep onset or waking (if you had only one episode, just describe that one)

Q50 How many times in your life have you experienced this?

Q51 How many times in the last year?

Q52 How many times in the last month?

Q53 At what age did you first have this experience?

Q54 When was the last time you had this experience?

Q55 Are there any particular conditions that precede these sleep-related experiences (e.g., changes in lifestyle, sleep patterns, work schedule, emotional experiences, etc.)?

Q56 If so, please describe

Q57 Does the sleep-related experience happen mostly when:
You sleep on your back
You sleep on your stomach

Your sleep position makes no difference
I don't know

Q58 During a sleep-related episode, about how long are/were you usually unable to move or speak?

Q59 Do you usually experience this when falling asleep or upon awakening?

Q60. a) During a sleep-related episode, did you see something like a shadow or shape move toward you?
Yes
No

Q60 b) If so, what shape did you see?

Q60 c) What, if anything, did you fear the shape might do to you?

Q60 d) Is there a name for what you saw?

Q61 Immediately after the first experience, what did you think had happened? How did you explain it? Check all that apply.
It was a dream
It was an encounter with a non-human intelligence (e.g. an extra-terrestrial, interdimensional or ultra-terrestrial being)
It was a ghost/kehua
It was a demonic entity/hinonga rewera
It was a spiritual encounter/tūtakitanga wairua
It was related to a physical health issue
It was related to a mental health issue
It was related to past sexual trauma
It was related to past physical trauma
It was related to drugs/alcohol
I had no idea
I didn't think about it at all
Other: (please describe what you thought had happened?)

Q62 How do you explain this experience today? Check all that apply
It was a dream
It was an encounter with a non-human intelligence (e.g. an extra-terrestrial, interdimensional or ultra-terrestrial being)
It was a ghost/kehua
It was a demonic entity/hinonga rewera
It was a spiritual encounter/tūtakitanga wairua
It was related to a physical health issue
It was related to a mental health issue
It was related to past sexual trauma
It was related to past physical trauma
It was related to drugs/alcohol
I had no idea
I didn't think about it at all

Other: (please describe what you thought had happened?)

Q63. a) Have you ever been concerned that these types of experiences could be related to a physical health issue?
Not at all
A little
Some
A fair amount
A lot

Q63. b) If so, what were you afraid might be happening with your body?

Q64 Have you ever been concerned that these types of experiences could be related to a mental health issue?
Not at all
a little
some
a fair amount
a lot

Q65 What, if any, other emotions did you experience?

Q66 Did you do anything to try to prevent future episodes?
No
Yes (Explain)

Q67 a) Did you consult any kind of health practioners to make sense of this experience?
Yes
No

Q67 b) If yes please tick who you consulted with from the list below
General Practioners
Sleep Specialist
Traditional healer
Elder
Google
Other (Please explain)

Q68 What did the person you consulted say was the cause of your sleep experience/s?

Q69 What did the person you consulted suggest as treatment for your sleep experience/s?

Q70 Have you tried any methods to better understand or alleviate these sleep experiences? Tick all that apply

Medications
Hypnosis
Herbal remedies
Adapting sleep-related behaviors or routines

Q71. a) Did you speak to anyone else about this experience?
Yes
No

Q71. b) If so, Explain:

Q72. a) To the best of your knowledge, has anyone in your community or family talked about these kinds of experiences?
Yes
No

Q72. b) If so, Explain:

Q73. a) At the time of your first episode, had you ever heard anyone describe a similar experience?
Yes
No

Q73. b) If so, who?

Q73. c) If so, what did they say about the experience?

Q74. a) Have you ever heard of a name for the experience?
Yes
No

Q74. b) If so, what name did you hear?

Q75) Is there any additional information you would like to tell us about your sleep experiences or sensations you have had while asleep?

Thank you for taking part in this research at this time. We appareciate your contribution to un derstanding the sleep status and factors associated with unusual sleep experiences among tertiary students.

Links to further information
https://www.sleephealthfoundation.org.au/sleep-disorders/common-sleep-disorders
https://www.sleepwake.ac.nz/projects/adult-sleep-disorders-and-sleep-services/

Need to talk? Free call or text 1737 any time.
Talk to a trained counsellor or call:
Depression helpline – 0800 111 757
Alcohol drug helpline – 0800 787 797
Healthline – 0800 611 116 – to get help from a registered nurse 24/7
Lifeline – 0800 543 354
Samaritans – 0800 726 666