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**An Investigation of the Continuity and Alternative Channels Hypotheses in
Sleep Paralysis and Narcolepsy**

Stacey A. McNulty

**A Thesis submitted to the Faculty of Graduate Studies and Research in partial
fulfillment of the requirements for the degree of Doctor of Philosophy**

Department of Psychology

Carleton University

April 2002

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Faculty of Graduate Studies and Research
Acceptance of the thesis:

"An Investigation of the Continuity and Alternative Channels Hypotheses
in Sleep Paralysis and Narcolepsy"

submitted by

Stacey McNulty

in Partial fulfillment of the requirements for
the degree of Doctor of Philosophy

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Carleton University
April, 2002

ACKNOWLEDGEMENTS

Dedicated to the memory of Gordon McNulty and Nick Spanos.

Thanks to my mother, Betty, and to my sister, Melissa for their unwavering support.

Thanks to my labmates and friends, Rhonda Bradley, Cheryl Burgess, Melissa Burgess, Caroline Burnley, François Chiocchio, Pat Cross, Sue Dubreuil, Krista Kiiffner, Shannon Poole, Cheryl Terrance and Minhtri Truong for their encouragement and advice on various aspects of this thesis.

Thanks to the “Graduate Psychology Team” of Etelle Bourassa, Kim Cook and Lynn Giff who never fail to go well beyond the call of duty for their students.

A special thanks to Kim Matheson for her hard work and her dedication to helping me complete my thesis.

ABSTRACT

The relationship between imagery associated with sleep and waking imagery was the focus of the current research. Two studies examined the validity of applying the Continuity versus the Alternative Channels Hypotheses to understanding the association between day and night imagery among individuals who self-reported sleep paralysis or with a clinical diagnosis of narcolepsy.

The Continuity Hypothesis suggests that individuals absorbed in night imagery are likely to be absorbed in daytime imagery, so those with sleep paralysis should show high levels of day and night imagery (which would be positively correlated). The Alternative Channels Hypothesis suggests that individuals experiencing trauma and psychopathology suppress daytime imagery; such imagery is channelled into night imagery. Thus, those who experience night imagery should show signs of pathology, and such imagery should be inversely correlated with day imagery.

In Study 1, students reporting sleep paralysis ($n=80$) were compared to controls ($n=80$) on indices assessing day and night imagery, psychopathology and trauma. Sleep paralysis participants did not differ from controls on the indices. However, regressions indicated a

positive relationship between day and night imagery, but this effect was moderated by psychopathology and trauma. Among individuals low in psychopathology (or trauma), high day imagery vividness scores were associated with high scores on night imagery, but not among those demonstrating high symptoms of pathology or trauma. Similarly, among individuals low in trauma, high scores on a multidimensional imagery measure were associated with high scores on the nightmare/terror index of night imagery, but not among those demonstrating high symptoms of trauma. It was suggested that while support appeared to be greater for the Continuity Hypothesis, the results were mixed due to the lack of clinical sleep pathology.

In Study 2, clinically diagnosed narcoleptics ($n=26$) were compared to controls ($n=26$) on the same indices. However, not only was there no difference between clinical and control groups on imagery and pathology, the positive relationship between day and night imagery was not significant. A moderating effect of psychopathology and trauma was not found among narcoleptics. Thus, among a clinical sample, there was support for neither hypothesis. Methodological concerns and theoretical implications were discussed.

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GENERAL INTRODUCTION

Psychology has traditionally been defined as the study of behaviour and mental processes. Implicitly, it is the study of the behaviour and mental processes of *waking* individuals. Thus, understanding disorders of sleep has primarily been approached from a medical perspective, with only a small branch of psychology investigating sleep, disorders of sleep, and dreaming. Consistent with a medical model, the majority of this psychological research has focused on rhythms of sleep, physiological underpinnings of sleep disorders, and dreaming and its functions, although the latter has also been very much an aspect of models of psychotherapy as well. Very little research in psychology has attempted to unify and link mental activities that occur while individuals are awake with those that occur during sleep. However, this linking may be important since it potentially provides insight into the relationship between conscious psychological processes or the flow of consciousness and imagination.

Of particular interest in the present study was the nature of the relationship between sleep disorders with imaginal components and waking imagery. Research on sleep disorders with imaginal components not only provides insight into the nature and potential causes of these types of sleep disorders, but might explain historical records and

anecdotes of imaginal events, such as encounters with mythical creatures, ghosts, UFO abductions and satanic happenings that are believed by the individual to have actually occurred, yet have no independent corroboration in reality (Spanos, McNulty, DuBreuil, Pires & Burgess, 1995). It is possible that waking imaginal propensities, such as ability to imagine vividly and fantasy proneness, act as catalysts for sleep disorders with imaginal components. The present study attempted to document whether individuals who were diagnosed with such disorders were more likely to show evidence of imaginative and fantasy propensities in their waking state. Such a relation would suggest a strong psychological basis for such disorders, or at least for their secondary consequences.

There are three main categories of sleep disorders: dyssomnias, which are disorders of initiating and maintaining sleep (e.g., primary insomnia, hypersomnia, narcolepsy and central and obstructive sleep apnea); parasomnias, characterized by abnormal behavioural or physiological events occurring in association with sleep, specific sleep stages, or sleep-wake transitions (e.g., nightmares, sleep paralysis, sleep terrors, sleeptalking and sleepwalking); and sleep disorders associated with medical or psychiatric diagnoses. These latter disorders are not primarily sleep disorders, but are disorders that have

either sleep disturbance or excessive sleepiness as a major secondary feature of another identifiable primary disorder. Medical diagnoses that may be associated with a symptomatic sleep disorder include (but are not limited to) degenerative neurological disease such as Parkinson's disease, cerebrovascular disease such as hypo-hyperthyroidism, viral or bacterial infections, coughing related to pulmonary disease such as chronic bronchitis and pain from muscular skeletal disease such as rheumatoid arthritis (American Sleep Disorder Association, 1990). Psychiatric diagnoses that may lead to a secondary sleep disorder include (but are not limited to) typical and atypical major depressive disorder, bipolar mood disorder, generalized anxiety disorder and schizophrenia (ASDA, 1990).

Two specific primary sleep disorders, sleep paralysis (a parasomnia) and narcolepsy (a dyssomnia), were focused on in the present study due to their psychological and imagery components. Sleep paralysis is characterized by a period of inability to perform voluntary movements either at sleep onset or upon awakening. It is associated with a number of hallucinations or imaginal accompaniments such as visual, auditory or tactile hallucinations and sensing a presence in the room when no one is there in reality (ASDA, 1990). Unlike sleep paralysis, narcolepsy is considered a neurological disorder. It is classified as a dyssomnia and

is characterized by excessive daytime sleepiness that is usually associated with cataplexy (a sudden loss of muscle tone) in addition to sleep paralysis and hallucinations. Sleep paralysis can occur as the sole disorder or in conjunction with narcolepsy. In either case the associated sleep paralysis shares the same sleep-related imagery accompaniments (ASDA, 1990).

Early research in the area of sleep was primarily focused on understanding the psychological underpinnings of dreams. These theories ranged from more rational considerations reflecting everyday cognitive processes that continued into the sleep phase, to psychodynamic considerations that viewed dreams as a release of pent-up psychological difficulties and traumas. Adopting a more cognitive rational perspective, Starker (1974) attempted to delineate the nature of the relationship between waking imagery and imagery associated with sleep. Previous studies had indicated that the frequency of waking imaginal activity correlated with the frequency of dream recall (Cohen, 1974). For instance, dream recall frequency was found to correlate significantly with daydream frequency (Singer & Schonbar, 1961) and vividness of imagery (i.e., the reported clarity of an image evoked by test items) (Hiscock & Cohen, 1973). As well, research participants with bizarre or impossible imagery in dreams were significantly more likely to report

daydreams that also contained bizarre or impossible happenings (Starker, 1974, 1977). Ratings of dream imaginativeness and Thematic Apperception Test imaginativeness were also found to be significantly positively correlated (Cartwright, 1966). In later research, Spanos, Stam, Radtke and Nightingale (1980) found that research participants who became highly absorbed in imaginal activity tended to have more vivid and emotional dreams than those who were relatively less absorbed in imaginings. Based on such research and his own studies, Starker (1974, 1977, 1985) hypothesized a continuity between the imaginative activities of wakefulness and imagery that is associated with sleep. This hypothesis, known as the Continuity Hypothesis, suggests that individuals who tend to become absorbed in vivid imaginal activities while awake are likely to be absorbed in night imagery.

Starker (1976, 1985) provided further supporting empirical evidence for the notion that daytime imagery was related to sleep disturbances. More specifically, he found that bizarre and impossible daydreams significantly correlated with reports of nightmares (Starker, 1976, 1985). Based on Starker's and other findings, it would seem reasonable to expect that, consistent with the Continuity Hypothesis, persons with sleep disorders that have vivid imagery would also display vivid daytime imagery. As

predicted by Starker (1982) the coming of the 'technologic era' virtually removed sleep research from psychology and into the realm of medicine, with rhythms and physiology of sleep and sleep disorders becoming the primary areas of investigation.

Although empirical research on the psychological underpinnings of sleep behaviours and disturbances has not been vigorously pursued in the past 15 years, the Continuity Hypothesis continues to be viewed as the most parsimonious explanation of dream vividness, and to be most consistent with the empirical data. Theoretically, a continuity between day and night imagery is supported for at least three reasons (Savage, 1975). These phenomena are all composed of the same basic ingredients (e.g., mental images) (Richardson, 1994); imagery can evolve or be transformed into other types of imagery, for example, waking fantasy is transformed by sleep into dreams (Klinger, 1971); the underlying mechanisms by which imagery is produced are similar, for example, they are all products of mental processes and brain activity (Jacobs & Trulson, 1979).

However, the Continuity Hypothesis also has some difficulties. Although there are logical and meaningful theoretical reasons for the continuity of day and night imagery, they are still largely uninvestigated. Thus, understandings of the reasons for a continuity between day

and night imagery are still imprecise. The extent of the empirical support for the Continuity Hypothesis in the realm of sleep disorders is also weak. While studies examining the continuity of day and night imagery have used various measures of both day and night imagery, research examining the continuity between day and night imagery in the form of sleep disorders have only used a single measure of daytime imagery (i.e., self-reported frequency of bizarre and vividness daydreams) which limits the internal validity and generalizability of these findings.

There are other theories regarding the relationship between day and night imagery that provide different expectations from the Continuity Hypothesis, that stem from psychodynamic frameworks. For example, another model is that of 'Alternative Channels' (Cartwright, 1972). This model suggests that there may be an inverse relationship in terms of vividness and bizarreness between day and night imagery. This hypothesis is based in Freudian theory which suggests that whatever is rendered inaccessible to conscious experience seeks expression in night dreams.

If the Alternative Channels hypothesis were valid, these forms of imaginative sleep disturbances would be expected to be more likely to occur among individuals who have clinical psychological problems or traumas, and are therefore more likely to be motivated to suppress negative

experiences from consciousness. That is, there may be an association between the use of alternative channels and psychopathology and trauma. In support of this corollary, Cartwright (1972) found that a decrease in bizarre, hallucinatory activity in waking mentation was accompanied by an increase of such activity during dreams and vice versa among schizophrenics. The main difficulty with the Alternative Channels hypothesis is its critical reliance on the theoretical concept of repression. The Alternative Channels Hypothesis proposes that there is a repression of daytime imagery and that this imagery is then expressed at night. However, it is important to note that over 60 years of research has yet to produce empirical evidence supporting the concept of repression (Holmes, 1990). Thus, support for this hypothesis is of questionable meaning. If an inverse relationship is found, as suggested by the Alternative Channels Hypothesis, the psychological mechanisms that result in such a redirection of imagery remain ambiguous.

The Continuity and Alternative Channels Hypotheses are not necessarily mutually exclusive. It is possible, and indeed hypothesized in the present study that for individuals who have experienced trauma or have psychological problems, low levels of daytime imagery may be associated with high levels of night imagery, including sleep paralysis. However, for individuals who have not

experienced trauma and hence have no need to suppress negative day imagery, this inverse association would not be expected. Rather, perhaps for these individuals, it may be that the Continuity Hypothesis is more descriptive of the relationship between day and night imagery.

A third possibility in terms of the relationship between day and night imagery is that these processes are relatively independent, bearing little or no measurable relationship to one another. While there is no support for this finding in the literature, it also possible that support for the null hypothesis, as suggested by this possibility, is unlikely to make its way into the research literature. However, if there is a reliable and valid diagnosis of a sleep disorder, and multiple psychometrically sound measures of waking imaginal activities are found to converge with one another but are not associated with the disorder, this would provide some compelling evidence to suggest the processes are independent.

To summarize, the primary goal of the present study was to determine the validity of the Continuity Hypothesis versus (or in conjunction with) the Alternative Channels Hypothesis to understand the psychological processes involved in sleep paralysis and narcolepsy. Study 1 assessed the symptoms, correlates and antecedents of sleep paralysis. In order to evaluate the applicability of the Continuity and

Alternative Channels Hypotheses to understanding sleep paralysis, individuals with sleep paralysis and control participants were compared on a number of measures of daytime imagery, night imagery, psychopathology and life events trauma. Study 2 assessed the symptoms, correlates and antecedents of narcolepsy.

If both sleep paralysis and narcolepsy are related to psychological factors, it may be that these factors serve as a catalyst and/or moderator of sleep disorders. If the psychological basis of sleep paralysis when it occurs as the primary disorder is distinct from its co-occurrence with narcolepsy, this provides an avenue for future research to determine the role of sleep paralysis in narcolepsy.

STUDY 1: SLEEP PARALYSIS

Although clinical descriptions of sleep paralysis exist in diagnostic manuals such as the International Classification of Sleep Diagnostic and Coding Manual (ASDA, 1990) and DSM-IV (1994), very little psychological research has been conducted concerning its causes, pervasiveness, frequency of occurrence, or psychological and life event correlates. This lack of research may be because the mechanisms underlying sleep disorders have been primarily under the purview of medical research. However, as no physiological correlates of sleep paralysis were demonstrated until 1992 (Takeuchi, Miyasita, Sasaki, Inugami & Fukuda, 1992), it was not a sleep disorder of much interest even to the medical community.

Sleep paralysis is defined by a period of inability to perform voluntary movements either at sleep onset or upon awakening. Typically, sufferers also report that they can open and move their eyes and, thereby, look around the room while paralysed. It is frequently associated with a feeling of pressure on the chest. In addition, the experience is usually accompanied by visual, auditory and tactile hallucinations as well as the feeling of an unseen presence in the vicinity (Hufford, 1982). Sufferers also report feeling anxious and afraid during the paralysis (Hufford, 1982).

Relatively little research is available concerning the prevalence and correlates of sleep paralysis (Ohayon, Zulley, Guilleminault & Smirne, 1999). The percentage of participants reporting sleep paralysis in various studies ranged from 3% (ASDA, 1990) to 62% (Ness, 1978). Such a range may reflect the lack of a consistent measure for diagnosing sleep paralysis. For example, Goode (1962) found a prevalence rate of 6%. The measure used was in response to a description of sleep paralysis as "transient paralysis: inability to speak or move any muscle groups-while entering or awakening from sleep". In contrast, Ness (1978), who reports a prevalence rate of 62%, asked participants whether they had ever experienced sleep paralysis with no further description. Thus, it was left to the participants to interpret the meaning of sleep paralysis, likely resulting in an overestimate of the prevalence of the disorder. Also, the populations under study have not been consistent, ranging from university students (Goode, 1962) to community samples (Ness, 1978). Therefore, it is difficult to discern the meaningfulness of differences in the rates of occurrence, as there may be demographic and lifestyle variables that further contribute to the prevalence.

For similar reasons, data concerning the relative prevalence of sleep paralysis in men and women are inconsistent. While some studies found no gender differences

in the prevalence of sleep paralysis (e.g., Fukuda, Inamatsu, Kuroiwa & Miyasita, 1991; Penn, Kripke & Scharff, 1981; Spanos et al., 1995), others have found a higher frequency of sleep paralysis in women than in men (Bell, Shakoor, Thompson, Dew, Hughley, Mays & Shorter-Gooden, 1984; Fukuda, Miyasita & Ishihara, 1987; Ohaeri, Odejide, Ikuesan & Adeyami, 1989), or conversely a higher frequency in men than in women (Goode, 1962; Ness, 1978). The specific reason for these different rates of occurrence in males and females remains unclear, as the studies differ on the numerous methodological dimensions, such as diagnosis and sampling methods, described earlier.

In terms of the physiological aspects of sleep paralysis, research has found that sleep paralysis was related to sleep onset rapid eye movement period (SOREMP; Takeuchi et al., 1992). This means that there is the simultaneous appearance of elements of both wake and sleep. The sequence of sleep paralysis is that alpha waves intrude into REM sleep, an arousal response (i.e. muscle twitching or eye opening) occurs and atonia persists despite the waking EEG pattern. Thus, sleep paralysis appears to occur in the transition between REM sleep and waking (i.e., during SOREMPs).

SOREMPs are more likely to occur under certain circumstances, such as reversal of the sleep-wake cycle

(i.e., sleeping during the day and staying awake at night) (Weitzman, Kripke, & Goldmacher, 1970), sleep interruption (Fukuda, Miyasita & Inugami, 1987; Miyasita, Fukuda & Inugami, 1989; Miyasita, Fukuda, Inugami & Ishihara, 1989) or naps (Marron, Rechtschaffen & Wolpert, 1964). This suggests that lifestyle (e.g., shift work) and psychological factors (e.g., stress, anxiety, psychopathology) that may affect sleep patterns may lead to the SOREMPs which are associated with sleep paralysis. Thus, sleep paralysis may not merely be seen as a physiological event, as there can be psychological and life event precursors that predispose the individual to the conditions that result in sleep paralysis.

Psychological Precursors

According to the Alternative Channels Hypothesis, there should be a negative relationship between day and night imagery. However, Alternative Channels is based on the psychological need to suppress day imagery due to psychopathology and life events trauma. Therefore, Alternative Channels may only apply to those experiencing psychopathology and trauma. If the Alternative Channels Hypothesis is valid, it was expected that psychopathology or trauma (e.g., abuse) that the individual attempts to suppress in the form of daytime imagery might lead to a greater probability of sleep paralysis. The Continuity Hypothesis does not speak to the moderating role of

psychopathology or trauma. The Continuity Hypothesis simply predicts that individuals with sleep paralysis will experience more vivid daytime imagery than those who do not have this sleep disorder.

Psychopathology

Although physiological factors seem to be related to sleep paralysis (Takeuchi et al., 1992), the potential causes of these physiological changes remains unclear. It has been suggested that psychological factors such as stress, anxiety and psychopathology may lead to disrupted sleep, which has been linked to SOREMP and sleep paralysis.

Only a few studies (Bell et al., 1984; Fukuda et al., 1991; Ness, 1978; Ohayon et al., 1999; Ohaeri et al., 1989; Spanos et al., 1995) have examined the relationship between indices of mental health and sleep paralysis. The results of these studies have been mixed. Several studies found no significant differences between sleep paralysis sufferers and non-sufferers on various indices of psychopathology. These indices included the Cornell Medical Index (which measured complaints related to the cardiovascular, digestive, and nervous systems in addition to feelings of inadequacy, depression, anxiety, sensitivity, anger and tension; Ness, 1978), the Holmes-Rahe social readjustment scale (Bell et al., 1984) and Eysenck's neuroticism and psychoticism scales (Ohaeri et al., 1989). In contrast,

Fukuda et al. (1991) and Spanos et al. (1995) found significant differences on measures of psychopathology between sleep paralysis and control participants. Fukuda et al. (1991) administered the Minnesota Multiphasic Personality Inventory (MMPI) and the Maudsley Personality Inventory; the only significant difference was on the paranoia scale of the MMPI, in that sleep paralysis respondents scored higher than controls without sleep paralysis. In addition, Spanos et al. (1995) found that sleep paralysis participants scored significantly higher than controls on a composite index of psychopathology as measured by the Symptom Checklist-90R, the Trauma Symptom Checklist (which tapped into neuroticism, dissociation, anxiety, depression, interpersonal sensitivity, psychoticism, self-esteem, paranoid ideation, phobic anxiety, hostility, somatization and obsessive compulsiveness), the Eysenck Personality Questionnaire (emotionality) and Rosenberg's self-esteem scale. These latter studies then suggest that there may be some associated psychopathologies.

It is difficult to determine the cause of the inconsistent findings related to psychopathology since measures are not consistent across studies. Also, the studies differed substantially in the nature of the populations they sampled from. Of the studies that found no

differences, participants were selected from various populations including a clinical sample (Bell, et al., 1984), medical students (Ohaeri et al., 1989) and the community (Ness, 1978). The studies that did find differences relied entirely on university students as participants. Therefore, once again it is difficult to derive any conclusions from the pattern of results demonstrated in past research.

Life Events

Life event precursors may also lead to disrupted sleep, which in turn has been linked to SOREMP and sleep paralysis. Factors such as degree of stress and fatigue could lead to disrupted sleep on a particular night making the individual vulnerable to a sleep paralysis episode. Additionally, it is possible that experiencing trauma could be a more chronic stress precursor that disrupts sleep. Links have been drawn between sleep paralysis and the dreams and symptoms of sexual trauma, leading to speculation that sleep paralysis may be an unconscious expression of past experiences of sexual abuse (Haga, 1989). When sexually abused individuals were asked to report the themes of their worst dreams, they reported dreams of being trapped or paralysed and sensing a presence (Fernandez, 1991; Garfield, 1987). These are primary features of the imaginal qualities of sleep paralysis.

In line with this possibility, a number of symptoms, which are purported to be useful in detecting a history of incest, are similar to the symptoms of sleep paralysis. For example, the abused women in Garfield's (1987) study reported that while they were awake they had the feeling that there was an evil or malevolent presence in their homes, frequent auditory hallucinations (e.g., hearing their name being called or "intruder" noises such as footsteps), visual hallucinations (e.g., seeing shadows or figures in the room) and tactile hallucinations (e.g., being touched or being pushed down). Such symptoms have often been identified in the reported content of the sleep paralysis.

To determine whether reports of past sexual abuse were related to experiencing sleep paralysis, Spanos et al. (1995) compared the frequency of reports of both sexual and physical abuse between participants with sleep paralysis and controls who had never experienced sleep paralysis. There was no significant difference between these groups on the frequency of reports of sexual abuse. However, of those participants who experienced sleep paralysis, those who reported physical abuse were found to experience more symptoms during the paralysis than those who did not report physical abuse. The authors did not speculate on the cause of this relationship but perhaps further clarification of the nature of physical abuse (e.g., family environment and

punitive childhood experiences) in individuals with sleep paralysis could shed some light on specific aspects of a physically abusive family environment influence the occurrence of sleep paralysis. It is possible that some factors related to physical abuse such as the severity of the abuse or a negative family environment (e.g., verbal conflict and verbal abuse) could be stressors associated with sleep disruptions, and the repressive processes that may lead to reports of sleep paralysis.

Imagery

According to the Continuity Hypothesis, individuals with sleep disorders such as sleep paralysis should experience more vivid daytime imagery than those who do not have this sleep disorder. In contrast, according to the Alternative Channels Hypothesis, they should experience less daytime imagery particularly if they have experienced previous trauma or psychopathology. There is some support for the Continuity Hypothesis, in that those who report sleep paralysis score significantly higher on a composite index of imaginativeness than those who do not (Spanos et al., 1995). Spanos et al. (1995) has noted that imaginativeness was correlated with the frequency of sleep paralysis attacks as well as the number of symptoms experienced simultaneously during the paralysis (e.g., fear, sensing a presence, pressure on chest). This suggests that

imagery in the day is not only continuous with whether or not a person experiences a sleep disorder with imaginal accompaniments but is also continuous in the way in which the sleep disorder expresses itself. For instance, a person with sleep paralysis who experiences much vivid daytime imagery will have more symptoms simultaneously during sleep paralysis and will have more sleep paralysis attacks than a person with sleep paralysis who experiences less daytime imagery.

According to the Continuity Hypothesis individuals who have sleep paralysis, which features particularly vivid night imagery should also show more night imagery (i.e., imagery not associated with sleep paralysis such as nightmares, night terrors and vivid dreams) than those who do not have sleep paralysis. However, in order for the hypothesis to have discriminant validity, sleep paralysis should not be related to sleep variables without imagery components, such as sleep walking and talking. No studies have yet examined the discriminant validity necessary to support the Continuity Hypothesis.

Research Goals

The present study had two major goals. The secondary goal was to gain exploratory information on the symptoms, antecedents and correlates of sleep paralysis. The primary goal was to determine the validity of applying the

Continuity Hypothesis versus the Alternative Channels

Hypothesis to understanding the psychological processes involved in sleep paralysis. University students with sleep paralysis were compared to controls on a number of measures of daytime imagery, night imagery, psychopathology and life events trauma. A university sample was used in order to find a greater range of experiences than would be found in a clinical sample and to clarify differences in rates of occurrence of sleep paralysis in this type of sample.

Exploratory Research on Sleep Paralysis

One of the inconsistencies in past research that has led to some confusion has been the lack of a consistent and adequate operational definition of sleep paralysis. For example, as with other research on sleep paralysis, Spanos et al. (1995) used a questionnaire that asked about very specific symptoms (e.g., 'hearing your name being called' and 'seeing someone pushing on your chest') selected from anecdotal and clinical descriptions of sleep paralysis. Consequently, this approach may not have detected some of the symptoms of sleep paralysis. The present study gathered detailed descriptions of individuals' last sleep paralysis experience through a semi-structured free-recall interview. Since all of the information available on sleep paralysis is based on anecdotal reports and questionnaires based on these anecdotes, systematic analysis of descriptions of sleep

paralysis from those reporting it is needed to determine whether the current depiction of a 'typical' sleep paralysis episode is accurate and whether there are other dimensions that may emerge. The use of a free-recall interview allowed for the emergence of any other symptoms (e.g., body sensations, imagery) and possible correlates (life event precursors; perception of the causes of the sleep paralysis attack; if they have had more than one sleep paralysis attack, what were the similarities/differences between the attacks) which may not have been detected in previous questionnaire-based investigations of the sleep paralysis experience. Additionally, the use of an interview was important because most operational definitions of sleep paralysis pre-date more recent research that has identified physiological as well as psychological elements that could be relevant.

The current study also investigated a number of potential precursors to sleep paralysis. Psychological dimensions such as stress, anxiety and psychopathology may lead to disrupted sleep, which has been linked to SOREMP, and sleep paralysis. Thus the current study presented a multi-dimensional measure of psychopathology (i.e., anxiety, hostility, psychoticism, interpersonal sensitivity, phobic anxiety, paranoid ideation and obsessive-compulsiveness) in order to determine dimensions that may be related to sleep

paralysis. This multi-dimensional measure is a comprehensive assessment strategy, which may allow past findings to be unified.

In addition, life event precursors may also lead to disrupted sleep, which has been linked to SOREMP, and sleep paralysis. Factors such as degree of stress and fatigue on the night of the sleep paralysis episode or a history of sexual and physical trauma could be precursors to sleep paralysis. Thus, the current study assessed these concepts.

Past research has found differences in prevalence rates as a function of gender. Although there were no specific hypotheses regarding the interaction between gender and the mechanisms associated with the experience of sleep paralysis, due to these past differences in prevalence rates, and potential differences in predisposing factors (e.g., sexual abuse), the interactive effects of gender were considered.

Research Regarding the Role of Imagery

Although it has been found that daytime imagery correlated with reports of nightmares (Starker, 1985), research on whether there is a relationship between other types of sleep disorders which display imaginal components and daytime imagery has not been conducted. The present study attempted to determine whether a relationship exists between daytime imagery and sleep paralysis.

According to the Alternative Channels Hypothesis, there should be a negative relationship between day and night imagery. However, Alternative Channels is based on the psychological need to suppress day imagery due to trauma and psychopathology. Therefore trauma and psychopathology should moderate the effect between day and night imagery. The Continuity Hypothesis does not speak to the moderating role of trauma.

The Continuity Hypothesis predicts that individuals with sleep paralysis will experience more vivid daytime imagery than those who do not have this sleep disorder. It was also expected that since sleep paralysis participants experience vivid night imagery during the paralysis, they might also experience other types of night imagery (i.e., nightmares, night terrors, vivid dreams and hypnagogic imagery) significantly more frequently than controls who do not have the vivid night imagery of sleep paralysis.

The discriminant validity between the relations with imaginary versus nonimaginary sleep components that would support the Continuity Hypothesis was also assessed. While there should be a relationship between daytime imagery and imagery related to sleep (e.g., sleep paralysis, nightmares, night terrors, vivid dreams and hypnagogic imagery), daytime imagery should not be related to sleep variables that do not have an imagery components (e.g., sleeptalking,

sleepwalking). In order to assess imagery related to sleep, a number of sleep dimensions with and without imagery components were assessed in the present study.

Previous research on the Continuity Hypothesis and sleep disorders lacks generalizability since a single measure of daytime imagery (i.e., daydreaming) was used. In order to overcome this difficulty, a multi-dimensional approach was taken. To assess daytime imagery a number of indices related to imagery such as imagery vividness, absorption in imaginings, a tendency to develop unusual sensory-perceptual and imaginal experiences, reports of dissociative experiences and hypnotizability were used.

Hypotheses

Continuity Hypothesis

1. Those who experience sleep paralysis would score significantly higher than controls on all measures of daytime and night imagery, and these two sets of variables would be positively correlated.
2. There would be no significant difference between sleep paralysis and controls on measures of non-imagery sleep variables, such as sleepwalking and sleep talking.

Alternative Channels Hypothesis

1. Sleep paralysis participants would score higher on psychopathology and life events trauma than

control participants.

2. Symptoms of psychopathology would moderate the effect of day imagery on night imagery. In particular, in those experiencing psychopathology, there would be an inverse relation between day and night imagery.
3. Symptoms of life events trauma would moderate the effect of day imagery on night imagery. In particular, in those experiencing life events trauma, there would be an inverse relation between day and night imagery.

Method

Participants

This study involved two sessions. In the first session, 1776 Introductory Psychology students participating in mass testing at Carleton University were given the Sleep Paralysis Questionnaire as a means of identifying individuals who had experienced this disorder. Based on these measures, 80 participants (males, $n=41$; females, $n=39$) who reported sleep paralysis were selected. An equal number of non-reporting controls (males, $n=32$; females, $n=48$) who do not report sleep paralysis or narcolepsy were asked to participate in the second session of the study. Participants' ages ranged from 18 to 49 years ($M=20.75$,

$SD=4.03$). All participants were given course credit for their participation.

Materials

Premeasure of Sleep Paralysis

The Sleep Paralysis Questionnaire (Appendix A) was administered to all students taking part in mass testing. This 49-item questionnaire included a diagnostic description developed for the current study to assess the symptoms of sleep paralysis. The diagnostic question was: "Have you had an experience similar to the one described below? 'I was falling asleep, but was still awake (or I had just woken up) when I discovered that my body felt paralysed and I could not move. However, I could move my eyes and I knew I was not dreaming.'" The questionnaire also asked participants whether they had experienced various phenomena which are thought to occur during sleep paralysis (e.g., imaginal elements such as "Did you hear any unusual sounds?"; scored 0 for 'no' and 1 for 'yes') as well as non-imaginal components of sleep such as "After the age of 12, how often did you walk in your sleep?". These variables were given a single score from 0 (never) to 3 (almost nightly).

Psychopathology and Life Events Trauma Measures

The Symptom Checklist (SCL-90R; Derogatis, 1977). This 47-item inventory of self-reported symptoms provides a multidimensional measure of psychological symptom patterns

and psychopathology (see Appendix C). It asks participants to rate, on a scale from 0 (not at all) to 4 (extremely), the extent to which they have been distressed by various symptoms in the past month. The questions break down into eight subscales: (i) interpersonal sensitivity (e.g., "How much were you distressed by your feelings of being easily hurt."); (ii) anxiety (e.g., "How much were you distressed by nervousness or shakiness inside."); (iii) hostility (e.g., "How much were you distressed by feeling easily annoyed or irritated."); (iv) psychoticism (e.g., "How much were you distressed by the idea that you should be punished for your sins."); (v) obsessive-compulsive (e.g., "How much were you distressed by having to repeat some action such as touching, counting, washing."); (vi) depression (e.g., "How much were you distressed by feelings of worthlessness."); (vii) phobic anxiety (e.g., "How much were you distressed by having to avoid certain things, places or activities because they frighten you."); and (viii) paranoid ideation (e.g., "How much were you distressed by feeling that most people can not be trusted."). Concurrent validity has been demonstrated through significant correlations with MMPI subscales ranging from .50 to .75 (Derogatis, 1977). Each dimension of the SCL-90R had its highest correlation with the like construct from the MMPI. The scales of the SCL-90R have also been found to correlate with the Middlesex

Hospital Questionnaire which also contains symptom dimensions. The correlations ranged from .36 to .92 between like dimensions (Derogatis, 1977). Internal consistency of the subscales ranged from .77 to .90 while test-retest reliability was between .78 and .90.

In the current sample, good inter-item reliabilities were also found for the subscales: interpersonal sensitivity, Cronbach's α = .77; anxiety, Cronbach's α = .90; hostility, Cronbach's α = .77; obsessive-compulsive, Cronbach's α = .88; depression, Cronbach's α = .87; phobic anxiety, Cronbach's α = .91; paranoid ideation, Cronbach's α = .78.

The Major Events Inventory (Cuddy, 1990). This 49-item checklist provides participants with a list of positive and negative life events and participants were asked to check off which events they had experienced (e.g. "___ Unwanted sexual activity BEFORE age 14 with someone 5 years (or more) older than yourself"; see Appendix D). This instrument was used to elicit information regarding unwanted sexual activity and physical abuse. Only the 6 self-report items related to physical and sexual abuse were used although the entire scale was administered so that there was not merely a focus on negative life events.

The Assessing Environments III Questionnaire (AEIII;

Berger, Knutson, Mehm & Perkins, 1988). This 164-item questionnaire assesses a broad range of punitive childhood experiences and family characteristics associated with child abusing environments (see Appendix E). Participants indicated whether statements were true or false in relation to their childhood family environment. Four subscales were assessed: (i) physical punishment (e.g., "My parents used physical discipline with me."); (ii) perception of discipline (e.g., "My parents were very strict disciplinarians."); (iii) negative family atmosphere (e.g., "We had lots of arguments in our family.") and (iv) parental rejection (e.g., "I never felt that my parents really loved me."). Discriminant validity has been established by demonstrating that responses by abused and non-abused adolescents could be distinguished (Berger et al., 1988). The AEIII has been shown to be stable and reliable. Internal consistency for the scales has been found to range from .65 to .79 and test-retest reliability for the scales ranged from .61 to .89 (Berger et al., 1988). Good inter-item reliability was demonstrated in the current sample: physical punishment, Cronbach's $\alpha = .82$; perception of discipline, Cronbach's $\alpha = .81$; negative family atmosphere, Cronbach's $\alpha = .77$ parental rejection, Cronbach's $\alpha = .81$.

Day Imagery Measures

Vividness of Mental Imagery Questionnaire (VMIQ; Shor, Orne & O'Connell, 1966). This scale assesses subjective reports of the vividness of various imagined situations or stimuli (see Appendix F). This 15-item questionnaire includes items from different sense modalities (i.e., vision, smell, hearing, taste, touch), but emphasizes visual imagery. Participants were asked to indicate the vividness of an imagined situation (e.g., "When you close your eyes and try to imagine a color, such as bright blue, how vividly can you imagine it?"). Responses were along a 7-point scale ranging from 1 (no image present at all; you only know that you are thinking it) to 7 (perfectly clear, and as vivid as the actual experience). A final score was calculated by taking the sum of all 15 items. Missing items were replaced with the individual's mean score on the rest of the items. The reliability coefficients for internal consistency of the imagery variables were at least .91 on two administrations (Shor et al., 1966). This scale has also been found to correlate in the order of $r=.56$ with hypnotizability, suggesting convergent validity (Shor et al., 1966). This is the most commonly used imagery vividness scale and is viewed as the most reliable and valid measure of imagery vividness (Richardson, 1994). The scale demonstrated good reliability

in the current sample ($\alpha=.89$).

Absorption Scale (Tellegen & Atkinson, 1974). This 34-item questionnaire measured participants' predisposition to become highly involved in sensory and imaginative experiences (see Appendix G) and is the most widely used imaginative involvement scale (deGroh, 1989). Participants indicated the frequency on a 4-point format ranging from 1(Never) to 4(Very Frequently) that they had experienced various imagined situations (e.g., "When I listen to music, I can get so caught up in it that I don't notice anything else."). The score for this questionnaire consists of the sum of the 34 items. Missing items were replaced with the individual's mean score on the rest of the items. As Spanos and Chaves (1989) report, construct validity was shown, in that this scale has been found to have a moderate association with scales measuring daydreaming and fantasy proneness. It failed to correlate significantly with personality and psychopathology variables. Since this indicates a divergence between measures of related but conceptually distinct dimensions, this provides evidence for discriminant validity (Spanos & Moretti, 1988). The reliability coefficients for internal consistency have been found to be about .68 (Richardson, 1994). This scale demonstrated adequate reliability with the current sample (Cronbach's $\alpha=.71$).

Perceptual Aberration Scale (Chapman, Chapman & Raulin, 1978). This is a 35-item true-false self-report measure of disturbances and distortions in perception of body image and objects (see Appendix H) (e.g., "Sometimes when I look at things like tables and chairs, they seem strange."). Scores for each subscale were obtained by summing responses that indicate beliefs/experiences pertinent to the subscale. Missing items were replaced with the individual's mean score on the rest of the items. Scores identify distortions reportedly found in schizophrenics and borderline schizophrenics (Allen, Chapman, Chapman, Vuchetich & Frost, 1987). The PAS has an internal consistency alpha coefficient of .90 and test-retest stability of .75 (Chapman & Chapman, 1985). The scale demonstrated good reliability with the present sample (Cronbach's α = .88).

The Magical Ideation Scale (Eckblad & Chapman, 1983). This 30-item true-false scale is a measure of imaginal propensity or the inclination of an individual to become involved with magical imagery (Eckblad & Chapman, 1983; see Appendix H). An example item would be, "At times I perform certain little rituals to ward off negative influences." Scores for each subscale were obtained by summing responses that indicate beliefs/experiences pertinent to the subscale. Missing items were replaced with the individual's mean score

on the rest of the items. It has been found to correlate with the Perceptual Aberration Scale (.70) (Eckblad & Chapman, 1983). Alpha coefficient reliabilities have been found between .82 and .85 (Chapman, Chapman & Miller, 1982). It should be noted that a combined version of the Magical Ideation and Perceptual Aberration Scale were administered. This is the most common practice when measuring these propensities (deGroh, 1989). This scale demonstrated good reliability with the current sample (Cronbach's $\alpha=.84$).

The Personal Philosophy Inventory (PPI; Persinger, 1984). The PPI was used to assess report of and beliefs in various imaginal experiences. This 140-item true-false inventory contains three subscales assessing liberal beliefs (e.g., beliefs in reincarnation; "Although I am not sure, there is a good possibility that I have lived in a previous time."), paranormal beliefs (e.g., beliefs in telepathy; "Sometimes I can read another person's thoughts.") and temporal lobe lability (i.e., index of unusual sensory and imaginal experiences; "I have had a religious experience that I know was real.") (See Appendix I). Scores for each subscale were obtained by summing responses that indicate beliefs/experiences pertinent to the subscale and dividing by the total possible items in the subscale. Missing items were replaced with the individual's mean score on the rest of the items. The PPI was found to have a test-retest

reliability of .90 after ten days and .65 to .75 after 100 days (Persinger, 1984). Convergent validity was demonstrated by a correlation with reports of paranormal experiences (.60 and .72 in two samples; Makarec & Persinger, 1985). The three subscales demonstrated good reliability with the current sample: liberal beliefs, Cronbach's α =.89; paranormal beliefs, Cronbach's α =.91; temporal lobe lability, Cronbach's α =.87.

Inventory of Childhood Memories and Imaginings (ICMI; Wilson & Barber, 1981). This 52-item inventory purports to measure fantasy proneness or imaginative involvement (e.g., "As an adult, I still occasionally live in a make-believe world." (see Appendix J). Participants indicate which of the items apply to them with a check mark. The score consists of the number of items endorsed. The ICMI has test-retest reliability of .93 to .98 (Rhue & Lynn, 1989). Construct validity has also been demonstrated since in previous studies it has been found to correlate significantly with absorption and imagery vividness (Rhue & Lynn, 1989). In the current sample, this scale demonstrated good reliability (Cronbach's α =.87).

The Dissociative Experience Scale (DES; Carlson & Putnam, 1993). This 28-item inventory measures dissociative experiences from minor to psychopathological (see Appendix

K). Participants were asked to provide the percentage of time they have had the experience (e.g., "Some people find that they have no memory for some important event in their lives (for example, a wedding or graduation)...Indicate the percentage of time this happens to you."). The final score represents the mean response across the 28 items. Bernstein and Putnam (1986) found that patients with a diagnosis of multiple personality scored higher on the DES than did college students, normal adults, or psychiatric patients with non-dissociative disorder diagnoses thus providing evidence of discriminate validity for the DES. In addition high inter-item reliability (.90) was found for this scale (Carlson and Putnam, 1993). The inter-item reliability for current sample was good (Cronbach's $\alpha = .88$).

The Carleton University Responsiveness to Suggestion Scale (CURSS; Spanos, Radtke, Hodgins, Stam & Bertrand, 1983). The CURSS is 7-item instrument designed to assess overt responses to test suggestions traditionally associated with hypnosis (see Appendix L). Suggestibility scores for each participant were assessed on objective (CURSS:O) or the index of overt response to suggestions, which ranges from *no suggestions passed* (0) to *all suggestions passed* (7). Test-retest correlations have been found to be adequate ($r = .76$; Spanos, Radtke, Hodgins, Bertrand, Stam, & DuBreuil, 1983).

Scores on the CURSS were found to correlate significantly with the Harvard Group Scale of Hypnotic Susceptibility: A and the Stanford Hypnotic Susceptibility Scale Form C (Spanos, Radtke, Hodgins, Bertrand, Stam, & Moretti, 1983). This scale is the most reliable for discerning participants who score in the high range of suggestibility (Spanos et al., 1983).

The Sleep Paralysis Interview

This semi-structured free-recall interview was administered only to sleep paralysis participants to gather detailed descriptions of the sleep paralysis experience and possible correlates (see Appendix M). The purpose of the interview was to allow for the emergence of other psychological accompaniments and correlates that may not have been detected in previous questionnaire-based studies of sleep paralysis. Participants were asked to describe the last time they had sleep paralysis in as much detail as possible. They were also asked to describe their life conditions before they had this sleep paralysis attack and whether they had taken any medication, drugs or alcohol. Next, participants indicated whether they had experienced sleep paralysis more than once. If they reported more than one sleep paralysis episode, they described how the sleep paralysis episodes were similar and how they were different, as well as their life conditions before this sleep paralysis

experience. All sleep paralysis participants were asked whether they had any other unusual sleep experiences as well as unusual experiences not related to sleep. Finally participants were asked whether there was anything else about the sleep paralysis that was not asked but they thought might be important.

The transcribed interviews were content analyzed on the basis of theory and on common themes arising out of the transcripts themselves. The content analysis also involved noting any idiosyncratic factors, such as any unusual life circumstances before the sleep paralysis episode and reports of unusual experiences such as having an out-of-body experience.

Procedure

All Introductory psychology students at Carleton University were asked to complete the Sleep Paralysis Questionnaire as part of the mass-testing program. Final study participants were selected for either the sleep paralysis or control conditions. They were telephoned and asked to participate in a study concerning personality and imagery. Participants were tested in small groups of up to ten people, each completing the package individually. Participants signed an informed consent form and then completed the questionnaires presented in random order at their own pace. Completion of the questionnaires took

approximately one hour. A female experimenter was available to answer questions. Upon completion of the questionnaires, control participants were debriefed (Appendix N) and dismissed. Sleep paralysis participants were taken one at a time for a one-on-one free recall semi-structured interview with a second female experimenter that lasted about 10 minutes. Upon completion of the interview, the sleep paralysis participants were debriefed.

Results

Exploratory Research on Sleep Paralysis

Descriptive Analysis of the Sleep Paralysis Questionnaire

Overall, 352 out of 1776 (20%) individuals who completed the mass testing premeasure reported one or more sleep paralysis experiences. Among the males, 146 out of 754 (19%) experienced sleep paralysis, and among the females, 206 out of 1022 (20%) reported one or more such episodes. This gender difference was not significant, $\chi^2(1, N=1776)=0.17, ns$.

Eighty (males, $n=41$ and females, $n=39$) individuals with sleep paralysis that were involved in the initial pre-screening agreed to take part in the next phase of the present study. The characteristics of sleep paralysis reported by these individuals were examined in greater detail. The individuals selected were a random sample of

this population, and hence should be representative. The mean number of sleep paralysis experiences reported was 6.85 ($SD=9.41$) and the median was 3.00. The age that participants reported having their first sleep paralysis experience ranged from 4 to 28 years ($M=14.64$, $SD=4.69$).

In describing their last sleep paralysis experience, 67.5% ($n=54$) reported that the paralysis occurred upon waking, 22.5% ($n=18$) reported that it occurred before falling asleep. Most reported being on their backs (63.8%; $n=51$), although some participants reported being on their stomachs (12.5%; $n=10$) or side (12.5%; $n=10$). The estimated duration of the episode ranged from 10 seconds to 4 hours with a median duration of 5 minutes ($M=12.64$, $SD=32.54$).

The percent of participants experiencing various symptoms of sleep paralysis during their last (or only) experience are presented in Table 1. The experiences most commonly associated with sleep paralysis were feeling afraid (67.5%; $n=54$), unusual body sensations (57.5%; $n=46$), sensing a presence (45.0%; $n=36$), and feeling a pressure on the chest (41.3%; $n=33$). These results are similar to sleep paralysis symptoms reported in past questionnaire research (Spanos et al., 1995). Participants also reported whether they felt tired, stressed or overworked before their sleep paralysis experience. Fifty-five percent ($n=44$) reported

feeling somewhat or severely tired before the sleep paralysis experience. Twenty-five percent ($n=20$) reported being somewhat or severely stressed before the sleep paralysis experience. Twenty-five percent ($n=20$) reported being somewhat or severely overworked before the sleep paralysis experience. Some felt two or all three of these symptoms prior to the experience. Thus, it is quite possible that psychological factors contributed to sleep disruptions that resulted in an experience of sleep paralysis.

Table 1

Percent of Sleep Paralysis Participants Reporting Various Symptoms

	Yes		No		Missing	
	Percent	<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>
Feel a Presence	45.0	36	55.0	44	0	0
See a person	17.5	14	81.3	65	1.3	1
Pressure on chest	41.3	33	57.5	4	1.3	1
Hear footsteps	18.8	15	81.3	65	0	0
Hear name	21.3	17	78.8	63	0	0
Felt touched	26.3	21	72.5	58	1.3	1
Saw someone pushing on chest	6.3	5	93.8	75	0	0
Floating sensation	16.3	13	83.8	67	0	0
Unusual noises	25.0	20	75.0	60	0	0
Unusual sights	16.3	13	80.0	64	3.8	3
Unusual body sensations	57.5	46	40.0	32	2.5	2
Afraid	67.5	54	32.5	26	0	0

The Sleep Paralysis Interview

Of the 80 participants with sleep paralysis, 78 successfully took part in the interview. Due to technical difficulties, two of the interviews were unknowingly not recorded.

The transcribed interviews (Appendix W) were content analysed with reference to the categories in Table 2. The unit of analysis was each statement. Each statement was coded as either positive (scored as 1) or negative (scored as 0) on each category, depending on whether it contained instances of those symptoms. Two judges not involved in other aspects of the study independently coded the symptoms derived from examination of the transcripts. Disagreements were resolved by discussion. As seen in Table 2, inter-rater reliabilities prior to discussion were good, with phi ranging from .89 to 1.00.

Table 3 contains the percent and number of participants that mentioned each of sleep paralysis symptoms. Each of the categories was coded (0 for absent; 1 for present) for whether it was mentioned in the interview. The most frequently reported symptom was feeling afraid (30.8%; $n=4$), a heavy feeling in the body (16.7%; $n=13$), and hearing sounds that were not really there (12.8%; $n=10$).

A number of new symptoms emerged from the interviews that were not assessed in the questionnaire. These included

reports of feeling at peace (3.8%; $n=3$), tingling sensations (3.8%; $n=3$), muscles feeling tense (6.4%; $n=5$), shaking (2.6%, $n=2$), perceptions of a level of consciousness 'different' from either sleep or wake (3.8%; $n=3$), and reports of vivid dreams before the sleep paralysis (16.7%, $n=13$). Although questionnaire research has detected a number of common sleep paralysis symptoms, the emergence of new symptoms with the interview format suggests that, as hypothesized, questionnaire studies may not have provided a comprehensive view of the sleep paralysis experience. Though most of these additional symptoms were not reported by the majority of participants, of particular interest given the emphasis in the present study on imaginal factors was the not infrequent mentioning of vivid dreams prior to the sleep paralysis experience.

Table 2

*Inter-rater Reliability for Symptoms Expressed in the
Interview*

	Inter-rater Reliability	
	Phi	Agreement
Fear	1.00	100
Felt at peace	1.00	100
Felt heavy	1.00	100
Felt a weight pushing on their body	.89	98.7
Felt held down	.89	98.7
Muscles felt tense	1.00	100
Tingling sensation	1.00	100
Shaking	1.00	100
Flying, floating or OBE	1.00	100
Difficulty Breathing	1.00	100
Saw a person or animal	1.00	100
Saw unusual light or colors	1.00	100
Heard sounds that were not really there	1.00	100
Different level of consciousness	1.00	100
Sensed a presence	1.00	100
Tried to speak or scream	1.00	100
Dreaming before the paralysis	.90	97.4

Table 3

Sleep Paralysis Symptoms Reported in the Interviews

	Present	
	Percent	(n)
Fear	30.8	24
Felt at peace	3.8	3
Felt heavy	16.7	13
Felt a weight pushing on their body	11.5	9
Felt held down	6.4	5
Muscles felt tense	6.4	5
Tingling sensation	3.8	3
Shaking	2.6	2
Flying, floating or OBE	3.8	3
Difficulty Breathing	7.7	6
Saw a person or animal	9.0	7
Saw unusual light or colors	3.8	3
Heard sounds that were not really there	12.8	10
Different level of consciousness	3.8	3
Sensed a presence	5.1	4
Tried to speak or scream	11.5	9
Dreaming before the paralysis	16.7	13

Participants were asked in the interview if they had been taking any drugs or alcohol before the sleep paralysis experience. One participant reported taking imipramine and one reported being on insulin. Thus, sleep paralysis did not seem to be the result of the ingestion of drugs or alcohol.

When asked how the sleep paralysis ended, it was most commonly reported (37.2%; $n=29$) that they fell back to sleep; 34.6% ($n=27$) suddenly were just able to move; 3.8% ($n=3$) heard a noise and then could move; and 2.6% ($n=2$) were only able to move when another person entered the room. It appears that sleep paralysis does not always end in the same manner for all those who report experiencing it.

Participants were also asked what their life conditions were like before the sleep paralysis: 53.9% ($n=42$) reported that their life was the same as usual; 16.7% ($n=13$) reported that they felt stressed; 5.1% ($n=4$) reported that there had been a death of a close relative or friend; 3.8% ($n=3$) reported that they were tense or anxious; 5.1% ($n=4$) reported that they were tired; 2.6% ($n=2$) reported major life changes; 2.6% ($n=2$) reported that they had been remembering stressful events and 1.3% ($n=1$) reported feeling relaxed and 8.9% ($n=7$) couldn't remember. These results do not seem to support the argument that sleep paralysis is caused by life conditions, at least not based on the self-

reports of the majority of participants.

Participants who reported more than one sleep paralysis experience were asked how the experience they chose to discuss was similar to the other(s) and how the experience was different from the other(s). Fifty-four participants reported more than one sleep paralysis experience. The most frequently noted similarities were simply the paralysis (32.6%; $n=16$); having it upon waking up (14.3%; $n=7$) and having a vivid dream before (8.2%; $n=4$). Most participants (66.7%, $n=36$) reported that there were no differences across experiences. Of the 18 participants who did, the most frequently reported differences were the duration of the sleep paralysis (27.7%; $n=5$) and differences in stress levels before the sleep paralysis (16.7%; $n=3$). These results suggest that the symptoms of sleep paralysis remain relatively consistent within an individual.

Participants were asked whether they also had other unusual sleep experiences; 62.8% ($n=49$) reported that they did not have any other unusual sleep experiences. The most frequently reported unusual sleep experience was vivid or bizarre dreams (14.1%; $n=11$), followed by reports of sleepwalking (5.1%; $n=11$). Participants were also asked whether they had experienced any other unusual experiences not related to sleep. The majority (82.1%; $n=64$) reported

that they did not. The most frequently reported unusual experience not related to sleep was seeing a ghost (5.1%; $n=4$) and having premonitions (3.8%; $n=3$). Finally, participants were asked whether there was anything else about the experience that was not asked, but they thought might be important: 64.1% ($n=50$) said that there was nothing else. The remainder did not bring up anything new that had not been previously discussed and coded for in other questions.

In summary, the results of the sleep paralysis questionnaire and interview indicated that although many of the symptoms of sleep paralysis have been accurately identified in questionnaire studies, at least according to the self-reported recollections of those experiencing such paralysis, other symptoms were possibly not tapped into. Questionnaire measures may have neglected to detect some, albeit infrequently reported through free-recall, symptoms such as tingling sensations and perceptions of a level of consciousness different from either sleep or wake. Of particular interest, was the prior presence and not uncommon experience of vivid dreams, even on other occasions.

Assessing Theoretical Predictions

Theoretical predictions regarding differences on a number of dependent variables (to be described below) between sleep paralysis and control participants were

assessed through planned multivariate analyses of variance (MANOVAs) with follow-up univariate *F*-tests for significant multivariate effects. Control of family-wise error rate, where applicable, was considered within each hypothesis through the use of Bonferroni corrections. Finally, hierarchical regressions were performed to assess the relations between day and night imagery, and the moderating effects of psychopathology or previous life traumas.

The Continuity Hypothesis

The Continuity Hypothesis predicts that individuals with sleep paralysis should experience both more daytime and night imagery than those without sleep paralysis. In order to assess the relationship among the daytime imagery variables, the correlations among these variables were examined (see Table 4). Based on the pattern of relations, it became evident that all of the day imagery variables were moderately highly correlated, with the exception of the Carleton University Responsiveness to Suggestion Scale-Objective and the Vivid Mental Imaginings Questionnaire. Thus, these latter 2 variables were assessed in separate univariate ANOVAs. A 2X2 (Condition: sleep paralysis/controls X Gender) MANOVA was conducted on 8 daytime imagery subscales (Inventory of Childhood Memories and Imaginings, Dissociative Experiences, Absorption, Personal Philosophy Inventory-XT, Personal Philosophy

Inventory-Paranormal Experiences, Personal Philosophy Inventory Liberal Beliefs, Perceptual Aberration, and Magical Ideation). Results indicated no significant multivariate effect for condition, Pillais=.05; $F < 1$ (see Table 5 for relevant means and standard deviations). It appears that individuals with sleep paralysis did not experience more daytime imagery, as measured by these indices, than those without sleep paralysis.

There was, however, a significant main effect for gender, Pillais=.11, $F(8, 149)=2.34$, $p < .05$. Follow-up univariate F -tests (Bonferroni's $\alpha=.01$) indicated that females scored significantly higher than males on Absorption, Dissociative Experience Scale and the Personal Philosophy Inventory-XT (see Table 6). There was no significant univariate gender effect for the Inventory of Childhood Memories and Imaginings, Perceptual Aberration and Magical Ideation, Personal Philosophy Inventory-Paranormal Experiences, Personal Philosophy Inventory Liberal Beliefs. The results indicated no significant multivariate interaction between condition and gender on these daytime imagery variables, Pillais=.03; $F < 1$.

A 2X2 (Condition: sleep paralysis/controls X Gender) univariate ANOVA was conducted on The Carleton University Responsiveness to Suggestion Scale- Objective. Results

indicated no significant effect for condition, $F<1$, $\eta^2=.00$; (see Table 5). However, there was a significant effect for gender, $F(1, 156)=10.73$, $p<.01$, $\eta^2=.06$ (see Table 6), in that females scored significantly higher than males on this scale. The results indicated no significant interaction between condition and gender, $F<1$, $\eta^2=.01$. A 2X2 (Condition: sleep paralysis/controls X Gender) univariate ANOVA was conducted on Vividness of Mental Imagery. Results indicated no significant effect for condition, $F<1$, $\eta^2=.00$ (see Table 5), gender $F<1$, $\eta^2=.00$ (see Table 6), nor their interaction ($F<1$, $\eta^2=.00$).

In sum, the Continuity Hypothesis prediction that individuals with sleep paralysis should experience more daytime imagery than individuals without sleep paralysis was not supported. There was no main effect for sleep paralysis, nor was there an interaction between condition and gender when examining daytime imagery. Thus, this hypothesis of the Continuity Hypothesis was not supported.

Table 4

Intercorrelations of Daytime Imagery Variables

	DES	ABS	PPIXT	PPIPb	PPIb	PA	MI	CURSO	VMIQ
ICMI	0.52**	0.71**	0.71**	0.52**	0.43**	0.64**	0.67**	0.22**	0.43**
DES	1.00	0.66**	0.58**	0.43**	0.17*	0.49**	0.56**	0.25**	0.21**
ABS		1.00	0.74**	0.53**	0.34**	0.62**	0.65**	0.20*	0.40**
PPIXT			1.00	0.59**	0.44**	0.66**	0.75**	0.17*	0.38**
PPIPb				1.00	0.28**	0.53**	0.59**	0.20*	0.41**
PPIb					1.00	0.37**	0.48**	0.14	0.18*
PA						1.00	0.75**	0.07	0.24**
MI							1.00	0.20*	0.37**
CURSO								1.00	0.26**

* $p < .05$, ** $p < .01$ (2-tailed)

Note: ICMI, Inventory of Childhood Memories and Imaginings; DES, Dissociative Experience Scale; ABS, Absorption; PPI-XT, Personal Philosophy Inventory-Temporal Lobe Signs; PPI-PB, Personal Philosophy Inventory-Paranormal Beliefs; PPI-LB, Personal Philosophy Inventory-Liberal Beliefs; PA, Perceptual Aberration; MI, Magical Ideation; CURSO, Carleton University Responsiveness to Suggestion Scale-Objective; VMIQ, Vividness of Mental Imagery Questionnaire.

Table 5

*Means and Standard Deviations for Daytime Imagery Variables
as a Function of Condition (Sleep Paralysis/Control)*

	Condition			
	Sleep Paralysis		Control	
	(n=80)		(n=80)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
ICMI	23.26	8.65	21.20	7.69
DES	19.26	12.63	16.17	11.30
Absorption	75.56	19.00	72.50	18.85
PPI-XT	.40	.15	.37	.13
PPI-PB	.37	.26	.37	.26
PPI-LB	.54	.21	.54	.25
Perceptual Aberration	6.21	5.75	4.99	4.24
Magical	9.44	6.24	8.16	6.17
Ideation				
CURSS:O	1.79	1.77	2.79	2.06
VMIQ	68.61	15.86	70.77	13.20

Note: ICMI, Inventory of Childhood Memories and Imaginings; DES, Dissociative Experience Scale; PPI-XT, Personal Philosophy Inventory-Temporal Lobe Signs; PPI-PB, Personal Philosophy Inventory-Paranormal Beliefs; PPI-LB, Personal Philosophy Inventory-Liberal Beliefs; CURSS-O, Carleton University Responsiveness to Suggestion Scale-Objective; VMIQ, Vividness of Mental Imagery Questionnaire.

Table 6

Means, Standard Deviations and ANOVAs for Daytime Imagery Variables as a Function of Gender

	Gender					
	Males		Females		ANOVA	
	(n=73)		(n=87)			
	M	SD	M	SD	F(1,156)	η^2
ICMI	20.56	8.01	23.63	8.18	6.80	.04
DES*	14.87	14.87	20.10	13.05	9.10	.06
Absorption*	70.01	18.76	77.40	18.50	6.94	.04
PPI-XT*	.35	.14	.41	.13	9.91	.06
PPI-PB	.36	.23	.40	.23	1.00	.01
PPI-LB	.50	.24	.56	.21	3.54	.02
Perceptual Aberration	5.29	6.68	5.86	4.34	.72	.00
Magical Ideation	7.96	6.29	9.51	6.10	3.14	.02
CURSS-O**	1.79	1.77	2.79	2.06	10.73	.06
VMIQ	68.88	16.33	70.38	13.00	.29	.00

Note: **p<.001, *p<.01. ICMI, Inventory of Childhood Memories and Imaginings; DES, Dissociative Experience Scale; PPI-XT, Personal Philosophy Inventory-Temporal Lobe Signs; PPI-PB, Personal Philosophy Inventory-Paranormal Beliefs; PPI-LB, Personal Philosophy Inventory-Liberal Beliefs; CURSS-O, Carleton University Responsiveness to Suggestion Scale-Objective; VMIQ, Vividness of Mental Imagery Questionnaire.

In order to assess the relationship among the night imagery variables, the correlations among these variables were examined (see Table 7). The patterns of relations suggest two sets of variables, namely the 3 variables associated with night terrors and nightmares, and the 3 variables associated with vivid dreams and imagery. These two sets of variables were subjected to 2X2 (Condition: sleep paralysis/controls X Gender) MANOVAs.

For the nightmare and night terror variables, results indicated no significant multivariate effect for sleep paralysis condition, Pillais=.02; $F(3,154)=1.07$, *ns* (see Table 8 for relevant means and standard deviations). Individuals with sleep paralysis did not experience more night imagery in the form of nightmares and night terrors than those without sleep paralysis. There was no significant multivariate effect for gender, Pillais=.03; $F(3,154)=1.45$, *ns*, nor for the interaction between experiencing sleep paralysis and gender, Pillais=.01; $F<1$.

The second 2X2 (Condition: sleep paralysis/controls X Gender) MANOVA was conducted on vividness of dreams, hypnagogic imagery and hypnopompic imagery. Results again indicated no significant multivariate effect for sleep paralysis condition, Pillais=.01; $F<1$ (See Table 8 for relevant means and standard deviations) gender, Pillais=.02; $F<1$, nor their interaction, Pillais=.01; $F<1$.

In sum, the Continuity Hypothesis prediction that individuals with sleep paralysis should experience more night imagery than individuals without sleep paralysis was not supported.

Table 7

Intercorrelations of Night Imagery Variables

	Night Terrors After 12	Nightmares	Vivid Dreams	Hypnagogic Imagery	Hypnopompic Imagery
Night Terror before 12	0.63**	0.30**	0.23**	0.22**	0.17*
Night Terror After 12	1.00	0.31**	0.11	0.15	0.15
Nightmares		1.00	0.31**	0.14	0.14
Vivid Dreams			1.00	0.45**	0.30**
Hypnagogic Imagery				1.00	0.39**

* $p < .05$, ** $p < .01$ (2-tailed)

Table 8

Means and Standard Deviations for Night Imagery Variables as a Function of Condition (Sleep Paralysis/Control)

Night Imagery Variable	Condition			
	Sleep Paralysis		Control	
	(n=80)		(n=80)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Night Terrors before 12	0.51	0.66	0.37	0.58
Night Terrors After 12	0.36	0.51	0.26	0.44
Nightmares	1.11	0.55	1.01	0.34
Vivid Dreams	2.15	0.87	2.02	0.89
Hypnagogic Imagery	1.94	0.85	1.86	0.90
Hypnopompic Imagery	1.70	0.89	1.55	0.99

Although the predictions made by the Continuity Hypothesis were not thus far supported, it had also been hypothesized that under this theory, sleep paralysis should not be related to non-imagery sleep variables. In order to test this, a 2-way (Condition: sleep paralysis/control) MANOVA was performed on sleepwalking before and after 12 years of age. Results indicated no significant main effect, Pillais=.02; $F(2,157)=2.00$, ns (see Table 9 for means and standard deviations). A 2-way (Condition: sleep paralysis/control) MANOVA was also performed on sleeptalking before and after 12 years of age, again indicating no significant main effect, Pillais=.01; $F < 1$ (see Table 9 for means and standard deviations). Thus, it appears that sleep paralysis was not related to sleepwalking and sleep talking. While this lends some support to the discriminant validity of the Continuity Hypothesis, in the context of being unable to reject the null hypothesis for the day and night imagery variables, it is difficult to draw any substantive conclusions from this finding.

Alternative Channels Hypothesis

In line with the Alternative Channels Hypothesis, it was expected that individuals with sleep paralysis would score significantly higher than controls on measures of psychopathology and life events trauma.

In order to assess the relationship among the

psychopathology variables, the correlations among these variables were examined (see Table 10). All of these indicators were moderately intercorrelated, and so were assessed in a 2X2 (Condition: sleep paralysis/controls X Gender) MANOVA. Results indicated no significant multivariate effect for condition, Pillais=.08, $F(8, 149)=1.52$, ns (see Table 11 for relevant means and standard deviations). However, there was a significant multivariate effect for gender, Pillais=.17, $F(8, 149)=3.93$, $p<.001$. Follow-up univariate F -tests ($\alpha=.01$), indicated that females scored significantly higher than males on anxiety, depression, interpersonal sensitivity, obsessive compulsiveness and phobic anxiety (see Table 12 for means, standard deviations, univariate F s and η^2). Finally, the interaction between sleep paralysis condition and gender was not significant, Pillais=.03; $F<1$.

In sum, the Alternative Channel Hypothesis prediction that individuals with sleep paralysis should experience more psychopathology than individuals without sleep paralysis was not supported. There was also no interaction between condition and gender when examining psychopathology. Thus, the Alternative Channels Hypothesis was not supported in terms of sleep paralysis reflecting these particular symptoms of psychopathology.

Table 9

*Means and Standard Deviation for Sleepwalking/talking
Variables as a Function of Condition (Sleep
Paralysis/Control)*

	Condition			
	Sleep Paralysis		Control	
	(n=80)		(n=80)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sleepwalking before 12	.51	.71	.32	.67
Sleepwalking after 12	.25	.52	.12	.33
Sleeptalking before 12	1.05	.93	.91	.87
Sleeptalking after 12	.84	.70	.81	.76

Table 10

Intercorrelations of Psychopathology Variables

	PI	PA	Hos	Anx	Dep	IS	OC
Psy	.68	.50	.52	.59	.68	.67	.59
PI	1.00	.53	.59	.65	.66	.74	.65
PA		1.00	.36	.65	.53	.60	.53
Hos			1.00	.54	.53	.46	.49
Anx				1.00	.70	.70	.70
Dep					1.00	.75	.70
IS						1.00	.67

All correlations are significant at $p < .01$ (2-tailed).

Note. Psy, psychoticism; PI paranoid ideation; PA, phobic anxiety; Hos, hostility; Anx, anxiety; Dep, depression; IS, interpersonal sensitivity; OC, obsessive compulsiveness.

Table 11

*Means and Standard Deviation for Psychopathology Variables
as a Function of Condition (Sleep Paralysis/Control)*

	Condition			
	Sleep Paralysis		Control	
	(n=80)		(n=80)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Obsessive	1.39	.70	1.19	.68
Compulsiveness				
Interpersonal	1.23	.77	1.23	.71
Sensitivity				
Depression	1.30	.71	1.27	.77
Anxiety	.77	.58	1.11	1.74
Hostility	1.02	.83	1.14	.86
Phobic Anxiety	.47	.61	.39	.55
Paranoid	1.18	.82	1.09	.75
Ideation				
Psychoticism	.68	.62	.60	.56

Table 12

*Means, Standard Deviations and ANOVAs for Psychopathology
Variables as a Function of Gender*

	Gender				ANOVA	
	Males		Females			
	(n=73)		(n=87)			
	M	SD	M	SD	F(1,156)	η^2
Interpersonal	.98	.65	1.47	.74	19.78	.11
Sensitivity**						
Depression**	1.08	.68	1.47	.74	12.20	.07
Anxiety**	.77	.58	1.11	1.74	11.18	.07
Hostility	.99	.73	1.16	.92	1.35	.01
Phobic	.25	.34	.59	.68	16.06	.09
Anxiety**						
Paranoid	1.01	.71	1.24	.83	3.77	.02
Ideation						
Psychoticism	.57	.55	.71	.62	2.64	.02

** $p < .001$. * $p < .01$

The association between day and night imagery and the moderating effects of psychopathology. Both the Continuity and Alternative Channels Hypotheses predict an association between day and night imagery. However, while the Continuity Hypothesis predicts a positive association, the Alternative Channels Hypothesis predicts that psychopathology moderates the effect of day imagery on night imagery, in that among those with symptoms of a psychopathology, the relation between these variables should be negative. In order to examine these competing hypotheses, a composite index of psychopathology was formed by standardizing and summing participants' scores on paranoid ideation, anxiety, depression, interpersonal sensitivity, obsessive compulsiveness, psychoticism, hostility and phobic anxiety. Since all of the day imagery variables were moderately highly correlated, with the exception of the Carleton University Responsiveness to Suggestion Scale-Objective and the Vivid Mental Imaginings Scale, these 8 daytime imagery variables were standardized and summed into an index of daytime imagery. The Carleton University Responsiveness to Suggestion Scale-Objective and the Vivid Mental Imaginings Scales remained distinct. Scores on these three indicators were then standardized, and their product with the standardized psychopathology index was computed to assess the interaction.

Based on their intercorrelations, two indices of night imagery occurring were formed (i.e., dream index and nightmare/terror index). Participants' scores on the dream index of night imagery were formed by standardizing and summing the scores on vividness of dreams, hypnagogic and hypnopompic hallucinations. Participants' scores on nightmare/terror index were formed by standardizing and summing the scores on nightmares and night terrors.

Three hierarchical regressions were performed for each of these night imagery indices, in which the night imagery variables was regressed first onto the standardized main effect of the daytime imagery variable of interest (i.e., Daytime Imagery Index, Vividness of Mental Imagery or the Carleton University Responsiveness to Suggestion Scale-Objective), second onto, the standardized main effect of psychopathology, and finally, onto the standardized interactions between the daytime imagery variable of interest and psychopathology. For the dream index of night imagery, it was found that both the Daytime Imagery Index ($R^2_{\text{change}} = .17$, $F(1, 158) = 32.14$, $p < .001$) and vividness of mental imagery significantly predicted night imagery ($R^2_{\text{change}} = .08$, $F(1, 158) = 13.13$, $p < .001$). The positive association reflected by the regression coefficients (see Table 13) supports the Continuity Hypotheses of a positive relationship between day and night imagery.

For each of these regressions, if psychopathology was a moderator, then Step 3 should be significant. In Step 3, both significant interactions as well as R^2_{changes} of above .15 were considered to be meaningful. It was found that the interaction was significant only for vividness of mental imagery (see Table 13 for the hierarchical regression statistics). Follow-up analyses were conducted by assessing the simple slopes for vividness of mental imagery at one standard deviation below and above the mean of psychopathology (Aiken and West, 1991). These regressions indicated that, contrary to the Alternative Channels Hypothesis, vividness of mental imagery did not negatively predict the dream index of night imagery at higher levels of psychopathology ($B=.12$, ns). However, day imagery was predictive of the dream index of night imagery at lower levels of psychopathology. Specifically, more consistent with the Continuity Hypothesis, at the lower levels of psychopathology, more vividness of mental imagery was associated with more night imagery ($B=.47$, $p<.001$).¹

¹ When the same regressions were performed using only sleep paralysis participants, the interaction was not significant (nor were there R^2 -changes of above .15) for the Daytime Imagery Index, The Carleton University Responsiveness to Suggestion Scale or the Vividness of Mental Imagery Questionnaire.

Table 13

*Hierarchical Regression Statistics Predicting the Dream
Index of Night Imagery from Daytime Imagery, Psychopathology
and their Interaction*

<i>Day Imagery</i>	<i>Step</i>	<i>R²</i>	<i>F change</i>	<i>df</i>	<i>B</i>	<i>r</i>
<i>Predictor</i>	<i>#</i>	<i>change</i>		<i>error</i>		
Daytime Imagery	1	.17	32.14**	158	.41	.41
Index						
Psychopathology	2	.00	.74	157	-.08	.19
Imagery * Pathology	3	.00	.55	156	.06	.17
VMIQ	1	.08	13.13**	158	.28	.28
	2	.01	2.55	157	.13	.19
	3	.03	4.64*	156	.17	.12
CURSS:O	1	.01	.75	158	-.07	-.07
	2	.04	6.35*	157	.19	.19
	3	.00	.44	156	.05	-.01

** $p < .001$, * $p < .05$

Note: CURSS:O, Carleton University Responsiveness to
Suggestion Scale-Objective; VMIQ, Vividness of Mental
Imagery Questionnaire.

For the nightmare-terror imagery index, it was found that the Daytime Imagery Index significantly predicted nightmare-terror imagery ($R^2_{\text{change}} = .11$, $F(1, 158) = 18.87$, $p < .001$). The positive association reflected by the regression coefficient (see Table 14) supports the Continuity Hypotheses of a positive relationship between day and night imagery.

For each of these regressions, if psychopathology was a moderator, then Step 3 should be significant. In Step 3, both significant interactions as well as R^2_{changes} of above .15 were considered to be meaningful. It was found that none of the interactions were significant.

Table 14

*Hierarchical Regression Statistics Predicting the
Nightmare/terror Index of Night Imagery from Daytime
Imagery, Psychopathology and their Interaction*

Day Imagery Predictor	Step #	R ² change	F change	df error	B	r
Daytime Imagery Index	1	.11	18.67**	158	.33	.33
Psychopathology	2	.00	.18	157	.04	.22
Imagery * Pathology	3	.01	2.37	156	.12	.22
VMIQ	1	.02	2.76	158	.13	.13
	2	.04	5.98	157	.19	.22
	3	.00	.75	156	.07	.08
CURSS:0	1	.00	.44	158	-.05	-.05
	2	.05	8.19*	157	.22	.22
	3	.00	.01	156	-.01	-.07

** $p < .001$, * $p < .05$

Note: CURSS:0, Carleton University Responsiveness to
Suggestion Scale-Objective; VMIQ, Vividness of Mental
Imagery Questionnaire

The role of traumatic life events. In order to assess the relationship among the life event trauma variables, the correlations among these variables were examined (see Table 15). All of the variables were moderately related, and so a 2x2 (Condition: sleep paralysis/controls X Gender) MANOVA was conducted on the five life event trauma subscales. There was no significant multivariate effect for sleep paralysis condition (Pillais=.03, $F(5,152)=1.01$, *ns*; see Table 16 for means and standard deviations), gender (Pillais=.04, $F(5,152)=1.24$, *ns*), nor their interaction (Pillais=.06, $F(5,152)=2.10$, *ns*). Thus, the Alternative Channel Hypothesis prediction that individuals with sleep paralysis should experience more life events trauma than individuals without sleep paralysis was not supported.

Table 15

Intercorrelations of Life Event Trauma Variables

	Physical Punishment	Perception of Discipline	Negative Family Atmosphere	Parental Rejection
Unwanted Sexual Activity	.35	.39	.34	.20
Physical Punishment	1.00	.74	.55	.45
Perception of Discipline		1.00	.72	.54
Negative Family Atmosphere			1.00	.53

All correlations are significant, $p < .01$ (2-tailed)

Table 16

*Means and Standard Deviation for Life Event Trauma Variables
as a Function of Condition (Sleep Paralysis/Control)*

	Condition			
	Sleep Paralysis		Control	
	(n=80)		(n=80)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Unwanted	.35	.69	.17	.52
Sexual				
Activity				
Physical	2.02	2.10	1.84	1.91
Punishment				
Perception of	2.98	2.75	2.58	2.84
Discipline				
Negative	2.45	2.42	2.25	2.46
Family				
Atmosphere				
Parental	.86	1.56	.66	1.20
Rejection				

The moderating effects of trauma on the relation

between day and night imagery. While the earlier analysis examining the moderating effects of symptoms of psychopathology did not support the Alternative Channels Hypothesis, it is possible that traumatic life events are more likely to invoke the repressive processes suggested by this hypothesis. In order to examine this possibility, a composite index of life events was formed by standardizing and summing participants' scores on physical punishment, perception of discipline, negative family atmosphere, parental rejection and unwanted sexual activity. Using the night imagery indices described earlier as the outcome variables, hierarchical regressions were performed.

While life events did not predict the dream index of night imagery over and above the day imagery indices, the interaction between life events and vividness of mental imagery significantly predicted night imagery (see Table 17 for the hierarchical regression statistics). Follow-up analyses were conducted by assessing the simple slopes for vividness of mental imagery at one standard deviation below and one standard deviation above the mean of traumatic life events. These regressions indicated that vivid mental imagery did not uniquely predict night imagery at higher levels of life events trauma ($B=.11$, ns), although it was predictive at lower levels. In particular, at the lower

levels of life events trauma, higher vividness of mental imagery was associated with higher levels of night imagery ($B=.48, p<.001$).² Thus, once again, these findings are more in line with the Continuity Hypothesis than the repressive processes suggested by the Alternative Channels Hypothesis.

² When the same regressions were performed using only sleep paralysis participants, the interaction was not significant (nor were there R^2 -changes of above .15) for the Daytime Imagery Index, The Carleton University Responsiveness to Suggestion Scale or the Vividness of Mental Imagery Questionnaire.

Table 17

*Hierarchical Regression Statistics Predicting the Dream
Index of Night Imagery from Daytime Imagery, Life Events and
their Interaction*

<i>Day Imagery</i>	<i>Step</i>	<i>R²</i>	<i>F</i>	<i>df</i>	<i>B</i>	<i>r</i>
<i>Predictor</i>	<i>#</i>	<i>change</i>	<i>change</i>	<i>error</i>		
Daytime	1	.17	32.14**	158	.41	.41
Imagery Index						
Life Events	2	.00	.04	157	.02	.14
Imagery *	3	.00	.37	156	.05	.14
Events						
VMIQ	1	.08	13.13**	158	.28	.28
	2	.01	2.42	157	.12	.14
	3	.02	4.06*	156	.16	.13
CURSS:0	1	.00	.75	158	-.07	-.07
	2	.02	3.24	157	.14	.14
	3	.00	.12	156	-.03	-.05

** $p < .001$, * $p < .05$

Note: CURSS:0, Carleton University Responsiveness to Suggestion Scale-Objective; VMIQ, Vividness of Mental Imagery Questionnaire.

While life events did not predict nightmare/terror imagery over and above the day imagery indices, both the interaction between life events and vividness of mental imagery as well as the interaction between life events and the daytime imagery index imagery significantly predicted nightmare-terror imagery (see Table 18 for the hierarchical regression statistics). Follow-up analyses were conducted by assessing the simple slopes separately for both the daytime imagery index and vividness of mental imagery at one standard deviation below and one standard deviation above the mean of traumatic life events. These regressions indicated that neither the daytime imagery index ($B=.11$, ns) nor vivid mental imagery ($B=-.05$, ns) uniquely predict the nightmare/terror index of night imagery at higher levels of life events trauma although it was predictive at lower levels. In particular, at the lower levels of life events trauma, higher scores on the daytime imagery index were associated with higher levels of nightmare-terror imagery ($B=.49$, $p<.001$). Similarly, at the lower levels of life events trauma, higher vividness of mental imagery was associated with higher levels of nightmare-terror imagery ($B=.35$, $p<.001$).³ Thus, once again, these findings are more

³ When the same regressions were performed using only sleep paralysis participants, the interaction was not significant (nor were there R^2 -changes of above .15) for the Daytime Imagery Index, The Carleton University Responsiveness to Suggestion Scale or the Vividness of Mental Imagery Questionnaire.

in line with the Continuity Hypothesis than the repressive processes suggested by the Alternative Channels Hypothesis.

Table 18

*Hierarchical Regression Statistics Predicting the
Nightmare/terror Index of Night Imagery from Daytime
Imagery, Life Events and their Interaction*

<i>Day Imagery</i>	<i>Step</i>	<i>R²</i>	<i>F</i>	<i>df</i>	<i>B</i>	<i>r</i>
<i>Predictor</i>	<i>#</i>	<i>change</i>	<i>change</i>	<i>error</i>		
Daytime	1	.11	18.87**	158	.33	.33
Imagery Index						
Life Events	2	.00	.04	157	.02	.13
Imagery *	3	.04	7.22*	156	.22	.26
Events						
VMIQ	1	.02	2.76	158	.13	.13
	2	.01	2.05	157	.11	.13
	3	.03	4.75*	156	.18	.17
CURSS:0	1	.00	.44	158	-.05	-.05
	2	.02	2.42	157	.12	.13
	3	.01	1.83	156	.11	.08

** $p < .001$, * $p < .05$

Note: CURSS:0, Carleton University Responsiveness to
Suggestion Scale-Objective; VMIQ, Vividness of Mental
Imagery Questionnaire.

Discussion

The primary goal of the present study was to determine the validity of the Continuity Hypothesis versus the Alternative Hypothesis to understand the psychological underpinnings for the experience of sleep paralysis. A first step to achieving this was to explore systematically the self-reported symptoms and associated aspects of the experience.

Of the total sample of university students tested, 20% reported one or more sleep paralysis experiences; the difference between men and women was not significant. This rate of occurrence is roughly consistent with rates found in studies providing participants with similar definitions of sleep paralysis, and with student samples (e.g., 29% in Cheyne, Newby-Clark & Rueffer, 1999; 28% in Cheyne, Rueffer & Newby-Clark, 1999; 21% in Spanos et al., 1995). The consistency of the results of the current study with the results of previous studies indicates the representativeness of the current sample. For example, both the current study as well as anecdotal reports (Hufford, 1982) and research (Spanos et al., 1995) found that most participants estimated the median duration of paralysis to be 5 minutes. Also consistent with other studies (Cheyne et al., 1999a; Spanos et al. 1995), fear and sensing a presence were two of the most commonly reported symptoms of sleep paralysis. These

findings indicate that the current sample was representative and thus an accurate depiction of the typical sleep paralysis experience.

As much of the information currently available on sleep paralysis is based on anecdotal reports and questionnaires based on these anecdotes, systematic analysis of descriptions of sleep paralysis from those reporting it was done to determine whether the current depiction of a 'typical' sleep paralysis episode was accurate and whether there are other dimensions not previously considered. Analysis of the interview revealed that most of the symptoms of sleep paralysis have been captured by various questionnaires assessing sleep paralysis (e.g., feeling afraid, feeling pressure on the body, sensing a presence).

However the questionnaire formats used in past studies had missed a number of symptoms. Some new symptoms included perception of a level of consciousness different from sleep or wake and reports of vivid dreams before the sleep paralysis. These new symptoms clearly have an imagery component suggesting that imagery is an important psychological underpinning for the experience of sleep paralysis. Nonetheless, without research examining the prevalence of these symptoms among individuals not demonstrating sleep paralysis, it would be premature to draw any conclusions about whether these symptoms are associated

with the experience of sleep paralysis.

Another novel finding were the reports of participants who had experienced more than one episode of sleep paralysis in terms of the similarities and differences across episodes. The variables that were different were not symptoms, but rather, factors such as the duration of the paralysis and stress levels before the paralysis. Past studies have asked for the frequency of sleep paralysis as well as the frequency of various symptoms (Cheyne et al., 1999a, 1999b), but there was no way to determine which symptoms occurred in what sleep paralysis attack since the symptoms were not separated by sleep paralysis attack. The current study suggests that although the symptoms of sleep paralysis vary between individuals, within an individual, the symptoms remain consistent. This may indicate some commonality in terms of etiology (e.g., SOREMP) of the sleep paralysis experience.

Not unlike previous studies examining sleep paralysis (e.g., Cheyne et al., 1999; Spanos et al., 1995), this study relied on university undergraduates and this may limit the generalizability of the results. Thus, while the results are consistent with previous studies that also used student samples perhaps factors such as the prevalence rates and details of the symptoms may be limited to this group. Consequently the reported symptoms of sleep paralysis may

vary in the other populations, in reality and/or in terms of self-reports.

Reports of feeling somewhat or severely tired, stressed, or overworked before the sleep paralysis experience were consistent with those found previously (Spanos et al., 1995). These findings, particularly the finding that 55% retrospectively reported feeling tired before the sleep paralysis, lends some support to the hypothesis that this factor is a possible precursor to this sleep disorder. Feeling stressed, overworked or tired may affect sleep patterns which may lead to the SOREMPs associated with sleep paralysis. Thus, sleep paralysis may not merely be a physiological event as there may be psychological and life event precursors that predispose the individual to the conditions that result in sleep paralysis.

It is important to note that in the current study, the occurrence of sleep paralysis was confirmed in two settings; the questionnaire and the interview. Consequently, it is unlikely that the sleep paralysis questionnaire lacks validity. Thus, any lack of significant differences between sleep paralysis and control participants was likely not due to poor categorization of participants.

Differences between those experiencing sleep paralysis and controls on daytime and night imagery. It was originally predicted by both theories that there should be a difference

in the extent of imagery reported by those experiencing sleep paralysis. Both theories concurred in expecting higher levels of night imagery, but they made opposite predictions about the extent of daytime imagery. However, no differences were found between controls and those experiencing sleep paralysis on either of these sets of imagery variables. This finding was not expected, and is not consistent with previous research.

One explanation is that these hypotheses may not apply to sleep disorders that are not chronic in nature. Sleep paralysis may occur on a few isolated occasions and never trouble the person again. In fact in the current study, the mean number of sleep paralysis experiences in participants was only 6.85. Perhaps in a sleep disorder in which sleep paralysis and the resulting night imagery are more chronic, the Continuity and Alternative Channels Hypotheses would be more applicable. There is some support for this possibility since the studies upon which these hypotheses were built (i.e., Starker, 1976, 1985) examined chronic sleep disorders (i.e., nightmares).

Another possible hypothesis for the lack of differences between those experiencing sleep paralysis and controls is that since a student sample was used in the current study, the extremes in imagery scores relevant to clinical diagnoses were not found. It may be that had a clinical

population been used, these differences would have been evident. Additionally, these null findings seem not to be a result of lack of power since the effect sizes (which are unaffected by sample size; Lane & Dunlap, 1978) were also minimal. It is also not likely that these null findings are due to the imagery measures given their multiplicity.

The association between day and night imagery. The Continuity Hypothesis predicted that daytime imagery would be related to night imagery. When examining the relationship between day and night imagery in all participants, it was found that two of the three measures of daytime imagery (i.e., the Daytime Imagery Index and vividness of mental imagery) were positively associated with night imagery. These findings are consistent with the Continuity Hypothesis. However, the Carleton University Responsiveness to Suggestion Scale- Objective did not predict night imagery in a meaningful way. It is possible that this measure was not associated with night imagery since it is the only scale that assessed overt responses (e.g., raising of an arm in response to the suggestion of a balloon lifting it, stroking movement with hand in response to the suggestion of patting a cat, nodding of the head in response to hearing a song) to daytime imagery. It is possible that this measure of daytime imagery is not related to night imagery since the individual has to both experience the imagery and act upon that

imagery.

The moderating effects of psychopathology and life events on the relation between day and night imagery. In line with the Alternative Channels Hypothesis, it was expected that individuals with sleep paralysis would score significantly higher on measures of psychopathology and life events trauma. The current study found no difference between the sleep paralysis and control groups on measures of psychopathology, providing no support for the Alternative Channels Hypothesis. Several studies have also found no significant differences on psychopathology (Ness, 1978; Bell et al., 1984; Ohaeri et al., 1989). This finding is contrary, however, to other studies that also used university students as participants but did find significant differences on psychopathology (Fukuda et al., 1987; Spanos et al., 1995). It is difficult to determine the cause of the inconsistent findings related to psychopathology. One potential reason for this difference is that the single multidimensional measure of psychopathology used by Spanos et al., (1995) contained some subscales that were measures of personality (i.e., self-esteem and emotionality) rather than psychopathology. This could have led to different results between these two studies.

The discrepancy between the current study and Fukuda et al. (1987) could come from the fact that the university

sample was from Japan. In Japan, unlike North America (with the exceptions of Alaska and Newfoundland), sleep paralysis has cultural folklore. The experience in Japan is known as *Kanashibari* which means the magic of Fudoh-Myohoh, one of the gods of Buddhism. Although the experience of *kanashibari* is identical to sleep paralysis, participants were not asked whether they had experienced sleep paralysis (nor were they told the symptoms and asked whether they had experienced them), rather, they were asked, 'Have you ever experienced *kanashibari*'. Given the connection of this term to belief in the supernatural and evil spirits, it is possible that its use accounts for the higher scores on paranoia in the sleep paralysis condition in Fukuda et al. (1987).

Additionally both Fukuda et al. (1987) and Spanos et al. (1995) used very large sample sizes (509 and 411 participants respectively). It is possible that very large sample sizes resulted in significant yet not meaningful differences, however since neither of these studies report effect sizes the true meaning of their results is difficult to determine. The current study found that the effect sizes for psychopathology were minimal. Relatedly, the current study did have enough sensitivity to replicate gender difference findings on psychopathology (Spanos et al., 1995), thus the null findings between sleep paralysis and control conditions was likely not due to a lack of

sensitivity of the psychopathology measures.

There was also no significant difference between participants with sleep paralysis and controls on life event trauma (i.e., physical punishment perceptions of discipline, negative family atmosphere, parental rejection and unwanted sexual activity). These null findings seem not to be a result of lack of power since, as with pathology, the effect sizes were small. This is consistent with Spanos et al. (1995) who found no significant differences between sleep paralysis and control conditions on frequency of reports of sexual and physical abuse. The current study had used a more multidimensional measure of life events than Spanos et al. (1995), in an attempt to more clearly define potential stressors. However, there was still no support for a hypothesized link between life event precursors and sleep paralysis.

As with the lack of significant differences between sleep paralysis and control participants on day and night imagery, it is possible that the lack of a significant differences on the psychopathology and life events trauma was caused by the fact that perhaps the Alternative Channels Hypothesis may not apply to sleep disorders that are not chronic in nature.

The Alternative Channels Hypothesis predicts that psychopathology and life events trauma moderate the effect

of day imagery on night imagery. A moderating psychopathology effect was found for vividness of mental imagery. In particular, it was found that in individuals low in psychopathology, high vividness of mental imagery scores were associated with high scores on the dream index of night imagery. These findings are more consistent with the Continuity Hypothesis than the Alternative Channels Hypothesis. A moderating life events trauma effect was also found for the same variable, vividness of mental imagery, when predicting each of the night imagery indices. Similar to the psychopathology findings, it was found that in individuals low in life events trauma, high vividness of mental imagery was associated with high scores on night imagery. A moderating life events trauma effect was also found for the daytime imagery index when predicting the nightmare/terror night imagery index. Again, in individuals low in life events trauma, high scores on the daytime imagery index were associated with high scores on nightmare/terror night imagery. Thus, once again, these findings are more in line with the Continuity Hypothesis than the repressive processes suggested by the Alternative Channels Hypothesis.

When examining the relationship between daytime and night imagery in all participants, it was found that two of the measures of daytime imagery (i.e., daytime imagery index

and vividness of mental imagery) were positively associated with night imagery. However, this effect was moderated by psychopathology and trauma. It could be that psychopathology and life events trauma may have some disruptive effect on day and night imagery associations.

To summarize, the results of the current study seem to suggest that in general the Continuity Hypothesis, is the best explanation for the relationship between day and night imagery since for the most part, daytime imagery was positively associated with night imagery. The results also pointed to the imagery aspect of vividness as particularly important to the experience of night imagery. However, neither the Continuity nor the Alternative Channels Hypothesis was helpful in understanding the psychological underpinnings for the unique experience of sleep paralysis. It is possible that the Alternative Channels Hypothesis would apply in a sleep disorder such as narcolepsy since sleep paralysis occurs in these patients very regularly. Thus as will be seen, in Study 2, a sample of patients under treatment of a sleep disorder where patients experience sleep paralysis (narcolepsy) on a regular basis was selected. Narcolepsy shares the same sleep-related imagery components as sleep paralysis. This commonality made it a good choice as a sleep disorder in which to examine the psychological factors that may serve as catalysts to sleep

disorders with imagery components.

STUDY 2: NARCOLEPSY

Like sleep paralysis, narcolepsy is a sleep disorder which comprises a number of striking imaginal components such as visual, auditory and tactile hallucinations. However, unlike the parasomnia form of sleep paralysis, narcolepsy is a dyssomnia with an underlying neurological basis. As a neurological disorder, research on narcolepsy has focused on the biology of the disorder such as polysomnographic correlates and the role of genetics in the disease. There has been little research on the relationship between narcolepsy and psychopathology and other sleep disorders and no research on the relationship between narcolepsy and daytime imagery. The possibility exists that environmental as well as psychological factors such as stress, anxiety and psychopathology may influence the development of narcolepsy. Conversely, narcolepsy may lead to psychological distress and even psychopathology. For some, the stress associated with the inappropriate expression of their symptoms during interpersonal interactions could lead to intense emotions which have been found to trigger cataplexy (Billiard, 1986). It is also possible that although psychological factors may not be associated with narcolepsy as a whole, they are involved in the extent to which various symptoms are expressed. Narcolepsy is a disorder characterized by excessive

sleepiness and more or less irresistible sleep attacks.

These are often associated with cataplexy, sleep paralysis and hypnagogic hallucinations, the latter two occurring during the transitions between sleep and wakefulness (ASDA, 1990; DSM-IV, 1994). Sleep attacks, cataplexy, sleep paralysis and hypnagogic hallucinations make up the four so-called 'tetrad' of symptoms characterizing the narcoleptic syndrome (Yoss & Daly, 1957).

Symptoms

Excessive Daytime Sleepiness

Excessive daytime sleepiness is evidenced by recurrent daytime naps or lapses into sleep. There appears to be no essential qualitative difference between narcoleptic sleepiness and the sleepiness of normal individuals (Dement, 1976; Parkes, 1991). This sleepiness, however differs in its duration and persistence. While normal individuals may experience brief and easily reversible episodes of drowsiness throughout the day, narcoleptics differ in that no amount of night or daytime sleep produces full alertness and they continually fight the urge to daytime sleep. Sleep may be resisted in certain circumstances for a period of time but eventually the patient falls asleep, often at inappropriate times such as in the middle of conversation or while driving. Billiard (1976) found that the mean number of unwanted sleep episodes per day was 3.6. These usually

lasted about an hour and were spontaneously terminated (Billiard, 1976).

Chronic sleepiness may also lead to periods of automatic behaviour (Billiard, 1986; Dement, 1976; Parkes, 1991). An automatic behaviour occurs when patients, while fighting a feeling of drowsiness, become less aware of their actions or speech, leading to nonsensical activities or irrelevant words or remarks in speech that may last a few seconds to a few minutes. Polysomnographic recordings of these automatic behaviours indicate repetitive microsleep episodes. A microsleep is a short lasting (less than 1 minute) burst of typically stage 1 NREM sleep and/or a short burst of synchronous theta activity (Rechtschaffen & Kales, 1968). Typically there is little or no memory for these episodes and perceptions of time passage are distorted. Although clinical descriptions of automatic behaviours indicate that they may appear almost daily (Dement, 1976; Parkes, 1991), this has not yet been confirmed empirically.

Visual problems such as blurred or double vision are also a reported clinical feature of excessive daytime sleepiness (Broughton & Ghanem, 1976; Parkes, 1991). The most commonly reported visual problems were eye fatigue (54.2%), difficulty focusing on objects (44.5%), double vision (31.4%), uncontrolled eye flickering (26.3%), eyes bothered by fluorescent lights (22.7%) and halos around

objects (22.1%) (Ferrans, Cohen & Smith, 1992). Similarly, in a survey of narcoleptics and non-narcoleptic controls, a number of visual problems, such as eye fatigue (47% of narcoleptics versus 41% of controls), defocusing (32% of narcoleptics versus 13% of controls) and flickering of eyes (24% of narcoleptics versus 12% of controls) were reported more frequently by narcoleptics (Broughton, Ghanem, Hishikawa, Sugita, Nevsimalova & Roth, 1981).

Cataplexy

In addition to excessive daytime sleepiness, cataplexy is one of the primary symptoms of narcolepsy. Cataplexy involves a sudden bilateral loss of muscle tone, usually in association with intense emotion which may last a few seconds to several minutes (ASDA, 1990; DSM-IV, 1994). Severe attacks may lead to paralysis of striated muscles, sparing only respiratory muscles. Milder episodes, which are more common, may cause sagging of the eyelids, drooping of the head or slight buckling of the knees (Karacan & Howell, 1988). Polysomnographic recordings of full body cataplexy usually show the EMG recordings becoming silent, confirming motor inhibition, whereas the EEG shows waking patterns (alpha or beta waves) (Dement, 1976).

Sleep Paralysis

Sleep paralysis, as in the sleep paralysis of individuals without narcolepsy, is the inability to perform

voluntary movements either at sleep onset or upon awakening (ASDA, 1990). Similar to the sleep paralysis experienced by non-narcoleptics, attacks last for only one to ten minutes and may occur 2 or 3 times a month (Parkes, 1991).

The percentage of narcoleptics found to experience sleep paralysis has differed among studies, ranging from 17% (Goode, 1962) to 27% (Yoss & Daly, 1957), up to as high as 64% (Rosenthal, et al., 1990). It has been hypothesized that lower prevalence may occur in some studies because sleep paralysis is not as troublesome as excessive daytime sleepiness and cataplexy. Participants may fail to report the symptom even if it is present, unless they are asked specifically about it.

As with sleep paralysis in non-narcoleptics, findings indicate that sleep paralysis in narcoleptics occurs exclusively during REM sleep, particularly at sleep onset (Dement, 1966; Hishikawa & Kaneko, 1965; Roth, Bruhova & Berkova, 1968). With the goal of determining whether sleep paralysis occurred during sleep onset REM, Hishikawa et al. (1978) repeatedly awakened narcoleptics from different states of sleep within one hour of sleep onset, and asked them about their subjective experiences just prior to awakening. In 12 out of 21 awakenings from REM sleep occurring at, or within several minutes after sleep onset, sleep paralysis was reported. In contrast, there were no

reports of sleep paralysis obtained in awakenings from NREM sleep.

Similarly Hishikawa et al. (1978) performed polysomnographic recordings of short naps in the evening and of nocturnal sleep in narcoleptic and normal participants. Participants were awakened from different states of sleep including sleep-onset REM period (SOREMP) and non-SOREMP (NSOREMP), and their subjective experiences before the awakening were retrieved. None of the control participants experienced sleep paralysis. In narcoleptic patients, it was shown that sleep paralysis was experienced during SOREMP occurring at the sleep onset or with a very short latency of less than two minutes after the sleep-onset and that these symptoms were not experienced during SOREMP occurring at a few minutes or more after the sleep-onset or during NSOREMP. The amount of alpha waves was significantly larger during SOREMP accompanied by sleep paralysis in narcoleptic patients than during the other episodes of SOREMP or NSOREMP in either narcoleptic patients or normal participants. The authors suggest that the level of consciousness in narcoleptic patients was higher during SOREMP accompanied by sleep paralysis than during other time periods of SOREMP, and also than during NSOREMP either in narcoleptic patients or in normal participants. Thus, due to a higher level of consciousness during SOREMP accompanied by sleep paralysis,

narcoleptics seem to become mentally aware of the centrally induced motor inhibition of REM sleep that prevents limb movement. This assumption is supported by the reports of the patients that they were awake while experiencing sleep paralysis (Hishikawa et al., 1978).

Hypnagogic Hallucinations

Narcoleptics may also experience hypnagogic visual, auditory and tactile hallucinations. Hallucinations are often (although not exclusively) experienced simultaneously with sleep paralysis (Goode, 1962; Ribstein, 1976; Sours, 1963). Hypnagogic hallucinations typically occur at the first sleep onset at the beginning of the night (Ribstein, 1976). Findings regarding the percentage of narcoleptics who experience hypnagogic hallucinations vary widely from 28 to 67% (Krishnan, Volow, Miller & Carwile, 1984; Sours, 1963). As with sleep paralysis in narcoleptics, this fairly large range in the prevalence of hallucinations could be due to the level of detail in questioning about the symptom. As with sleep paralysis, since hallucinations are not as troublesome as excessive daytime sleepiness and cataplexy, respondents may fail to report the symptom even if it is present.

Disrupted Nocturnal Sleep

Although not typically recognized as part of the 'tetrad' of narcoleptic symptoms, disrupted nocturnal sleep

is a common complaint and, for some, may be the major complaint (Aldrich, 1992). For example, Rosenthal et al. (1990) found that 81% of patients reported that they had trouble sleeping at night. Narcoleptics had more body movements during their sleep and woke up more frequently throughout the night, with some of these awakenings lasting one hour or more (Montplaisir, 1976; Rechtschaffen, Wolpert, Dement, Mitchell & Fisher, 1963; Scollo-Lavizzari, 1970).

Symptom Summary

The symptoms of narcolepsy consist of sleep attacks, cataplexy, sleep paralysis and hypnagogic hallucinations. Obtaining appropriate diagnosis for narcolepsy is a very common problem. Although the age of onset is generally between 18 and 30 years (Alaia, 1992), there is often a time lag of about 15 years between the onset of symptoms and correct diagnosis (Ferrans et al., 1992; Scharf, Brown, Woods, Brown & Horowitz, 1985). This difficulty in diagnosis could be ameliorated if there was more knowledge regarding the psychological correlates of the disorder.

Etiology of Narcolepsy

Epidemiological studies indicate a prevalence of 0.02% to 0.16% for narcolepsy in the adult population, with equal rates for males and females (ASDA, 1990; DSM-IV, 1994). There is a genetic factor implicated in the development of narcolepsy associated with certain human leukocyte antigens

(HLA-DR2) (Aldrich, 1990; 1992; Mignot, 1998; 2001). In this respect, 80 to 100% of narcoleptics have the HLA-DR2 phenotype versus 20-40% for normal controls (Juji, Satake, Honda & Doi, 1984; Langdon, Welsh, van Dam, Vaughan & Parkes, 1984; Seignalet & Billiard, 1984). Despite the identification of a potential genetic marker, the pathological events in the brain associated with narcolepsy in humans remain largely unknown (Aldrich, 1992).

While there may be a genetic basis for narcolepsy in many individuals (Aldrich, 1992), a few cases of narcolepsy have developed in close association with brain lesions (Aldrich & Naylor, 1989). In most, the brain pathology involved the region of the hypothalamus and areas surrounding the third ventricle, regions concerned with sleep-wake regulation, among their numerous other functions.

Despite this genetic association, having the HLA-DR2 phenotype does not necessarily mean that a person will develop narcolepsy. Of the individuals carrying this haplotype, only a few develop narcolepsy. In addition, monozygotic twins may be concordant or discordant for narcolepsy (Douglas, Harris & Pazderka, 1989; Mignot, 1998; Montplaisir & Poirier, 1987; Orellana, Villemin, Tafti, Carlander, Besset & Billiard, 1994). Thus, even if HLA-DR2 were in some fashion related to narcolepsy, its contribution would at best reflect a vulnerability factor. In effect,

other factors, including psychological variables, may ultimately promote narcolepsy in high-risk individuals.

More recently, it has been found that narcolepsy is associated with a loss of hypocretin-containing neurons (a centrally occurring peptide that appears to act as a neurotransmitter) in the CNS (Peyron et al., 2000). Although this deficiency may play a role in narcolepsy, it is important to underscore that low levels of this peptide are not always predictive of pathology (Nishino, Ripley, Overeem, Lammers & Mignot 2000). Together, these findings regarding the etiology of narcolepsy suggest that environmental factors (for example, life events trauma or psychopathology) may be additionally involved in the development of narcolepsy (Nishino, Ripley, Overeem, Lammers & Mignot, 2000).

Treatment

There is no known cure for the narcolepsy and thus the goal of treatment has been limited to the alleviation of symptoms (Broughton & Mamelak, 1979; Doghrami, 1989). Marginal symptomatic relief is available through drug treatment (Broughton & Mamelak, 1979), primarily using stimulants such as d-amphetamine and methylphenidate which combat sleepiness (Buysse, Morin & Reynolds, 1995).

Naps may also be used to help to reduce sleepiness in narcoleptics. Naps may improve alertness and psychomotor

performance without worsening nocturnal sleep disturbance

(Roehrs, Zorick, Wittig, Paxton, Sicklesteel & Roth, 1986).

A single long nap (lasting 25% of the average total sleep time) has been found to significantly improve reaction time performance over not napping, although performance on some tasks (e.g., grammatical transformation) were not improved by naps and may even have suffered (Mullington & Broughton, 1993). Thus, the role of napping in reducing daytime sleepiness is still unclear (Mullington & Broughton, 1993).

Psychological Correlates of Narcolepsy

Narcolepsy shares some of the same sleep-related imagery components as sleep paralysis. Additionally, it was hypothesized in Study 1 when examining sleep paralysis, that the mixed results may have been due to the lack of clinical sleep pathology. Narcolepsy is a sleep disorder with clinical sleep pathology. Furthermore the current understanding of the etiological basis of narcolepsy is limited, environmental as well as psychological factors such as stress, anxiety and psychopathology may influence the development of narcolepsy in high-risk individuals. These factors made it a good choice as a sleep disorder in which to examine validity of applying the Continuity Hypothesis versus the Alternative Channels Hypothesis as well as to examine the psychological factors that may serve as catalysts to sleep disorders with imagery components.

The first step to clarifying the links between narcolepsy and psychological factors is to determine whether they are linked at all. The psychological variable that has received the greatest attention is that of depression. A number of studies suggested that narcolepsy is associated with depression as measured through clinical diagnosis (Krishnan et al., 1984; Pawluk, Hurwitz, Schluter, Ullevig & Mahowald, 1995; Roth & Nevsimalova, 1975), Center for Epidemiological Studies Depression Scale (Merritt, Cohen & Smith, 1992) and the MMPI (Beutler, Ware, Karacan & Thornby, 1988; Kales et al., 1982). Thus it appears that there is some relationship between narcolepsy and depression.

Studies have found that narcoleptics score higher than controls on other measures of psychopathology such as the hysteria, mania and schizophrenia scales of the MMPI (Kales et al., 1982), the psychoticism scale of the California Personality Inventory (Sachs & Levander, 1981), as well as the obsessive-compulsive, interpersonal sensitivity, anxiety, phobic anxiety and psychoticism scales of the Symptom Checklist (Kales et al., 1982).

As with sleep paralysis in non-narcoleptics, parallels could be drawn to symptoms of sexual trauma (for example, hallucinations of footsteps, shadows or figures in the room) and the sleep paralysis of narcoleptics. No studies have yet examined the relationship between reports of abuse and

narcolepsy. It is possible that sexual and physical trauma could be a chronic stress precursor to the development of narcolepsy. It is further possible that a life event trauma has an impact on the relationship between day and night imagery and therefore affects the expression of narcolepsy in terms of experiencing episodes of sleep paralysis. This hypothesis has been expressed in relation to narcolepsy. As Bladin (2000) notes, psychoanalytic theory would predict that narcolepsy might involve a repression of sexually related thoughts into dreams. As noted earlier, the Alternative Channels Hypothesis suggests that individuals experiencing trauma will suppress daytime imagery, and as a result such thoughts are channelled into night imagery. Therefore it is possible that the experience of trauma may moderate the nature of the relationship between daytime and night imagery.

According to the Continuity Hypothesis, individuals with narcolepsy should experience more vivid daytime imagery than those who do not have this sleep disorder. It was also expected that since participants with narcolepsy experience vivid night imagery, they might also experience other types of night imagery (i.e., nightmares, night terrors, vivid dreams and hypnagogic imagery) significantly more frequently than controls.

Research Goals

The present study had two major goals. The primary goal was to determine the validity of applying the Continuity Hypothesis versus the Alternative Channels Hypothesis to narcolepsy, and to the sleep paralysis and hallucinations associated with narcolepsy.

Exploratory Research on Narcolepsy

As in Study 1, the present study examined the same conceptual variables and measures of psychopathology, life events trauma and imagery. Narcolepsy shares some of the same sleep-related imagery components as sleep paralysis. Since sleep paralysis is a symptom of narcolepsy, both the narcoleptics and the control group were given a sleep paralysis questionnaire to determine whether participants had experienced sleep paralysis. The sleep paralysis questionnaire examined the frequency of sleep paralysis and several aspects of the participants' last sleep paralysis experience such as whether it occurred at sleep onset or awakening, duration of the paralysis and body position. It was expected that the narcoleptics would report sleep paralysis significantly more often than the control participants. Also, the characteristics and accompanying features of sleep paralysis were compared between the narcoleptic with sleep paralysis and control participants with sleep paralysis.

Gender was used as an independent variable in the current study. Although there were no specific hypotheses regarding the interaction between gender and condition on the dependent variables, it was thought that due to these past differences in pathology and stress reactions, it would better to include gender as an independent variable rather than interpret main effects which may be the result of an unexamined interaction between condition and gender.

Research Regarding the Role of Imagery

An examination of the Continuity and Alternative Hypotheses in narcoleptics would test the ability of these theories to generalize to a sleep disorder with a neurological basis. It was expected that psychological factors would be associated with narcolepsy even though there is a neurological basis for this disorder. Psychological and environmental factors could be additional factors that contribute to the development of narcolepsy. As in parasomnia sleep paralysis, narcolepsy was examined applying the Continuity and Alternative Channel Hypotheses.

Hypotheses

Continuity Hypothesis

1. Those with narcolepsy would score significantly higher than controls on all measures of daytime and night imagery, and these two sets of variables would be positively correlated.

Alternative Channels Hypothesis

1. In narcoleptics, symptoms of psychopathology would moderate the effect of day imagery on night imagery. In particular, those experiencing psychopathology would be more likely to experience narcolepsy and among this group, there would be an inverse relation between day and night imagery.
2. Similarly narcoleptics would score higher on life events trauma than control participants, and among narcoleptics, the relation between day and night imagery would be negative.

Method

Participants

Narcoleptic patients ($N=71$) from the Ottawa General Hospital Sleep Disorders Centre were contacted by telephone and were asked to participate in the study (see Appendix O). Twenty-six narcoleptic participants (males, $n=10$, females, $n=16$) who agreed to take part in the study were mailed the questionnaire package. Thirty-two control participants

(males, $n=13$; females, $n=19$) were solicited through an advertisement posted throughout the Ottawa General Hospital (see Appendix P). Control participants who called regarding the advertisement, if they were still interested after a brief description of the study (see Appendix Q), were sent the questionnaire package through the mail.

Materials

All participants were mailed a package containing the informed consent form (Appendix R) and the following measures.

The Narcolepsy Questionnaire

This questionnaire (Appendix T), based on diagnostic descriptions of the symptoms of narcolepsy, was developed for the current study to assess various symptoms of narcolepsy including daytime sleepiness, automatic behaviour, vision problems, cataplexy and hallucinations. However, the sleepiness and cataplexy subscale have been used clinically (Broughton, 1995), although psychometric information is not available. In the Excessive Daytime Sleepiness Subscale, participants were presented with eight situations, such as sitting and reading, sitting and talking to someone, and being stopped in a car in traffic, and were asked to report the chance that they would fall asleep from 0 (would never doze) to 3 (a high chance of dozing). In the present study, the scale demonstrated good reliability,

Cronbach's $\alpha = .81$. The Cataplexy subscale consisted of six situations which might elicit cataplexy; for example, "Listening to a good joke", "If I was very angry" and "Suddenly seeing a long forgotten friend or acquaintance". Participants were asked to rate on a 10-point scale from never to always, the likelihood that they would experience cataplexy. In the current sample, the scale demonstrated high reliability, Cronbach's $\alpha = .93$.

Questionnaire Package

The remaining measures were identical to those used in Study 1. All of the scales demonstrated good reliability in the current sample (see Appendix S). The Carleton University Responsiveness to Suggestion to Scale (Spanos et al., 1983) was not administered in the current study since many of the narcoleptic patients lived outside of the Ottawa area and this questionnaire requires an oral administration.

Procedure

Narcoleptic patients from the Ottawa General Hospital Sleep Disorders Clinic were contacted by telephone by a female experimenter. They were provided with a brief description of the study, explaining that if they agreed to participate, a questionnaire would be sent to them asking about their sleep experiences, personality, abilities and imagery experiences. The control participants were solicited

through the posting of an advertisement throughout the Ottawa General Hospital. The advertisement asked prospective participants to telephone the experimenter if they were interested in taking part in a questionnaire study examining sleep experiences, personality, abilities and imagery experiences.

The narcoleptic and control participants who agreed to take part in the study were mailed the informed consent form, the questionnaire package, and the debriefing separately sealed with instructions not to read until the questionnaire package was completed. They were asked to complete the questionnaires at their own pace and were encouraged to telephone the experimenter if they had any questions or concerns. Participants were asked to return the questionnaires and consent form by mail in a provided stamped, addressed envelope to the Ottawa General Hospital within two weeks of receipt.

Results

Descriptive Analyses of Medications and Symptoms of Narcolepsy

Among narcoleptics, 5 (19%) individuals were taking stimulants only to treat sleepiness, 17 (65%) were taking stimulants as well as antiepileptic compounds, 1 (4%) was solely taking an antiepileptic compound, and 3 (12%) were not taking any medication for narcolepsy. Medication may

have affected narcoleptics' responses on some scales (for example, scales examining the symptoms of narcolepsy).

However, given the small sample size of narcoleptics, these participants were retained in subsequent analyses.

In relation to their sleep patterns, the mean reported number of awakenings through the night for narcoleptics was 2.5 ($SD=1.35$) and the median reported total time awake through the night was 30 minutes. The mean reported total time in bed was 7.41 hours ($SD=1.62$). These findings related to disrupted night sleep are consistent with past research (e.g., Rosenthal et al., 1991).

Similar to Billiard (1976), it was found that the average number of naps during the day was 2.77 ($SD=1.24$), with a median total nap time of 67.5 minutes and the average chance of falling asleep was 2.0 times per day? ($SD=.45$).

Results related to amnesic automatic behaviour were similar to past research (Dement, 1976; Parkes, 1991) in that 38.5% ($n=10$) of narcoleptic participants reported amnesic automatic behaviour. The average number of times per week that automatic behaviour occurred was 1.5 ($SD=1.41$, $n=7$) and episodes lasted for an average of 2.1 minutes ($SD=1.12$, $n=10$).

Similar to Ferrans, Cohens & Smith (1992) episodes of blurred vision were reported by 52% ($n=13$) and episodes of

double vision were reported by 32% ($n=8$) of narcoleptic participants.

The mean score on the cataplexy scale was 4.22 ($SD=2.88$) which indicated that the narcoleptics would sometimes fall asleep in these situations. Participants also reported whether they usually had hallucinations during cataplexy. Consistent with Guilleminault (1976) and Mitler & Gujavarty (1986), only 3.4% ($n=2$) experienced visual hallucinations (e.g., seeing a person who was not really in the room), 5.2% ($n=3$) experienced auditory hallucinations (e.g., hearing a voice that was not real,) and 22.4% ($n=13$) experienced other unusual body sensations (such as tingling, or pressure).

Participants also reported on hallucinations that did not occur during cataplexy. The majority, 57.7% ($n=15$), reported having hallucinations less than once per month, 15.4% ($n=4$) had hallucinations less than once per week, and 7.7% ($n=2$) had hallucinations daily. Duration of the hallucinations ranged from 30 seconds to 35 minutes ($M=6.32$, $SD=8.63$; median=5). Forty-two percent of participants reported visual hallucinations ($n=11$) and 26.9% ($n=7$) reported auditory hallucinations. All of these findings are similar to results found in previous research on hallucinations (Krishnan, Volow, Miller & Carwile, 1984;

Sours, 1963). Taken together, these results indicated that the narcoleptics experienced the common tetrad of narcolepsy symptoms. In addition, they also experienced symptoms that have not been commonly investigated in the narcolepsy literature, such as vision disturbances and automatic behaviour.

*Descriptive Analyses Exploring Sleep Paralysis in
Narcoleptics*

Overall 20 out of 26 (76.9%) (females $n=6$; males, $n=14$) narcoleptics experienced sleep paralysis at least once. The percent of narcoleptics reporting sleep paralysis in the current study was consistent with other studies that have asked specifically about this symptom (Rosenthal et al., 1990). Most participants could not give a specific number of times that they had experienced sleep paralysis, but rather, they reported that they had experienced it "many" times (85%). The age that participants reported having their first sleep paralysis experience ranged from 12 to 40 years ($M=25.74$, $SD=9.26$).

In describing their last sleep paralysis experience, 55% ($n=11$) of narcoleptics reported that the paralysis occurred upon awakening, 5% ($n=1$) reported that it occurred before falling asleep and 40% ($n=8$) did not know. The estimated duration of the episode ranged from 10 seconds to 1 hour with a median duration of 2.5 minutes which is

consistent with past research (e.g., Parkes, 1991).

The percent of participants experiencing various symptoms of sleep paralysis during their last (or only) experience are presented in Table 19. The experiences most commonly associated with sleep paralysis were being afraid (80%; $n=16$), sensing a presence (45.0%; $n=15$) and feeling touched (65%; $n=13$).

Participants also reported whether they felt tired, stressed or overworked before their sleep paralysis experience. Seventy percent ($n=14$) reported feeling somewhat or severely tired before the sleep paralysis experience. Twenty-five percent ($n=5$) reported being somewhat or severely stressed before the sleep paralysis experience. Twenty-five percent ($n=5$) reported being somewhat or severely overworked before the sleep paralysis experience.

Table 19

*Percent of Narcoleptics with Sleep Paralysis Reporting
Various Symptoms*

	Yes		No	
	Percent	<i>n</i>	Percent	<i>n</i>
Presence	75	15	25	5
See a person	45	9	55	11
Pressure on chest	50	10	50	10
Hear footsteps	55	11	45	9
Hear name	15	3	85	17
Felt touched	65	13	35	7
Floating sensation	20	4	80	16
Unusual noises	45	9	55	11
Unusual sights	25	5	75	15
Unusual body sensations	45	9	55	11
Afraid	80	16	20	4

Assessing Sleep Paralysis in Control Participants

Overall 6 out of 32 (18.7%) (females, $n=3$; males, $n=3$) controls without narcolepsy experienced sleep paralysis at least once. The mean number of sleep paralysis experiences reported was 8 ($SD=3.43$) and the median was 3.00. The age that participants reported having their first sleep paralysis experience ranged from 14 to 30 years ($M=20.67$, $SD=5.16$). These participants were removed from subsequent analyses in order to have a control group that was neither diagnosed with narcolepsy nor had experienced sleep paralysis.

Assessing Theoretical Predictions

Theoretical predictions regarding differences between narcoleptic and control (eliminating those who report sleep paralysis) participants and their fit with the Continuity and Alternative Channels Hypotheses were assessed through MANOVAs with follow-up univariate F -tests for significant multivariate effects. Analyses with significant results were considered meaningful, as were results with effects sizes of greater than .15. Control of family-wise error rate, where applicable, was considered within each hypothesis through the use of Bonferroni corrections. Finally, hierarchical regressions were performed to assess the relations among day and night imagery, and the moderating effects of pathology or previous life traumas.

The Continuity Hypothesis

The Continuity Hypothesis predicts that participants with narcolepsy should experience both more daytime and night imagery than those without narcolepsy. Based on the pattern of relations⁴, a 2X2 (Condition: narcolepsy/controls X Gender) MANOVA was conducted on 8 daytime imagery subscales. Results indicated no significant multivariate effects for narcolepsy condition, Pillais=.15, $F<1$ (see Table 20 for relevant means and standard deviations); gender, Pillais=.12, $F<1$, nor a significant multivariate interaction between narcolepsy condition and gender on these daytime imagery variables, Pillais=.12, $F<1$. A 2X2 (Condition: narcolepsy/controls X Gender) univariate ANOVA was conducted on Vividness of Mental Imagery. Results indicated no significant effects for condition, $F(1, 48)=2.82$, *ns*, $\eta^2=.06$ (see Table 20); gender $F<1$, $\eta^2=.01$; nor their interaction, $F(1, 48)=2.47$, *ns*, $\eta^2=.06$. It appears that individuals with narcolepsy did not experience more Vividness of Mental Imagery than those without narcolepsy.

4 The pattern of relation among the daytime imagery variables was similar to Study 1, indicating moderate significant correlations among all variables except the Vividness of Mental Imagery Questionnaire, and none above .90.

Table 20

*Means and Standard Deviations for Daytime Imagery Variables
as a Function of Condition (Narcolepsy/Control)*

	Condition			
	Narcolepsy		Control	
	(n=26)		(n=26)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
ICMI	16.84	7.25	17.92	8.49
DES	12.07	8.19	7.87	6.25
Absorption	63.38	16.94	64.69	18.77
PPI-XT	.30	.15	.27	.15
PPI-PB	.44	.24	.30	.26
PPI-LB	.51	.28	.45	.24
Perceptual Aberration	3.23	2.24	3.84	3.85
Magical Ideation	6.11	4.31	5.84	4.02
VMIQ	61.88	17.35	68.00	15.54

Note: ICMI, Inventory of Childhood Memories and Imaginings; DES, Dissociative Experience Scale; PPI-XT, Personal Philosophy Inventory-Temporal Lobe Signs; PPI-PB, Personal Philosophy Inventory-Paranormal Beliefs; PPI-LB, Personal Philosophy Inventory-Liberal Beliefs; VMIQ, Vividness of Mental Imagery Questionnaire.

Based on the pattern of relations among the night imagery variables⁵, two MANOVAs were performed. The first 2X2 (Condition: narcolepsy/controls X Gender) MANOVA was conducted on the nightmare and night terror variables. Results indicated no significant multivariate effect for narcolepsy condition, Pillais=.09; $F(3, 46)=1.64$, *ns* (see Table 21 for relevant means and standard deviations). There was no significant multivariate main effect for gender, Pillais=.03; $F<1$, nor the interaction between experiencing narcolepsy and gender, Pillais=.07; $F(3, 46)=1.10$, *ns*.

The second 2X2 (Condition: narcolepsy/controls X Gender) MANOVA was conducted on vivid dreams, hypnagogic imagery and hypnopompic imagery. Results indicated no significant multivariate effect for condition, Pillais=.09; $F(3, 46)=1.50$ (See Table 21 for relevant means and standard deviations) gender, Pillais=.03; $F<1$, nor a significant multivariate interaction, Pillais=.04; $F<1$.

In sum, it appears that individuals with narcolepsy did not experience more night imagery as measured by these variables than those without narcolepsy. The prediction made by both the Continuity Hypothesis and the Alternative Channels Hypothesis that narcoleptics should score

⁵ The pattern of relation among the night imagery variables was similar to Study 1, indicating the same two sets of variables with moderate significant correlations among variables in each set, and none above .90.

significantly higher than controls on measures of night

imagery was not supported.

Table 21

Means and Standard Deviations for Night Imagery Variables as a Function of Condition (Narcolepsy/Control)

	Condition			
	Narcolepsy		Control	
	(n=26)		(n=26)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Night	.31	.54	.24	.43
Terrors				
before 12				
Night	.42	.81	.19	.40
Terrors				
After 12				
Nightmares	1.15	.61	.89	.52
Vivid	2.11	.99	1.66	.94
Dreams				
Hypnagogic	1.50	1.06	1.42	.99
Imagery				
Hypnopompic	1.50	1.07	1.19	.85
Imagery				

Alternative Channels Hypothesis

In line with the Alternative Channels Hypothesis, it was necessary to determine whether there were significant differences between narcoleptic participants and controls on measures of psychopathology and life events trauma. In order to assess the relationship among the psychopathology variables, the correlations among these variables were examined. All of these indicators were moderately correlated⁶, and so were assessed in a 2X2 (Condition: narcolepsy/controls X Gender) MANOVA. Results indicated no significant multivariate effects for condition, Pillais=.12, $F < 1$ (see Table 22 for relevant means and standard deviations), gender, Pillais=.13, $F < 1$, nor a significant interaction, Pillais=.03, $F < 1$. Thus, the Alternative Channels Hypothesis prediction that narcoleptics should score significantly higher than controls on measures of psychopathology was not supported.

⁶ The pattern of moderate significant correlations was similar to that in Study 1, with no correlations above .90.

Table 22

*Means and Standard Deviation for Psychopathology Variables
as a Function of Condition (Narcolepsy/Control)*

	Condition			
	Narcolepsy		Control	
	(n=26)		(n=26)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Obsessive	1.28	1.01	1.02	.72
Compulsiveness				
Interpersonal	.88	.61	.79	.69
Sensitivity				
Depression	4.82	3.50	4.02	3.28
Anxiety	.79	.83	.60	.60
Hostility	.65	.51	.83	.77
Phobic Anxiety	.56	.87	.24	.59
Paranoid	.85	.73	.78	.74
Ideation				
Psychoticism	.59	.65	.45	.62

The association between day and night imagery and the moderating effects of psychopathology in narcoleptics. Both the Continuity and Alternative Channels Hypotheses predict an association between day and night imagery. However, while the Continuity Hypothesis predicts a positive association, the Alternative Channels Hypothesis predicts that psychopathology moderates the effect of day imagery on night imagery, in that among those with symptoms of a psychopathology, the relation between these variables should be negative. A composite index of psychopathology, and daytime imagery (as in Study 1, the Vivid Mental Imaginings Scale remained separate) were formed. Scores on pathology and imagery were then standardized, and their product computed to assess their interaction.

Participants' scores on night imagery also formed two indices (i.e., dream index and nightmare/terror index), and hierarchical regressions were performed in narcoleptics only, in which the night imagery indices was regressed first onto the standardized main effect of the daytime imagery variable of interest (i.e., Daytime Imagery Index and Vividness of Mental Imagery), second onto, the standardized main effect of psychopathology, and finally, onto the interactions between the daytime imagery variable of interest and psychopathology. Neither the Daytime Imagery Index ($R^2_{\text{change}}=.07$, $F(1, 24)=1.92$, ns) nor vividness of

mental imagery ($R^2_{\text{change}}=.01$, $F<1$) predicted the dream index of night imagery in a meaningful way (i.e., R^2_{change} greater than .15; see Table 23 for the hierarchical regression statistics). This suggests no support for the Continuity Hypotheses of a relationship between day and night imagery. The interactions in the Daytime Imagery Index ($R^2_{\text{change}}=.02$, $F<1$) and the vividness of mental imagery ($R^2_{\text{change}}=.02$, $F<1$) were not significant either, indicating that psychopathology was not a moderator of the relation between day and night imagery, contrary to expectations delineated by the Alternative Channels Hypothesis.

Neither the Daytime Imagery Index ($R^2_{\text{change}}=.04$, $F<1$) nor vividness of mental imagery predicted the nightmare/terror index of night imagery, ($R^2_{\text{change}}=.01$, $F<1$); see Table 24 for the hierarchical regression statistics). The interactions in the Daytime Imagery Index ($R^2_{\text{change}}=.00$, $F<1$) and vividness of mental imagery ($R^2_{\text{change}}=.02$, $F<1$) were not significant either, indicating that psychopathology was not a moderator of the relation between day and night imagery, contrary to expectations delineated by the Alternative Channels Hypothesis.

Table 23

*Hierarchical Regression Statistics Predicting the Dream
Index of Night Imagery from Daytime Imagery, Psychopathology
and their Interaction*

	Step	R ²	F change	df	B	r
	#	change		error		
Daytime Imagery	1	.07	1.92	24	.27	.27
Index						
Psychopathology	2	.06	1.49	23	.18	.32
Imagery x	3	.02	.40	22	-.13	-.03
Psychopathology						
VMIQ	1	.01	.36	24	-.12	-.12
	2	.09	2.25	23	.31	.32
	3	.02	.44	22	-.14	-.21

Note: VMIQ, Vividness of Mental Imagery Questionnaire.

Table 24

*Hierarchical Regression Statistics Predicting the
Nightmare/terror Index of Night Imagery from Daytime
Imagery, Psychopathology and their Interaction*

	Step #	R ² change	F change	df	B	r
					error	
Daytime Imagery	1	.04	.97	24	.19	.19
Index						
Psychopathology	2	.02	.39	23	.14	.19
Imagery x	3	.00	.00	22	.01	.07
Psychopathology						
VMIQ	1	.01	.14	24	.08	.08
	2	.05	1.21	23	.23	.19
	3	.02	.41	22	-.14	-.14

Note: VMIQ, Vividness of Mental Imagery Questionnaire.

The role of traumatic life events. In order to assess the relationship among the life events trauma variables, the correlations among these variables were examined. All of these indicators were moderately correlated⁷, and so were assessed in a 2x2 (Condition: narcolepsy/controls X Gender) MANOVA. There were no significant multivariate effects for condition, Pillais=.12, $F(5,44)=1.14$, ns (see Table 24 for means and standard deviations), gender (Pillais=.14, $F(5,44)=1.37$, ns, nor the narcolepsy condition by gender interaction, Pillais=.13, $F(5,44)=1.27$, ns. Thus, the Alternative Channel Hypothesis prediction that individuals with narcolepsy should experience more life events trauma than individuals without narcolepsy was not supported.

⁷ The pattern of moderate significant correlations was similar to that in Study 1, with no correlations above .90.

Table 25

*Means and Standard Deviation for Life Event Trauma Variables
as a Function of Condition (Narcolepsy/Control)*

	Condition			
	Narcolepsy		Control	
	(n=26)		(n=26)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Unwanted Sexual Activity	.31	.87	.16	.37
Physical Punishment	2.07	2.22	1.77	2.00
Perception of Discipline	2.23	2.96	2.65	3.45
Negative Family Atmosphere	1.65	1.83	1.85	2.57
Parental Rejection	.73	1.42	1.46	1.83

The moderating effects of trauma on the relation between day and night imagery in narcoleptics. While the earlier analysis examining the moderating effects of symptoms of psychopathology in narcoleptics did not support the Alternative Channels Hypothesis, it is possible that traumatic life events were more likely to invoke the repressive processes suggested by this hypothesis. In order to examine this possibility, a composite index of life events was formed, as in Study 1. In narcoleptics only, using the night imagery indices described earlier as the outcome variables, hierarchical regressions were performed (see Table 25 for hierarchical regression statistics). While the life events trauma did not predict the dream index of night imagery among narcoleptics, over and above day imagery, the interactions of life events trauma with the Daytime Imagery Index ($R^2_{\text{change}} = .01$, $F < 1$) and the vividness of mental imagery ($R^2_{\text{change}} = .01$, $F < 1$) regressions were also not significant, indicating that life events trauma was not a moderator between day and night imagery, providing no support for the Alternative Channels Hypothesis.

While the life events trauma did not predict the nightmare/terror index of night imagery among narcoleptics, over and above day imagery, the interactions of life events trauma with the Daytime Imagery Index ($R^2_{\text{change}} = .02$, $F < 1$) and the vividness of mental imagery ($R^2_{\text{change}} = .01$, $F < 1$; see Table

26) regressions were also not significant, indicating that life events trauma was not a moderator between day and night imagery, providing no support for the Alternative Channels Hypothesis.³

³ Univariate analyses comparing narcoleptics with sleep paralysis (n=20) to those without sleep paralysis (n=6) on daytime and night imagery, psychopathology and life events trauma revealed no significant differences.

Table 26

*Hierarchical Regression Statistics Predicting the Dream
Index of Night Imagery from Daytime Imagery, Life Events and
their Interaction*

<i>Day Imagery Predictor</i>	<i>Step #</i>	<i>R² change</i>	<i>F change</i>	<i>df</i>	<i>B</i>	<i>r</i>
Daytime Imagery	1	.07	1.92	24	.27	.27
Index						
Life Events	2	.08	2.09	23	.28	.32
Imagery x Events	3	.01	.32	22	-.14	.09
VMIQ	1	.01	.36	24	-.12	-.12
	2	.09	2.32	23	.32	.32
	3	.01	.17	22	.14	-.21

Note: VMIQ, Vividness of Mental Imagery Questionnaire.

Table 27

Hierarchical Regression Statistics Predicting Nightmare-terror Index of Night Imagery from Daytime Imagery, Life Events and their Interaction

Day Imagery Predictor	Step #	R ² change	F	df	B	r
Daytime Imagery	1	.04	.97	24	.19	.19
Index						
Life Events	2	.03	.61	23	.16	.19
Imagery x Events	3	.02	.39	22	.16	.00
VMIQ	1	.01	.14	24	.08	.08
	2	.05	1.32	23	.25	.19
	3	.01	.30	22	-.14	.00

Note: VMIQ, Vividness of Mental Imagery Questionnaire.

Discussion

The primary goal of the present study was to determine the validity of applying the Continuity Hypothesis versus the Alternative Channels Hypothesis to narcolepsy. Narcolepsy shares some of the same sleep-related imagery components as sleep paralysis. This commonality made it a good choice as a sleep disorder in which to examine the psychological factors that may serve as catalysts to sleep disorders with imagery components. Since the current understanding of the etiological basis of narcolepsy is limited, environmental as well as psychological factors such as stress, anxiety and psychopathology may influence the development of narcolepsy in high-risk individuals. Study 1 seemed to suggest that, in general, the Continuity Hypothesis was the best explanation for the relationship between day and night imagery, as daytime imagery (and in particular vividness of mental imagery) predicted night imagery. However, neither the Continuity nor the Alternative Channels Hypothesis was helpful in understanding the psychological underpinnings for the experience of sleep paralysis. It was thought that if a clinical population were used, for whom the experience of sleep paralysis was more chronic, perhaps the differences predicted by the hypotheses between those with sleep paralysis and controls would have been evident. Narcolepsy fits this description and hence,

this was another important reason for choosing narcolepsy as the sleep disorder of interest in the current study.

Inherent in the examination of a rare sleep disorder like narcolepsy (given a prevalence of about of 0.02% in the adult population), is the difficulty in getting a sufficient sample size. Therefore the results of the current study should be interpreted with caution due to the small sample size. This said, the consistency of the symptom results of the current study with those of previous studies indicates the representativeness of the current sample. For example, both the current study as well past research found that narcoleptics, on average, reported a moderate chance of falling asleep during various everyday situations (Billiard, 1976). Consistent with clinical descriptions (Dement, 1976; Parkes, 1991; Thorp, 1976), participants reported occurrences of automatic behaviour. As with other studies, there were reports of visual disturbances (Ferrans, Smith and Cohens, 1992). Also consistent with previous research (Krishnan, Volow, Miller & Carwile, 1984; Sours, 1963), 42% of narcoleptics reported visual hallucinations and 27% reported auditory hallucinations. These findings demonstrate the representativeness of the current sample of narcoleptics.

In the present study, the rate of occurrence of narcoleptics who reported sleep paralysis was roughly

consistent with rates found by Rosenthal et al. (1957) who also used specific questioning about sleep paralysis. It is interesting to note that when asked to report the number of times that they had experienced sleep paralysis, most participants could not give a specific number but rather reported that they had experienced it *many* times. This further supports the decision to examine narcolepsy in Study 2 as among this sample, the rate of occurrence was more chronic and so perhaps the relation between day and night imagery would be more evident.

Consistent with past research (Parkes, 1991), narcoleptic participants reported median sleep paralysis duration of 2.5 minutes. It was found that the experience most commonly associated with sleep paralysis was fear (80%), sensing a presence (45%) and feeling touched (65%). The only hallucinatory experience during the paralysis that was novel for this group was hearing footsteps that were not really there. None of the non-narcoleptics with sleep paralysis reported hearing this while 55% of the narcoleptics with sleep paralysis reported hearing them. Further, it is interesting to note that none of the non-narcoleptics with sleep paralysis reported any auditory symptoms while in the narcoleptic condition, 15% ($n=3$) reported hearing their name being called and 25% ($n=5$) heard other unusual sounds. Previous studies have hypothesized

that auditory hallucinations during sleep paralysis involve pontine-driven oculomotor or middle ear activity (Cheyne, Rueffer & Newby-Clark, 1999). The findings of the current study could indicate that sleep paralysis of narcoleptics involves pontine-driven oculomotor or middle ear activity. Further investigation of this finding could point to physiological correlates of sleep paralysis in narcoleptics leading to a better understanding of the still unclear etiology of narcolepsy.

Narcoleptics did not differ from control participants with sleep paralysis on the duration of sleep paralysis or the age of their first sleep paralysis experience. Thus, it appears that the experience of sleep paralysis did not differ between those with narcolepsy and those without. This would be consistent with findings that indicate that sleep paralysis in both narcoleptics and non-narcoleptics are caused by the same mechanisms (Takeuchi et al., 1992). However, this conclusion should be interpreted with caution due to differences in samples (Study 1 used a student sample, while Study 2 used a clinical sample), as well as the small sample size in Study 2.

Differences between narcoleptics and controls on daytime and night imagery. Despite the use of a clinical sample that experienced more chronic episodes of sleep paralysis, findings from this study again failed to find

support for the Continuity Hypothesis prediction that individuals with narcolepsy would experience more vivid daytime imagery than those without narcolepsy, or other types of night imagery. One explanation is that perhaps chronicity of the sleep disorder is not an important factor to the relationship between day and night imagery. Despite the small sample size, these null findings are likely not a result of lack of power since the effect sizes were small, and given the replication with Study 1. It is also not likely that these null findings were due to the imagery measures given their multiplicity.

The association between day and night imagery in narcoleptics. In Study 1, it was found that daytime imagery predicted night imagery. In the current study, the relationship between daytime and night imagery was examined specifically in narcoleptics to determine whether this relationship was replicable among narcoleptics. Neither the Daytime Imagery Index nor vividness of mental imagery predicted night imagery. Indeed, the proportions of variance in night imagery predicted by vividness of mental imagery and the Daytime Imagery Index was small. It could be that due to the small sample size and the directed focus on narcoleptics, there was a restricted range of responses, which resulted in a nonsignificant relationship between daytime and night imagery. Alternatively, this relation was

not evident in Study 1 among those with some form of other pathology or past trauma.

The moderating effects of psychopathology and life events on the relation between day and night imagery. The current study found no difference between the narcolepsy and control groups on measures of psychopathology and life events trauma. Again, these null findings are likely not a result of lack of power since the effect sizes were small. It is also not likely that these null findings are due to the psychopathology and life events trauma measures given their multiplicity.

The Alternative Channels Hypothesis predicts that psychopathology and life events trauma moderate the effect of day imagery on night imagery. In Study 1, when examining all participants, a moderating effect was found on the relation between vividness of mental imagery and night imagery, in that only among individuals low in psychopathology (or life events trauma), high daytime imagery vividness scores were associated with high scores on night imagery. Additionally, among individuals low in life events trauma, high scores on the daytime imagery index were associated with high scores on the nightmare/terror index of night imagery, but not among those demonstrating symptoms of a pathology or life events trauma. In Study 2, neither psychopathology nor life events trauma moderated the

relationship between day and night imagery in narcoleptics.

Although there is no evidence to support this, another alternative explanation is that the sample of narcoleptics who agreed to participate in the study were different from those who did not, either in the nature of their disorder or their levels of reporting. It was possible that the narcoleptics who participated had less severe symptomology. It was also possible that these narcoleptics, in fact had the same severity in symptomology, but also had a tendency to respond to self-report scales at levels that were lower than their actual experience. Only 12% of the narcoleptics who participated in this study were not on medications for their sleepiness or for cataplectic attacks. This medication may have affected their responses on the scales, for instance some medications for cataplectic attacks may also be anti-depressants and consequently narcoleptics may have scored in a range similar to controls on certain variables (e.g., depression, anxiety) while on this medication. Therefore, the Alternative Channel Hypothesis prediction that narcoleptics should score higher on measures of psychopathology (e.g., depression, anxiety and phobic anxiety) may not have been found due to these medications. Also, these medications may have reduced REM fragmentation resulting in less night imagery (e.g., nightmares; Broughton, 1982). This may have had an impact of finding no

support for either the Continuity or Alternative Channels

Hypothesis. If this medication was removed, narcoleptics may have scored higher on night imagery, and psychopathology measures and an association may have been found between day and night imagery. On a more practical level, narcoleptics who were on medications were not excluded from the analyses, as this would have even further compromised the sample size.

Within the framework of unifying and linking day and night imagery, the question of whether there was a relationship between imagery associated with sleep (and its disorders) and waking imagery was the primary focus of the current research. Both studies presented in the current investigation were designed to examine the validity of applying the Continuity Hypothesis versus the Alternative Channels Hypothesis to understanding the association between day and night imagery among individuals with sleep disorders with an imaginal component.

The Continuity Hypothesis (Starker, 1974; 1977; 1985) predicts a positive relationship between the imaginative activities of wakefulness and imagery that is associated with sleep. This theory suggests that individuals who tend to become absorbed in vivid imaginal activities while awake are likely to be absorbed in night imagery. Consistent with this, Starker (1976, 1985) found that daytime imagery in the form of impossible and bizarre daydreams was related to the sleep disturbances of nightmares.

Based on this and the results of other studies, it was expected that persons with sleep paralysis (Study 1) and narcolepsy (Study 2) would experience more daytime and night imagery than those who did not have these sleep disorders. No support was found for this hypothesis. Additionally, the

Continuity Hypothesis predicted that daytime imagery would be related to night imagery. When examining the relationship between daytime and night imagery among participants in Study 1, a multidimensional measure of imagery (i.e., the Daytime Imagery Index) as well as vividness of mental imagery indeed positively predicted night imagery. In Study 2, however, which assessed whether this relationship held in narcoleptics, daytime imagery did not predict night imagery. This implies that the Continuity Hypothesis, in general, provides insight into the nature of the relationship between daytime and night imagery. However, it is not helpful in understanding the psychological underpinnings of narcolepsy.

The Alternative Channels model suggests that individuals experiencing trauma and psychopathology would suppress daytime imagery and as a result, such thoughts are channelled into night imagery such as sleep disorders with imaginal components. Support for this hypothesis was not found in either Study 1 or Study 2. Individuals with sleep paralysis or narcolepsy did not score significantly higher than control participants on measures of psychopathology and life events trauma. However, in Study 1, a moderating effect of psychopathology and life events trauma was found for the vividness of mental imagery. More specifically, among individuals low in psychopathology (or low in life events trauma), high vividness of mental imagery scores were

associated with high scores on both indices of night imagery, but not among those demonstrating symptoms of a pathology or life events trauma. Additionally, among individuals low in life events trauma, high scores on the daytime imagery index were associated with high scores on the nightmare/terror index of night imagery, but not among those demonstrating symptoms of a pathology or life events trauma. A moderating effect of symptoms of psychopathology and life events trauma was not found among narcoleptics in Study 2.

On the surface these results suggest greater support for the Continuity Hypothesis, given the positive relations between day and night imagery in Study 1. However, since the positive relations between day and night imagery did not hold among those who experienced pathology symptoms (including narcolepsy) or life event trauma, this might provide some tentative support for an alternative-channels-like explanation. While the lack of a negative relationship undermines the notion of a repressive mechanism, the significant reduction in the relationship between day and night imagery among these groups, suggests that the pathology may have some disruptive effect on day and night imagery associations.

Although pathology and SOREMPs have not been specifically discussed as disrupting factors in neither the

Continuity Hypothesis nor the Alternative Channels

Hypothesis literature, the results of the current thesis as well as three converging lines of research suggest that they may be. First, past research supporting either the Continuity and Alternative Channels Hypotheses have *all* examined the relationship between daytime and night imagery in sleep disorders that are not associated with SOREMP (Starker, 1976, 1985). This implies that it is possible that the validity of applying the Continuity and Alternative Channels Hypotheses may be limited to sleep disorders that are not associated with SOREMPs and that, due to the focus thus far on sleep disorders not related to SOREMP, this limitation had not yet been discerned or tested. Second, SOREMPs and shortened REM sleep latency have been linked to pathology such as depression (Kupfer & Foster, 1972; Schulz, Lund, Cording & Dirlich, 1979), bipolar disorder and mania (Hudson et al., 1992) and schizophrenia (Keshevan, Reynolds & Kupfer, 1990; Tandon, Shipley, Taylor, Greden, Eiser, DeQuardo, & Goodson, 1992). This implies that pathology may be a disruptor due to its association with SOREMP. Third, pathology and SOREMPs have been linked to the disruption of normal cognitive links. For example, Dement (1955) correlated the lack of dream recall in schizophrenia to reduction in REM sleep latency. This implies that in individuals with pathology, SOREMP may impact cognitive

links between day and night. It may be that pathology and perhaps associated SOREMPs may disrupt other cognitive links between day and night such as imagery. Taken together, the current thesis as well as these three lines of research suggests that pathology and possibly SOREMP may have some disruptive effect on day and night imagery associations. They also point to the need for future research examining SOREMP and other aspects of sleep paralysis and imaginal events (e.g., the sleep stage in which they occur, their frequency of occurrence, the total amount of imagery experienced during the sleep disturbance) to assess their relationship with daytime imagery. This could provide insight into moderators of imagery continuity, to the extent that it exists.

A number of limitations to the present studies should be noted. First, as almost inevitably is the case when examining sleep disorders, this is a quasi-experimental design and therefore the results should be interpreted cautiously. Quasi-experimental designs lack the control provided by experiments, therefore uncontrollable (and unpredictable) factors may have influenced the results on these studies. For example, perhaps uncontrollable and unknown factors present *before* the onset of a sleep disorder impacts on the relationship between the sleep disorder and daytime imagery. Perhaps the extent of daytime imagery

experienced before the onset of the sleep disorder somehow impacts on the relationship between daytime and night imagery after the onset of the sleep disorder. In the current studies, it was impossible to know an individual's level of daytime imagery before the onset of their sleep disorder and thus not possible to assess how this may have impacted the current findings.

Additionally, because of this lack of control, definitive statements cannot be made about cause and effect. For instance, although a relationship was found in Study 1 between daytime and night imagery, it is possible that the nature or extent of daytime imagery experienced impacted on the nature or extent of night imagery experienced (for example, maybe a daydream with all of its associated imagery aspects impacts on the imagery of a dream). Another alternative is that the amount of night imagery impacts on the nature or extent of daytime imagery experienced (for example, perhaps a dream with all its associated imagery stimulates daytime imagery as a daydream). Or, as previously discussed, there could be some third unknown and uncontrolled factor impacting the relationship.

Another limitation was that the measures used in these studies were self-report measures. Self-report measures rely exclusively on participants' reports of their experiences. Consequently, these measures depend on the participants'

willingness and ability to report on the phenomenon of interest. Despite the fact that the current studies used multiple measures of imagery, it is possible that all of these measures were subject to bias due to their self-report nature. For example, individuals without pathology may have deduced that day and night imagery should be positively related, and hence biased their responses to reflect this, while those who have experienced pathology may have a vested interest in not showing such a relation (e.g., they may be more likely to espouse the psychodynamic properties of dreams). In order to detect response biases, such as the tendency to endorse unusual experience, measures of acquiescent tendencies should be included in future research.

In addition, future studies should attempt, where possible, to include non-self-report measures to corroborate the phenomenon of interest. For example, performance measures of imagery, which are usually linked to the controllability of mental imagery (such as mental rotation or scanning), could be used. In a related vein, future research examining the linkage between daytime and night imagery could examine other aspects of the relationship between day and night imagery, for instance, the ability to control imagery across day and night. Tasks of mental rotation could be compared to reports of the night imagery

that are said to be controllable (e.g., lucid dreams). Other aspects of imagery such as modality of imagery (e.g., visual, auditory, olfactory etc.) or affective responses (e.g., fear, anxiety etc.) to imagery could also be examined to determine whether there is a relationship between daytime imagery and night imagery. Examinations of other aspects of imagery and the relationship between daytime and night measures of these aspects could shed light on the results of the current study. It is possible that the Continuity and Alternative Channels Hypotheses are valid explanations of the relationship between daytime and night imagery in individuals with sleep disorders with imaginal components. However, perhaps these are valid explanations not for the aspects of imagery assessed in the current study (e.g., absorption, imaginativeness, fantasy proneness) but rather for other aspect of imagery such as the ability to control imagery across day and night. This could be the case since past research has found that pathology such as neuroticism does not correlate with imagery vividness but does correlate with ability to control imagery (Richardson, 1994). Thus, perhaps psychopathology and life events trauma only moderate the relationship between day and night imagery in the manner predicted by the Alternative Channels Hypothesis when the measure of daytime imagery is correlated with the pathology.

In light of the limitations of the present research,

the results nonetheless provide insight into the relationship between imagery associated with sleep (and its disorders) and waking imagery. A positive relationship between daytime and night imagery as well as the finding that the relationship does not hold for those experiencing pathology provides support for a link between the mental activities that occur while individuals are awake with those that occur during sleep. It also suggests that there may be disrupters, such as pathology, to the flow of mental activities. Further research into the flow of mental activities and its disruptions could provide insight into both the mechanisms of this flow as well as the mechanisms involved in sleep disorders. The current study suggests that pathology and sleep disorders may disrupt conscious psychological processes such as imaginal abilities, however, it remains unclear what impacts these disrupters may be having on other aspects of conscious psychological processes (e.g., perceptions, cognitions or cognitive links). Additionally, the clinical impact of these potential disrupters, such as pathology and traumatic life events, on sleep disorders remains unclear and further could have implications for both the diagnosis and treatment of sleep disorders.

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Appendix A: Sleep Paralysis Questionnaire

Name _____ Student Number _____
Phone Number _____

Male _____ Female _____ Age _____

The following questions ask about experiences that occur while people are falling asleep or waking up. All of these experiences occur in normal individuals and none, in and of themselves, are symptoms of psychopathology. Please read each question carefully before answering.

Have you had an experience similar to the one described below?

I was falling asleep, but was still awake (or I had just woken up) when I discovered that my body felt paralysed and I could not move. However, I could move my eyes and knew I was not dreaming.

1) Have you had an experience like the one described above?

a) **NO**; If you have never had an experience like this, go to Question 28 and answer this question and all of the questions following it.

b) **YES**: If you answered yes to the above question, please answer all of this questionnaire. If you have had an experience like this, one or more times, which of the following characterize your last experience?

2) How many times have you had this experience?
_____ times

3) Were you awake? Could you actually see the room from the perspective where you were lying?
Yes _____ No _____

4) Did you feel a presence of someone in the room?
Yes _____ No _____

5) Did you see a person or thing in the room?
Yes _____ No _____

- 6) Did you feel a pressure on your chest?
Yes _____ No _____
- 7) Did you hear a sound something like footsteps?
Yes _____ No _____
- 8) Did you hear your name being called?
Yes _____ No _____
- 9) Did you feel like someone or something touched you?
Yes _____ No _____
- 10) Did you see someone or something sitting or pushing
on your chest?
Yes _____ No _____
- 11) Were you afraid during this experience?
Yes _____ No _____
- 12) Did you feel your body floating upward into the air?
Yes _____ No _____
- 13) Which position were you lying in when this occurred?
a) On my back
b) On my stomach
c) On my side
d) Sitting in a chair
- 14) Did this experience occur when you were:
Falling asleep _____ Waking up _____
- 15) What was the approximate date of your most recent
experience? _____ month _____ date _____ year
- 16) If you were just falling asleep, how long were you in
bed before the experience occurred? _____
- 17) If you were just waking up, how long had you been
asleep? _____
- 18) At what time did this experience occur? _____
- 19) How long did the experience last? _____
- 20) The night before this experience, did you feel:
Stressed
a) Not at all b) Slightly c) Somewhat d) Severely

Overworked

a) Not at all b) Slightly c) Somewhat d) Severely

Tired

a) Not at all b) Slightly c) Somewhat d) Severely

21) Did the experience end when you were able to move a finger or other extremity?

Yes _____ No _____

22) Did you hear any unusual sounds?

Yes _____ No _____

Explain _____

23) Did you see anything unusual?

Yes _____ No _____

Explain _____

24) Did you have any unusual body sensations?

Yes _____ No _____

Explain _____

25) How old were you when you first had this experience? _____

26) Do you know of any other family members who have had an experience like the core experience described above?

Yes _____ No _____

What relation are they to you? (for example mother, sister, etc.) _____

27) What do you think caused you to have an experience like the core experience described above? _____

28) Before and including the age of 12, how often did you talk in your sleep?

- a) Never
- b) Once per week or less
- c) More than once per week but not nightly
- d) Nightly

- 29) After the age of 12, how often did you talk in your sleep?
- a) Never
 - b) Once per week or less
 - c) More than once per week but not nightly
 - d) Nightly
- 30) Before the age of 12, how often did you walk in your sleep?
- a) Never
 - b) Less than once per month
 - c) More than once per month but not than nightly
 - d) Almost nightly
- 31) After the age of 12, how often did you walk in your sleep?
- a) Never
 - b) Less than once per month
 - c) More than once per month but not than nightly
 - d) Almost nightly
- 32) Have you ever had nightmares that awoke you suddenly from sleep and you could remember the nightmare?
- a) Never
 - b) Once per week or less
 - c) More than once per week but not nightly
 - d) Nightly
- 33) Before and including the age of 12 did you ever sit up in bed screaming even though you were asleep? (night terrors):
- a) Never
 - b) Once per month or less
 - c) More than once per month but not nightly
 - d) Almost nightly
- 34) After the age of 12 did you ever sit up in bed screaming even though you were asleep (night terrors):
- a) Never
 - b) Once per month or less
 - c) More than once per month but not nightly
 - d) Almost nightly
- 35) Have you ever been diagnosed with narcolepsy?
- Yes _____ No _____

36) Have you ever had the experience of being asleep and during the dream realize that you are dreaming?

Yes _____ No _____

37) Have you ever had the experience of being paralysed either while falling asleep or waking up?

Yes _____ No _____

- 38) Have you ever had the experience of leaving your body and floating upwards so when you look down you can see your body below?
Yes _____ No _____
- 39) How vivid are your dreams?
a) Not vivid
b) Slightly vivid
c) Somewhat vivid
d) Extremely vivid
- 40) While falling asleep, do you have vivid dreamlike imagery?
a) Never
b) Rarely
c) Sometimes
d) Frequently
- 41) While waking up from sleep, do you have vivid dreamlike imagery?
a) Never
b) Rarely
c) Sometimes
d) Frequently
- 42) How well do you remember your dreams the next day?
a) Not at all
b) Poorly
c) Fairly well
d) Very well
- 43) Have you ever seen a U.F.O?
Yes _____ No _____
- 44) How long do you usually sleep per night? _____
- 45) Have you ever experienced a sudden intense fear of dying and a feeling of impending doom along with one or more of these symptoms: dizziness, choking, trembling, palpitations, chest pains, sweating? (In other words a panic attack?)
a) Never
b) More than once
c) 2-5 times
d) More than 5 times

- 46) Do you ever have severe headaches?
- a) Never
 - b) Once per month or less
 - c) More than once per month but less than once per week
 - d) More than once per week
- 47) Have you ever been diagnosed as having migraine headaches?
- Yes _____ No _____
- 48) If yes, how often do you have migraine headaches?
- a) Once per year
 - b) More than once per year but less than once per month
 - c) More than once per month but less than once per week
 - d) More than once per week
- 49) In what position do you usually sleep?
- a) Back
 - b) Stomach
 - c) Side

Appendix B

Informed Consent

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

The purpose of this study is to examine the relationship between sleep phenomena and various experiences.

You will be asked to complete a questionnaire that asks whether you have had various experiences. You may also be asked to take part in an interview that will ask you about a sleep phenomenon you may have experienced. This interview will be tape recorded for transcription. If you do not feel comfortable with the tape recorder you may request at any time that it be shut off.

Your participation is completely voluntary and you have the freedom and right to withdraw from this study at any time without question or reprimand by the investigator or the university and without loss of experimental credits. You may also refuse to answer any questions that you do not wish to answer.

All information will be strictly confidential and will be used for research purposes only. Data will be coded such that your name is not associated with the data and this coded data will be made available only to researchers associated with this project.

I have read the above description and understand the conditions of my participation. My signature indicates that I agree to participate in this experiment.

Signature of participant _____
Date _____

Signature of investigator _____

Research personnel: The following people are involved in this research project and may be contacted at any time: Stacey McNulty 788-2600 x2684 or Dr. N.P. Spanos (Faculty Advisor) 788-2600 x2683.

Should you have any ethical concerns about this research please contact Dr. L. Paquet, Chair, Dept. of Psychology Ethics Committee 788-2600 x2692 or Dr. W. Jones, Chair, Dept. of Psychology 788-2600 x2648.

Appendix C
Symptom Checklist-90R

Below is a list of problems and complaints that people sometimes have. Read each one carefully and select one of the numbered descriptors that best describes HOW MUCH THAT PROBLEM HAS CAUSED YOU DURING THE PAST MONTH INCLUDING TODAY. Place that number in the open block to the right of the problem. Do not skip any items and print your number clearly. If you change your mind, erase your first number completely. Read the example below before beginning and if you have any questions please ask the experimenter.

EXAMPLE

		<u>Descriptors</u>
	Answer	0. Not at all
Ex. Bodyaches.....	Ex. <u>3</u>	1. A little bit
		2. Moderately
		3. Quite a bit
		4. Extremely

		<u>Descriptors</u>
HOW MUCH WERE YOU DISTRESSED BY:		0. Not at all
		1. A little bit
		2. Moderately
		3. Quite a bit
		4. Extremely
1.	Headaches	_____
2.	Nervousness or shakiness inside	_____
3.	Repeated unpleasant thoughts that won't leave your mind	_____
4.	Faintness or dizziness	_____
5.	Loss of sexual interest or pleasure	_____
6.	Feeling critical of others	_____
7.	The idea that someone else can control your thoughts	_____
8.	Feeling other are to blame for most of your troubles	_____

9. Trouble remembering things_____
10. Worried about sloppiness or carelessness_____
11. Feeling easily annoyed or irritated_____
12. Pains in heart or chest_____
13. Feeling afraid in open spaces or on
the streets_____
14. Feeling low in energy or slowed down_____
15. Thoughts of ending your life_____
16. Hearing voices that other people do not hear_____
17. Trembling_____
18. Feeling that most people cannot be trusted_____
19. Poor appetite_____
20. Crying easily_____
21. Feeling shy or uneasy with the opposite sex_____
22. Feelings of being caught or trapped_____
23. Suddenly scared for no reason_____
24. Temper outbursts that you could not control_____
25. Feeling afraid to go out of your house alone_____
26. Blaming yourself for things_____
27. Pains in lower back_____
28. Feeling blocked in getting things done_____
29. Feeling lonely_____
30. Feeling blue_____
31. Worrying too much about things_____

HOW MUCH WERE YOU DISTRESSED BY:	<u>Descriptors</u>
	0. Not at all
	1. A little bit
	2. Moderately
	3. Quite a bit
	4. Extremely
32. Feeling no interest in things	_____
33. Feeling fearful	_____
34. Your feelings being easily hurt	_____
35. Other people being aware of your private thoughts.....	_____
36. Feeling others do not understand you or are unsympathetic	_____
37. Feeling that people are unfriendly or dislike you.....	_____
38. Having to do things very slowly to insure correctness	_____
39. Heart pounding or racing	_____
40. Nausea or upset stomach	_____
41. Feeling inferior to others	_____
42. Soreness of your muscles	_____
43. Feeling that you are watched or talked about by others	_____
44. Trouble falling asleep	_____
45. Having to check and double check what you do	_____
46. Difficulty making decisions	_____
47. Feeling afraid to travel on buses, subways, or trains	_____
48. Trouble getting your breath	_____
49. Hot or cold spells	_____

HOW MUCH WERE YOU DISTRESSED BY:	<u>Descriptors</u>
	0. Not at all
	1. A little bit
	2. Moderately
	3. Quite a bit
	4. Extremely
50. Having to avoid certain things, places, or activities because they frighten you	_____
51. Your mind going blank	_____
52. Numbness or tingling in parts of your body	_____
53. A lump in your throat	_____
54. Feeling hopeless about the future	_____
55. Trouble concentrating	_____
56. Feeling weak in parts of your body	_____
57. Feeling tense or keyed up	_____
58. Heavy feelings in your arms or legs	_____
59. Thoughts of death or dying	_____
60. Overeating	_____
61. Feeling uneasy when people are watching or talking about you	_____
62. Having thoughts that are not your own	_____
63. Having urges to beat, injure, or harm someone ...	_____
64. Awakening in the early morning	_____
65. Having to repeat the same action such as touching, counting or washing	_____
66. Sleep that is restless or disturbed	_____
67. Having urges to break or smash things	_____
68. Having ideas or beliefs that others do not share	_____

	<u>Descriptors</u>
HOW MUCH WERE YOU DISTRESSED BY:	0. Not at all
	1. A little bit
	2. Moderately
	3. Quite a bit
	4. Extremely
69. Feeling very self-conscious with others	_____
70. Feeling uneasy in crowds, such as shopping or
at a movie	_____
71. Feeling everything is an effort	_____
72. Spells of terror or panic	_____
73. Feeling uncomfortable about eating or drinking
in public	_____
74. Getting into frequent arguments	_____
75. Feeling nervous when you are left alone	_____
76. Others not giving you proper credit for your
achievements	_____
77. Feeling lonely even when you are with people	_____
78. Feeling so restless you couldn't sit still	_____
79. Feelings of worthlessness	_____
80. The feeling that something bad is going to
happen to you	_____
81. Shouting or throwing things	_____
82. Feeling afraid that you will faint in public	_____
83. Feeling that people will take advantage of you if
you let them	_____
84. Having thoughts about sex that bother you a lot .	_____
85. The idea that you should be punished for
your sins.....	_____

HOW MUCH WERE YOU DISTRESSED BY:	<u>Descriptors</u>
	0. Not at all
	1. A little bit
	2. Moderately
	3. Quite a bit
	4. Extremely
86. Thoughts or images of a frightening nature	_____
87. The idea that something serious is wrong with your body	_____
88. Never feeling close to another person	_____
89. Feelings of guilt	_____
90. The idea that something is wrong with your mind.....	_____

Appendix D**Major Events Inventory**

The following is a list of "major events" that can occur in life. Please check off all the ones that you have experienced. Some items allow for more than one response - again please check off all the ones that apply to you.

1. ☐ Engagement or marriage

2. ☐ Major surgery

3. ☐ Minor surgery

4. ☐ Major lottery prize win

Physical abuse BEFORE age 16:

5. ☐ Single event

BY: ☐ mother ☐ father ☐ brother ☐ sister
☐ boyfriend ☐ girlfriend ☐ other ☐ peer

6. ☐ Repeated event

BY: ☐ mother ☐ father ☐ brother ☐ sister
☐ boyfriend ☐ girlfriend ☐ other ☐ peer

Physical Abuse age 16 or LATER:

7. ☐ Single event

BY: ☐ mother ☐ father ☐ brother ☐ sister
☐ boyfriend ☐ girlfriend ☐ other ☐ spouse

8. ☐ Repeated event

BY: ☐ mother ☐ father ☐ brother ☐ sister
☐ boyfriend ☐ girlfriend ☐ other ☐ spouse

9. ☐ Desired pregnancy

10. ☐ Undesired pregnancy

11. ☐ Kidnapped
 12. ☐ Death of a friend
 13. ☐ Death of a nuclear family member (parents or siblings)
 14. ☐ Death of other relative
 15. ☐ Winning a scholarship or other major academic award
 16. ☐ Being in a serious car accident
 17. ☐ Being in a minor car accident
- Unwanted sexual activity BEFORE age 14 with someone 5 years (or more) older than yourself.
18. ☐ Single event

BY: ☐ parent ☐ friend ☐ stranger
☐ relative ☐ acquaintance ☐ don't remember
 19. Repeated event

BY: ☐ parent ☐ friend ☐ stranger
☐ relative ☐ acquaintance ☐ don't remember

Unwanted sexual activity BEFORE age 14 with someone less than 5 years older than yourself.
 20. ☐ Single event

BY: ☐ friend ☐ stranger ☐ relative
☐ acquaintance ☐ don't remember
 21. Repeated event

BY: ☐ friend ☐ stranger ☐ relative
☐ acquaintance ☐ don't remember

Unwanted sexual activity age 14 or LATER with someone 5 years (or more) older than yourself.

22. _____ Single event

BY: _____parent _____friend _____stranger
 _____relative _____acquaintance _____don't remember

23. _____ Repeated event

BY: _____parent _____friend _____stranger
 _____relative _____acquaintance _____don't remember

Unwanted sexual activity age 14 or LATER with someone less than 5 years older than yourself.

24. _____ Single event

BY: _____friend _____stranger _____relative
 _____acquaintance _____don't remember

25. Repeated event

BY: _____friend _____stranger _____relative
 _____acquaintance _____don't remember

26. _____ Taking a "trip of a lifetime"

27. _____ Being in a fire

28. _____ Your home being burned down

29. _____ Being robbed or mugged

30. _____ Alcoholism in your family when growing up

31. _____ Alcoholism in your family now

32. _____ Winning an athletic event

33. _____ Winning other public award

34. _____ Separation/divorce of parents as a child

35. _____ Separation/divorce of parents as an adult

36. ☐ Separation/divorce of self
37. ☐ Major physical illness
38. ☐ Major physical injury
39. ☐ Physical disability
40. ☐ Learning disability
41. ☐ Being arrested
42. ☐ Emotional abuse as a child:
BY: ☐ mother ☐ father ☐ other
43. ☐ Emotional abuse as an adolescent:
BY: ☐ mother ☐ father ☐ other
☐ girlfriend ☐ boyfriend
44. ☐ Emotional abuse as an adult:
BY: ☐ mother ☐ father ☐ spouse
☐ girlfriend ☐ boyfriend ☐ other
45. ☐ Witnessing violence against others in your home while growing up.
46. ☐ Witnessing violence against others outside your home while growing up.
47. ☐ Witnessing violence in your home as an adult.
48. ☐ Witnessing violence outside your home as an adult
49. ☐ Experiencing sexual harassment

Appendix E Assessing Environments III

This is a questionnaire about your childhood environment and some of your current attitudes, feelings and behaviors. Most of the questions refer to experiences that occurred during your childhood (before age 18, or before you left your parents' house-whichever came first). Many of the questions refer to your perception of events or people, so they have no right or wrong answers. Please answer the questions as accurately and as honestly as you can, but bear in mind that some of the questions ask for your opinion as opposed to fact.

Special Problems You Might Have With This Questionnaire

- 1) If the question refers to something which happened at least ONCE, then the answer is true.
- 2) If you lived in more than one place, answer the question in terms of the place you lived the longest.
- 3) If you lived with both your natural father and a step-father (or natural mother and a step-mother), answer the questions for the one with whom you lived for the longest period of time.
- 4) If you never knew one of your natural parents, and never had a step-parent in his/her place, leave questions referring to that parent blank.

1. Marital Status:
 - 1) Single
 - 2) Married
 - 3) Separated
 - 4) Divorced
 - 5) Widowed
2. Number of Children:
 - 1) 0 Children
 - 2) 1 child
 - 3) 2 children
 - 4) 3 children
 - 5) more than 3 children
3. Number of Siblings (brothers and sisters):
 - 1) None
 - 2) 1 sibling
 - 3) 2-5 siblings
 - 4) 6-10 siblings
 - 5) 11-20 siblings
4. Position in the family:
 - 1) 1st born
 - 2) 2nd born
 - 3) 3rd born
 - 4) last born
 - 5) other

5. Family economic group: 1) Lower
2) Middle
3) Upper
6. Religion: 1) Catholic
2) Jewish
3) Protestant
4) Other
5) None
7. Type of area in which you were reared: 1) Rural
2) Urban
3) Suburban
8. Approximate population: 1) less than 10,000
2) 11,000-100,000
3) 110,000-500,000
4) 510,000-1 million
5) more than 1 million
9. T F We had a typewriter.
10. T F My mother did (does) volunteer work.
11. T F Within the last several years, my father has taken an adult education or a university extension course.
12. T F I received head injury from the discipline used by my parents.
13. T F My father got mad a lot.
14. T F Our family used food stamps.
15. T F My parents used harsh discipline with me between the ages of 5 and 10.
16. T F My father is set in his ways.
17. T F I had a bicycle when I was a child.
18. T F I was forced to engage in sexual activities by one or both of my parents.
19. T F I received dental injury from the discipline used by my parents.
20. T F Most people in my family were too busy to spend much time reading.
21. T F My father is a good father.
22. T F At least one of my parents was/is an officer in an organization to which he/she belongs.
23. T F My mother has a quick temper.
24. T F My mother supported her children alone.
25. T F I had some good friends when I was a child.
26. T F My parents were very strict disciplinarians.
27. T F My parents' use of discipline was reasonable.
28. T F My parents used to hit me with a stick, switch or paddle when I did something wrong.

29. T F My parents used physical force with each other.
30. T F When I was a child, if my parent had a problem, he/she would sometimes talk to me about it.
31. T F My parents used to hit me with a flyswatter when I did something wrong.
32. T F I get/got along pretty well with my father.
33. T F Other children used to tease me.
34. T F My parents used to give me piggyback rides when I was small.
35. T F I received burns from the discipline used by my parents.
36. T F My parents never seemed to have many friends.
37. T F Our family almost always ate supper together.
38. T F I have never been hit by an object thrown by my parent(s) when I did something wrong.
39. T F My parents were always very supportive of me.
40. T F I received cuts from the discipline used by my parents.
41. T F When I was bad, my parent(s) used to lock me in a closet.
42. T F My father is a nervous man.
43. T F My mother is or has been in treatment for emotional or nervous problems.
44. T F My mother is active in community affairs.
45. T F I never received an kind of injury from the discipline used by my parents.
46. T F I went to a nursery school when I was a young child.
47. T F When I was a young child, my parents used to leave me (and my younger brothers and sisters) alone when they went out.
48. T F I think my mother has/had a good attitude toward me.
49. T F My parents were inconsistent in their discipline of me. I never knew whether or not I would be punished for a particular behavior.
50. T F My parents seemed to demand a lot of emotional support from me when I was a child.
51. T F I received broken bones from the discipline used by my parents.
52. T F My mother is easily upset.
53. T F Our home had more than one hundred books (excluding children's books).
54. T F I required medical attention (at least once) for injuries caused by my parents.
55. T F My parents did a good job of raising me.

56. T F My parents didn't argue very much.
57. T F I had my own crayons when I was a child.
58. T F My parent(s) used to punch me when they got angry with me.
59. T F I, and all my brothers and sisters (if any), were mistreated by our parents.
60. T F I required hospitalization for injuries caused by my parents.
61. T F At least one member of our family was active in political organizations.
62. T F I was physically abused by my parents when I was a child.
63. T F I required stitches for injuries caused by my parents.
64. T F Sometimes one of my parents would complain to me about the other parent.
65. T F When I was a child, my parents tried marital separation.
66. T F I received bruises from the discipline used by my parents.
67. T F I was severely beaten by my parents.
68. T F My father is rather cold and unsympathetic.
69. T F My father works in an unskilled job.
70. T F We had an encyclopedia when I was a child.
71. T F I was rejected by my parents when I was a child.
72. T F My mother was/is often depressed.
73. T F My parents were very harsh with me.
74. T F My father helped make important family decisions.
75. T F My parents used to hit me with something other than their hands when I did something wrong.
76. T F My parents used to hit me with the buckle on a belt when I did something wrong.
77. T F My father left everything up to my mother.
78. T F I have very few quarrels with members of my family.
79. T F My parents argued a lot.
80. T F I never felt that my parents really loved me.
81. T F My parents used physical discipline with me.
82. T F My parent(s) used to hit me with their hands (other than spanking).
83. T F My parents used hot water or a hot object to discipline me when I did something wrong.
84. T F My parents always expected more from me than I was capable of doing.
85. T F My father made the important decisions around our house.

86. T F We rarely had guests over to our home when I was a child.
87. T F My parents are divorced.
88. T F My parent(s) used to spank me.
89. T F We had lots of arguments in our family.
90. T F My mother read a lot.
91. T F My father was employed regularly.
92. T F Other children didn't seem to like me.
93. T F My parents would hit me with a hairbrush when I did something wrong.
94. T F My family often did things together.
95. T F I required a cast for injuries caused by my parents.
96. T F My parents used harsh discipline with me before the age of 5.
97. T F My father was too strict with me.
98. T F I had very little contact with my parents' own families. (If your parents did not have any living relatives, leave this one blank).
99. T F We often had relatives or friends over to our house.
100. T F My parents used harsh discipline with me during adolescence.
101. T F My parents saved money for my college education.
102. T F My family attends church or synagogue regularly.
103. T F My parents usually seemed to agree on when I needed to be disciplined.
104. T F I was rarely punished when I was a child.
105. T F One of my brothers or sisters was physically abused by my parents.
106. T F I would describe my relationship with my mother as very close.
107. T F My father is/was a good provider.
108. T F My parents often took me along with them to visit friends or relatives.
109. T F Our family got along very well.
110. T F My parents used to hit me with a belt or a strap when I did something wrong.
111. T F My father completed high school.
112. T F My parents never used harsh discipline with me.
113. T F My parent(s) used to kick me when they got angry with me.
114. T F My mother helped make important family decisions.
115. T F I felt rejected by my parents.

116. T F When my parents(s) were angry, they sometimes grabbed me by the throat and started to choke me.
117. T F My family was pretty easygoing.
118. T F Our family spent a lot of time watching TV.
119. T F My parents used to hug me when I was a child.
120. T F My father has or has had a problem with the police.
121. T F My father was easygoing.
122. T F My father was active in community affairs.
123. T F At night, our family often did things together such as playing cards or a game, working on a project together, etc.
124. T F My parents used to kiss me when I was a child.
125. T F My parents used to hold me on their laps.
126. T F My father left the discipline up to my mother.
127. T F My father changed his mood very quickly.
128. T F I had alot of freedom when I was a child, but if my parents did decide to punish me they were very harsh.
129. T F My parents used to hit me with a wooden spoon or ruler when I did something wrong.
130. T F My mother belonged to a social, civic, political, study, literary or art club.
131. T F My father has been in jail.
132. T F When I did something wrong, my parent(s) sometimes tied me up.
133. T F When I was a child, I shared a lot of activities with my parents.
134. T F My mother had some college education.
135. T F My parents used to call me bad names and/or they used to insult me, tell me I was a bad child and so forth.
136. T F I think my parents have/had a good marriage.
137. T F I was born and reared in the United States.
138. T F Some people in my family are picked on more than others.
139. T F I have very little contact with my parents now.
140. T F I tend to get impatient with my family.
141. T F My parents were very protective of me when I was a child.
142. T F When I was young, I was often cared for by a baby sitter for the entire day.
143. T F There were a lot of young families in our neighborhood.

144. T F There were lots of interesting things for me to do around the house.
145. T F I had a regular bed time as a child.
146. T F We have lived in at least one home for more than six years.
147. T F I was forced to engage in sexual activities by a brother or sister.
148. T F We had two or more pieces of playground equipment in our yard.
149. T F For at least part of my childhood, I lived with a step-parent.
150. T F Almost everyone in our family agreed how to do things.
151. T F Many of the things my family did were centered around me.
152. T F I got good grades in school
153. T F When I was a child, my mother often found time to play with me.
154. T F I was born prematurely.
155. T F At some time during my childhood my mother had a job outside of the home.
156. T F My parents have told me that I was an unplanned baby.
157. T F (As far as I know) I was premaritally conceived.
158. T F We lived in a quiet neighborhood.
159. T F I was not allowed to participate in many activities in which my friends were allowed to participate.
160. T F My father was a quiet man.
161. T F For at least part of my childhood, I lived with only one parent.
162. T F One of my parents died when I was a child.
163. T F We talked about religion in our family.
164. T F I was separated from my family for 5 days or more prior to first grade, due to medical problems or other difficulties.

Appendix F
Vividness of Mental Imagery Questionnaire

Directions: This questionnaire involves imagining certain situations. For each of the following questions, please indicate which of the responses in the key below best applies.

- a) perfectly clear, and as vivid as the actual experience
- b) very clear, and comparable in vividness to the actual experience
- c) moderately clear and vivid
- d) not clear or vivid but recognizable
- e) vague and dim
- f) so vague and dim as to be hardly discernible
- g) no image present at all; you only know that you are thinking of it

Please circle one response for each question.

1. When you close your eyes and try to imagine a specific automobile which you have seen many times, how vividly can you imagine it?

a b c d e f g

2. When you keep your eyes open and try to imagine the automobile, how vividly can you imagine it?

a b c d e f g

3. When you close your eyes and try to imagine a color, such as bright blue, how vividly can you imagine it?

a b c d e f g

4. When you keep your eyes open and try to imagine a patch of the wall becoming a different colour, how vividly can you imagine the changed colour?

a b c d e f g

5. When you close your eyes and try to imagine your name and address written on a paper before you, how vividly can you imagine seeing the words?

a b c d e f g

6. When you try to imagine hearing a tune, how vividly can you imagine it?

a b c d e f g

7. When you try to imagine yourself running, how vividly can you imagine yourself actually moving? (This refers to feeling of your muscles in motion, not to visually seeing yourself running.)

a b c d e f g

8. When you try to imagine your arms as being especially heavy, how vividly can you imagine it?

a b c d e f g

9. When you try to imagine a common odour, such as a fragrant cup of hot coffee, how vividly can you imagine it?

a b c d e f g

10. When you try to imagine a common taste, such as the sweetness of sugar, how vividly can you imagine it?

a b c d e f g

11. When you try to imagine the room as becoming especially warm, how vividly can you imagine it?

a b c d e f g

12. When you try to imagine the room as becoming especially cold, how vividly can you imagine it?

a b c d e f g

13. When you imagine yourself stroking fur, how vividly can you imagine the fur? (This refers to the feeling of touching, not visually trying to see it.)

a b c d e f g

14. When you try to imagine how it feels when you have a stomach ache how vividly can you imagine it?

a b c d e f g

15. When you try to imagine the room spinning, how vividly
can you imagine it?

a b c d e f g

Appendix G
Absorption Scale

Please circle the appropriate number (1=Never; 4=Very Frequently)

1. Sometimes I feel and experience things as I did when I was a child.

Never	1	2	3	4	Very Frequently
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2. I can be greatly moved by eloquent or poetic language.

Never	1	2	3	4	Very Frequently
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3. While watching a movie, a T.V. show, or a play, I may become so involved that I forget about myself and my surroundings and experience the story as if it were real and as if I were taking part in it.

Never	1	2	3	4	Very Frequently
-------	---	---	---	---	--------------------

4. If I stare at a picture and then look away from it, I can sometimes "see" an image of the picture, almost as if I were still looking at it.

Never	1	2	3	4	Very Frequently
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5. Sometimes I feel as if my mind could envelop the whole world.

Never	1	2	3	4	Very Frequently
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6. I like to watch cloud shapes change in the sky.

Never	1	2	3	4	Very Frequently
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7. If I wish, I can image (or daydream) some things so vividly that they hold my attention as a good movie or story does.

Never 1 2 3 4 Very
Frequently

8. I think I really know what some people mean when they talk about mystical experiences.

Never 1 2 3 4 Very
Frequently

9. I sometimes "step outside" my usual self and experience an entirely different state of being.

Never 1 2 3 4 Very
Frequently

10. Textures - such as wool, sand, wood - sometimes remind me of colours or music.

Never 1 2 3 4 Very
Frequently

11. Sometimes I experience things as if they were doubly real.

Never 1 2 3 4 Very
Frequently

12. When I listen to music, I can get so caught up in it that I don't notice anything else.

Never 1 2 3 4 Very
Frequently

13. If I wish, I can imagine that my body is so heavy that I could not move it if I wanted to.

Never 1 2 3 4 Very
Frequently

14. I can often somehow sense the presence of another person before I actually see or hear her/him.

Never 1 2 3 4 Very
Frequently

15. The crackle and flames of a wood fire stimulate my imagination.

Never	1	2	3	4	Very Frequently
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Appendix H
Combined Perceptual Aberration-Magical Ideation Scale

Please circle whether each statement is true (T) or False (F) for you.

1. T F Sometimes I have had feelings that I am united with an object near me.
2. T F I have sometimes had the feeling that one of my arms or legs is disconnected from the rest of my body.
3. T F Some people can make me aware of them just by thinking about me.
4. T F I sometimes have to touch myself to make sure I'm still there.
5. T F I have had the momentary feeling that I might not be human.
6. T F Sometimes I have had the feeling that a part of my body is larger than it usually is.
7. T F I have sometimes been fearful of stepping on sidewalk cracks.
8. T F At times I have wondered if my body was really my own.
9. T F I think I could learn to read others' minds if I wanted to.
10. T F Parts of my body occasionally seem dead or unreal.
11. T F Horoscopes are right too often for it to be a coincidence.
12. T F Things sometimes seem to be in different places when I get home, even though no one has been there.
13. T F Sometimes I have had a passing thought that some part of my body was rotting away.

14. T F Numbers like 13 and 7 have no special powers.
15. T F Occasionally I have felt as though my body did not exist.
16. T F Sometimes I have felt that I could not distinguish my body from other objects around me.
17. T F I have occasionally had the silly feeling that a TV or radio broadcaster knew I was listening to him.
18. T F It has seemed at times as if my body was melting into my surroundings.
19. T F I have never felt that my arms or legs have momentarily grown in size.
20. T F I have worried that people on other planets may be influencing what happens on earth.
21. T F The boundaries of my body always seem clear.
22. T F The government refuses to tell us the truth about flying saucers.
23. T F I can remember when it seemed as though one of my limbs took on an unusual shape.
24. T F I have felt that there were messages for me in the way things were arranged, like in a store window.
25. T F I sometimes have had the feeling that my body is abnormal.
26. T F I have never doubted that my dreams are the products of my own mind.
27. T F I have sometimes had the feeling that my body is decaying inside.
28. T F Good luck charms don't work.
29. T F I have had the momentary feeling that the things I touch remain attached to my body.

30. T F I have noticed sounds on my records that are not there at other times.
31. T F Occasionally it has seemed as if my body had taken on the appearance of another person's body.
32. T F The hand motions that strangers make seem to influence me at times.
33. T F Sometimes I feel like everything around me is tilting.
34. T F I almost never dream about things before they happen.
35. T F Ordinary colors sometimes seem much too bright to me (without taking drugs).
36. T F I have had the momentary feeling that someone's place has been taken by a look-alike.
37. T F My hands or feet have never seemed far away.
38. T F It is not possible to harm others merely by thinking bad thoughts about them.
39. T F I have sometimes felt that some part of my body no longer belonged to me.
40. T F I have sometimes sensed an evil presence around me, although I could not see it.
41. T F I have felt that something outside my body was a part of my body.
42. T F I sometimes have a feeling of gaining or losing energy when certain people look at me or touch me.
43. T F I have felt that my body and another person's body were one and the same.
44. T F I have sometimes had the passing thought that strangers are in love with me.
45. T F Now and then when I look in the mirror, my face seems quite different than usual.

46. T F I have never had the feeling that certain thoughts of mine really belonged to someone else.
47. T F I have felt as though my head or limbs were somehow not my own.
48. T F When introduced to strangers, I really wonder whether I have known them before.
49. T F Sometimes when I look at things like tables and chairs, they seem strange.
50. T F If reincarnation were true, it would explain some unusual experiences I have had.
51. T F I have never had the passing feeling that my arms or legs had become longer than usual.
52. T F People often behave so strongly that one wonders if they are part of an experiment.
53. T F I sometimes have had the feeling that some parts of my body are not attached to the same person.
54. T F At times I perform certain little rituals to ward off negative influences.
55. T F I have had the momentary feeling that my body has become misshapen.
56. T F I have felt that I might cause something to happen just by thinking too much about it.
57. T F Sometimes part of my body has seemed smaller than it usually is.
58. T F My hearing is sometimes so sensitive that ordinary sounds become uncomfortable.
59. T F I have wondered whether the spirits of the dead can influence the living.
60. T F Sometimes people whom I know well begin to look like strangers.

61. T F I have sometimes felt confused as to whether my
body was really my own.
62. T F At times I have felt that a professor's lecture
was meant especially for me.
63. T F Often I have a day when indoor lights seem so
bright that they bother my eyes.
64. T F I have sometimes felt that strangers were
reading my mind.
65. T F For several days at a time I have had such a
heightened awareness of sights and sounds
that I cannot shut them out.

Appendix I***The Personal Philosophy Inventory***

This questionnaire was designed to help us understand the relationship between philosophical beliefs and personality. These questions are not intended to embarrass or to question any religious belief. They have been asked in accordance with a single assumption: if a belief is true, then no amount of challenge will change it. All answers are confidential. Computer analyses will be performed only after the person has been protected by a coded number.

Please answer the following questions as correctly as you can. Think carefully about each question before you answer. The answer is either true or false. For each question place an X in the appropriate true or false box on the answer sheet. If the answer could be either true or false, then select the answer that is appropriate most of the time. Now turn the page and begin.

1. Most nights I go to sleep without thoughts or ideas bothering me.
2. I like reading mechanics magazines.
3. I do not always tell the truth.
4. During important conversations, I stick to the topic more than most people.
5. When I get upset or angry, my legs feel weak.
6. I go to church at least once a month.
7. After writing prose or poetry, I feel better.
8. I do not read every editorial in the newspaper everyday.
9. I like to read or study while listening to the radio.
10. There is good evidence that life exists on other planets.
11. If I breathe quickly, I feel dizzy or odd.
12. Sometimes an event will occur that has special significance for me only.
13. I am afraid of earthquakes.
14. I like to buy new things.
15. I have had a vision.
16. Once in a while I put off until tomorrow what I ought to do today.
17. An inner voice has told me where to find something and it was actually there.
18. At least once in the last ten years, I have fallen asleep and then awoken the next morning in another room.
19. I would rather go to a priest or minister than a psychologist for personal problems.
20. Sometimes I am sure that people can tell what I am thinking.

21. At least once during childhood, I hit my head (or was hit in the head) and blacked out.
22. I like to eat well-prepared meat.
23. There have been times when I have stared at an object and it appeared to become larger and larger.
24. If I could get into a movie without paying and be sure I was not seen, I would probably do it.
25. Once I start talking in an enjoyable setting, I have a hard time leaving.
26. I believe there is a God.
27. About once a year, I will awaken during sleep and not be able to move.
28. Once in a while, I laugh at a dirty joke.
29. While sitting quietly, I have had uplifting sensations as if I were driving quickly over a rolling road.
30. I prefer to eat with my left hand.
31. Belief in science and belief in God are not compatible.
32. Sometimes I can read another person's thoughts.
33. People tell me that I "blank out" sometimes when we are talking.
34. I would rather win than lose in a game.
35. I have had a religious experience that I know was real.
36. Once I thought about a person whom I had not seen for a while and then saw the person a few minutes later.
37. Compared to other people, my memory is excellent.
38. At least once in my life very late at night, I have felt the presence of another Being.
39. If I am not careful, a high pressure salesperson can sell me a "bill of goods".

40. When I have a tough decision to make, a sign will be given and I will know what to do.
41. I like to know some important people because it makes me feel important.
42. Intense smells bother me more than other people.
43. God has healed me or one of my family on at least one occasion.
44. I would like to time travel.
45. Evil spirits possess me sometimes.
46. There are no such things as ghosts or haunts.
47. I like to read about science.
48. I like to poke fun at people.
49. I do not like everyone I know.
50. I go to church at least once a week during most months.
51. There must be something more to life.
52. Most of the time, I am happy.
53. I keep a diary or notebook about my feelings and thoughts.
54. If there was a car accident, I believe I would have a better chance than most people to survive.
55. I have been known to walk in my sleep.
56. I gossip a little at times.
57. My spouse or (girl or boy) friend should do what I want out of love for me.
58. I have been taken aboard a spaceship.
59. People tell me that I become excited over insignificant events.

60. Sometimes I am so full of pep and energy that I feel superhuman.
61. Every so often I feel like gripping my thumb within the fingers of the same hand.
62. When relaxed or just before falling asleep, I sometimes feel pleasant vibrations moving through my whole body.
63. Sometimes, in the early morning hours between midnight and 4:00 AM, my experiences are very meaningful.
64. I am no different from anybody else.
65. Sometimes at elections, I vote for a person about whom I know very little.
66. Christ has appeared to me in a vision.
67. I am afraid of snakes.
68. There is something wrong with my mind.
69. I have a good appetite.
70. When I have a headache, it is primarily along the sides of my head.
71. My soul sometimes leaves my body.
72. I am afraid of mice.
73. I get angry sometimes.
74. When I have personal problems, talking to an older person is more helpful than talking to my friends.
75. I have never had "memory blanks" where I could not recall previous events.
76. I have heard an inner voice call my name.
77. Criticism and scolding hurt me terribly.
78. When I am really upset, I feel my hands shaking.
79. Lightning is one of my fears.

80. Everything is turning out just like the prophets in the Bible said it would.
81. At times I feel like swearing.
82. At least once a month, I experience intense smells that do not have an obvious source.
83. The existence of God cannot be explained by Science.
84. I use "hunches" more than simple learning to solve new problems.
85. There are some days when I accidentally hit my hand on something, smash my fingers or trip over my own two feet.
86. I prefer to write with my right hand.
87. When I lose an argument, I spend alot of time thinking about what I should have said.
88. I often feel as if things are not real.
89. I love(d) my father.
90. People tell me that I imitate the characters in a movie I have just seen.
91. When I walk up stairs, I sometimes note a strange smell from nowhere.
92. I like poetry.
93. I can "speak in tongues".
94. Telepathy (ESP) is a real phenomenon.
95. Sometimes people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.
96. As a child, I played with an imaginary friend.
97. I sometimes feel a sensation or a bulge in my abdomen.
98. My table manners are not quite as good at home as when I am out in company.

99. Animals should not be killed just for the benefit of mankind.
100. I have kept a diary.
101. There is an Eternal and Infinite Force.
102. Once, in a crowded area, I suddenly could not recognize where I was.
103. I have learned to meditate.
104. Although I am not sure, there is a good possibility that I have lived in a previous time.
105. I like to spend time persuading people to do things.
106. Once in a while, I think of things too bad to talk about.
107. After my religious conversion, I suddenly felt full of energy.
108. When I start something, I have a hard time stopping until it is finished.
109. I have had experiences when I felt as if I were somewhere else.
110. I have dreams of floating or flying through the air at least once a year.
111. I am very religious (more than most people).
112. At times I feel like smashing things.
113. I have had an epileptic seizure.
114. Sometimes when I am not feeling well I am cross.
115. Alien intelligence is probably responsible for UFOs.
116. Haunts and poltergeists are the works of the devil.
117. I have frequent headaches.
118. I have noticed tingling sensations along the back of my legs.

119. My parents should be obeyed and respected.
120. At least once a month or so, I'll keep singing or thinking a part of a song again and again.
121. I lack self confidence.
122. When I am alone or feel really low, reciting poetry or prose is a pleasant experience.
123. At least once in my life, just before falling down, I had the intense sensation of a smell from childhood.
124. I do not worry about catching diseases.
125. There are some things that Science should not investigate.
126. I believe in the second coming of Christ.
127. When I see a child starving from hunger on T.V. commercials, I feel sad.
128. Most people should be guided to insure their spiritual development.
129. I am a special agent of God.
130. Women should have the same opportunity as men for education.
131. I have experienced terror.
132. Most of the time, I study while listening to music.
133. I have been visited by a Spiritual Being.
134. My face has never been paralysed.
135. I sincerely believe that I am very special.
136. If God told me to kill, I would do it in His name.
137. Two or three times in my life, there have been a few brief moments when I felt very close to a Universal Consciousness.

138. My first religious or mystical experience occurred before
I was a teenager.
139. I have a tremor in one or both of my hands.
140. People say that I repeat myself often.

Appendix J***Inventory of Childhood Memories and Imaginings (ICMI)***

The major purpose of this inventory is to determine how many adults remember themselves as very imaginative during childhood. A second purpose is to quantify the kinds of childhood imaginative activities, fantasies, and related experiences that can be remembered by adults. A third purpose is to determine to what extent childhood imaginings affect adult experiences or carry over into adult functioning.

Please place a check in front of each item below that applies to you. Please answer as honestly as possible and do not be concerned if you find that you are either checking almost all the items or almost none.

- ☐ 1. When I was a child, I enjoyed active movement such as running and jumping.
- ☐ 2. When I was a child, I enjoyed swinging (on a swing).
- ☐ 3. When I was a child, I liked some kinds of music.
- ☐ 4. When I was a child, I enjoyed cartoons (on TV or in movies).
- ☐ 5. I can remember clearly one or more things that happened to me when I was two years of age or younger.
- ☐ 6. When I remember back to when I was 6, 7, or 8 years of age, I can re-experience myself as a child; that is, I can "see" and "hear" what I saw and heard then and I can feel again the emotions and sensations I felt then.
- ☐ 7. Although I have grown and I've had more experiences, I still feel basically the same as I did when I was a child.
- ☐ 8. When I was a child, I believed in such beings as fairies, elves, or leprechauns, etc.
- ☐ 9. Now that I am an adult, I still in some sense believe in such beings as fairies, elves, or leprechauns, etc.

- ___10. When I was a child, I would dream or imagine I was flying with such vividness that I felt as if I actually did fly.
- ___11. When I was a child, I enjoyed fairytales.
- ___12. As an adult, I would still enjoy fairytales.
- ___13. When I was a child, I was very imaginative.
- ___14. At the present time I am very imaginative.
- ___15. When I was a child, I was a "childhood philosopher". That is, I spent time thinking about such things as the meaning of life, and of death, about hypocrisy, levels of existence, etc.
- ___16. When I was a child (below age 12), I preferred playing make-believe games which require imagining or pretending, such as cowboys, school, house, etc. I preferred such make-believe games over realistic games which require skills such as hopscotch, checkers, building things, ballgames, etc.
- ___17. When I was playing make-believe games as a child, I usually would imagine so vividly that what I pretended seemed real to me.
- ___18. When I was a child, I lived in a make-believe world much or most of the time.
- ___19. As an adult, I still occasionally live in a make-believe world.
- ___20. When I was a young child, I believed that my doll(s) or stuffed animal(s) were alive.
- ___21. When I was a child I had an imaginary companion (or companions) such as an imagined person, animal, or object which I talked to, shared feelings with, or took along with me.
- ___22. When I was a child, I would at times pretend and in some sense believe I was someone else such as a fairytale character (e.g. Snow White, Peter Pan, Rapunzel, etc.), a prince or a princess, an orphan, etc.

- ___23. As an adult, I occasionally pretend I am someone else.
- ___24. When I was a child, I would have enjoyed or I did enjoy taking ballet dancing lessons.
- ___25. When I was a child or teenager, at times I was afraid my imagining would become so real to me that I would be unable to stop it.
- ___26. When I was a child or teenager, sometimes I was accused of lying when I was just reporting what I imagined.
- ___27. When I was a young (pre-teenage) child, I had sexual fantasies.
- ___28. I have had an orgasm (or orgasms) just by imagining only.
- ___29. When I was a child, I would spend at least half my total waking day imagining.
- ___30. Now as an adult, I spend a substantial part of my total waking day imagining.
- ___31. If I could not imagine anymore, besides other effects it would have on my life, I wouldn't be me anymore - - I would be a basically different person.
- ___32. At times, when I was a child or adolescent, it was difficult for me to determine whether something actually happened or whether I had imagined it happened.
- ___33. If given the opportunity, I would be very eager to experience an entirely new sensation - - a sensation such as vision, hearing, smell, or touch, but as different from all these as they are all different from each other.
- ___34. I have had a deeply moving personal religious, spiritual, or mystical experience.
- ___35. I have felt, heard, or seen an apparition (a spirit or ghost).

- ___36. I have had an out-of-body experience, that is, I have felt as if I (my mind or my spirit) left my body and existed for awhile independently of my body.
- ___37. I have experienced precognition (prophecy or foretelling the future) in a dream or while awake. That is, I have known something would happen even though there was no rational way I could have known.
- ___38. I have at times written poems, inspirational messages, short stories, or songs, etc., and I did not feel it was I who was creating them.
- ___39. I have at times felt unexplainably compelled to go somewhere, or do something I wouldn't ordinarily do (such as call someone I wouldn't ordinarily call) and then later discovered there was a reason for my compulsion. (For instance, the person I called desperately needed me at that moment.)
- ___40. I believe reincarnation is possible, and I have become aware of a life (or lives) that I may have lived prior to this one.
- ___41. I have at some time in my life experienced with marijuana, psychedelic drugs (LSD, etc.) amphetamines ("uppers"), tranquilizers ("downers"), or other such drugs in order to experience an altered state of consciousness; that is, in order to experience the world in a new way, not just to relax or feel good.
- ___42. I would like to experience hypnosis.
- ___43. I think I am hypnotizable; that is, I think I could be hypnotized.

- ___44. I have at times thought something happened to me, developed physical symptoms but later found out that what I thought happened never actually occurred. (Some possible examples to illustrate this are as follows: (a) you thought something was in your eye, your eye became irritated, but you couldn't find anything in your eye, (b) or you thought you ate spoiled food, became ill, but later found out that others eating the same food were not bothered, (c) or you thought you touched poison ivy, developed an itch but the doctor said it wasn't poison ivy.)
- ___45. I have at some time in my life thought I was pregnant and in addition to not menstruating, developed other symptoms of pregnancy (e.g., morning sickness, abdominal enlargement, breast changes, etc.), only to find out later that I was not pregnant.
- ___46. While listening to my favourite music, in addition to experiencing mood changes (e.g., feeling calm, relaxed, energetic, mellow, etc.) I also often experience a transformation (e.g., a feeling of oneness with the music or being transformed to the past or to another place or time, etc.).
- ___47. When I remember significant events in my life, in addition to thinking about them, I can also re-experience them. That is, I can see again what I saw then, hear again the sounds, voices, etc., as I heard them before, feel the emotions and sensations I felt then. I can re-live them - not just think about them or see them in my mind's eye.
- ___48. I can vividly re-experience in my imagination such things as the feeling of a gentle breeze, warm sand under bare feet, the softness of fur, cool grass, the warmth of the sun, and the smell of freshly cut grass.
- ___49. When asked to close my eyes and imagine holding a baby or an animal (dog, cat, etc.) on my lap, I can experience it as if it were actually there. That is, I can feel its weight and warmth, touch it, see it, hear it, etc.
- ___50. At times just before I fall asleep, I experience vivid images.

- ___51. Many or most of my dreams tend to be at least as vivid as actual life experiences.
- ___52. If I wish, I am usually able to finish or change a dream after I awaken.

Appendix K***Dissociative Experiences Scale*****DIRECTIONS**

This questionnaire consists of twenty-eight questions about experiences that you may have in your daily life. We are interested in how often you have these experiences. It is important, however, that your answers show how often these experiences happen to you when you are not under the influence of alcohol or drugs. To answer the questions, please determine to what degree the experience described in the question applies to you and mark the line with a vertical slash at the appropriate place, as shown in the example below.

Example:

0% |-----/-----|100%

1. Some people have the experience of driving a car and suddenly realizing that they don't remember what has happened during all or part of the trip. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

3. Some people have the experience of finding themselves in a place and having no idea how they got there. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

6. Some people sometimes find that they are approached by people that they do not know who call them by another name or insist that they have met them before. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

8. Some people are told that they sometimes do not recognize friends or family members. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

10. Some people have the experience of being accused of lying when they do not think that they have lied. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

11. Some people have the experience of looking in a mirror and not recognizing themselves. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

12. Some people have the experience of feeling that other people, objects and the world around them are not real. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

13. Some people have the experience of feeling that their body does not seem to belong to them. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

14. Some people have the experience of sometimes remembering past event so vividly that they feel if they were reliving that event. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

17. Some people find that when they are watching televisions or a movie they become so absorbed in the story that they are unaware of other events happening around them. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

19. Some people find that they sometimes are able to ignore pain. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

20. Some people find that they sometimes sit staring off into space, thinking of nothing and are not aware of the passage of time. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

21. Some people sometimes find that when they are alone they talk out loud to themselves. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

22. Some people find that in one situation they may so differently compared with another situation that they feel almost as if they were two different people. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.). Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

24. Some people find that they cannot remember whether they have done something or have just thought about doing that thing (for example, not knowing whether they have just mailed a letter or have just thought about mailing it.). Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

25. Some people find evidence that they have done things that they do not remember doing. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

28. Some people sometimes feel as if they are looking at the world through a fog so that people and objects appear far away or unclear. Mark the line to show what percentage of the time this happens to you.

0% |-----|100%

Appendix L

The Carleton University

Responsiveness To Suggestion Scale

Name _____

Date _____

Age _____

Sex _____

Occupation _____

Telephone _____

PLEASE DO NOT OPEN this booklet until specifically
instructed to do so.

Now, in your own words please list all of the suggestions you can remember. You have two minutes to do this.

PLEASE DO NOT TURN THIS PAGE until you are specifically instructed to do so.

PLEASE DO NOT RETURN TO PAGE 2.

PLEASE DO NOT TURN THIS PAGE until you are specifically
instructed to do so.

PLEASE DO NOT RETURN TO EARLIER PAGES

Now, in your own words please list all of the suggestions you can remember. You have two minutes to do this.

PLEASE DO NOT TURN THIS PAGE until you are specifically instructed to do so.

PLEASE DO NOT RETURN TO EARLIER PAGES

Now, in your own words, please list all of the suggestions you can remember. You have two minutes to do this.

PLEASE DO NOT TURN THIS PAGE until you are specifically instructed to do so.

SECTION ON OBJECTIVE, OUTWARD RESPONSES

Listed below in chronological order are the specific suggestions you were administered following the standard hypnotic induction procedure. We wish you to estimate whether or not you objectively responded to these suggestions, that is, whether or not an onlooker would have observed that you did or did not make certain definite responses by certain specific, predefined criteria. Thus, in this section we are interested in your estimates of your outward behaviour and not in what your inner, subjective experience of it was like. Later on you will be given an opportunity to describe your inner, subjective experience, but in this section refer only to the outward behavioral responses irrespective of what the experience may have been like subjectively.

It is understood that in some cases your estimates may not be as accurate as you might wish them to be and that you might even have to guess. But we want you to make whatever you feel to be your best estimates.

Beneath is a description of each of the six suggestions and are sets of two responses, labelled A and B. Please circle either A or B for each question, whichever you judge to be the more accurate. Please answer every question. Make sure that you do not skip any question. Please answer every one.

1. Arm Rising (Right Arm)

You were asked to extend your right arm straight out in front of you, and were told that your arm was rising into the air. Would you estimate that an onlooker would have observed that your arm had risen at least six inches (before the time you were asked to replace the arm in your lap)?

- Circle one: A. My arm rose at least six inches
B. My arm rose less than six inches

11. Arms Moving Apart

You were asked to extend your arms straight out in front of you with the fingers of one hand touching the fingers of the other. You were then told that your arms were moving apart. Would you estimate that an onlooker would have observed that your hands had moved apart by at least six inches (before the time you were asked to replace them in your lap)?

- Circle one: A. My hands had moved apart at least six inches
B. My hands had moved apart less than six inches

111. Arm Rigidity (Left Arm)

You were asked to hold your left arm straight out in front of you, and were told that the arm was becoming stiff and rigid and that it would not bend. Would you estimate that an onlooker would have observed that there was less than two inches of arm bending (before you were told that your arm was no longer stiff and to replace it in your lap)?

- Circle one: A. My arm was bent less than two inches by then
B. My arm was bent two or more inches by then

1V. Arm Heaviness (Right Arm)

You were asked to place your right forearm on the table with your hand facing down. You were then told how heavy your arm and hand felt and asked to try to lift them from the table. Would you estimate that an onlooker would have observed that you did not lift your hand and arm at least one inch up from the table (before being told that your arm was no longer heavy)?

- Circle one: A. I did not lift my arm and hand at least one inch by then
B. I did lift my arm and hand an inch or more by then

V. Experiencing Music

You were told that a record player had been brought into the room, that you would hear it playing Jingle Bells, and that you would move your head to keep time to the tune. Would you estimate that an onlooker would have observed you to make recognizable movements of the head (before you were told that the record player had been turned off)?

Circle one: A. I did recognizably move my head to the tune
B. I did not recognizably move my head to the tune

VI. Experiencing a Kitten

You were told that a kitten was sitting in your lap. Then you were asked to look at the kitten and to pet it with your hand. Would you estimate that an onlooker would have observed you to make a petting movement with your hand?

Circle one: A. I did make a petting movement with my hand
B. I did not make a petting movement with my hand

PLEASE DO NOT RETURN TO EARLIER PAGES

SECTION ON SUBJECTIVE, INNER EXPERIENCE 1

In this section we are interested in your inner subjective experiences instead of your outward behaviour. We want to find out about what you experienced during each of the suggestions you were given. Please read each question carefully and answer it honestly. The outward response people make to a suggestion may or may not correspond to their inner experience. For example, take a person who's outward behaviour is arm rising when given the suggestion that their arm is light and moving upward. In some cases, a person may have experienced his or her arm as feeling light. In other cases, however, the person's arm may have moved upward even though it did not feel the least bit light. The important thing to keep in mind is that one type of experience is no better or no worse than the other.

This is a scientific study, and all we are interested in is getting at the truth of what people experience. Please answer every question. Make sure that you do not skip any questions.

For each question, choose the one alternative that best describes your experience.

1. Arm Rising (Right Arm)

You were told that your arm was feeling lighter and lighter and was rising in the air. You were asked to imagine that it was like a balloon and was being filled with air.

During this suggestion my arm felt light:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

11. Arms Moving Apart

You were told that your outstretched arms were moving apart, and that they felt like a force was repelling them and pushing them apart.

During this suggestion, my arms felt like a force was pushing them apart:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

111. Arm Rigidity (Left Arm)

You were told that your outstretched left arm was becoming stiff, rigid, and unable to bend. You were asked to imagine the arm in a splint.

During this suggestion, my arm felt stiff and rigid:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

III. Arm Heaviness (Right Arm)

You were told that your arm and hand were very heavy, so heavy that you couldn't lift them from the table. You were asked to imagine heavy weights placed on your hand and arm.

During this suggestion my arm and hand felt heavy:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

V. Experiencing Music

You were told that you would hear the song Jingle Bells and that you would move your head in time with the music.

During this suggestion, I felt like I was hearing the tune Jingle Bells:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

VI. Experiencing a Kitten

You were told that you would see a kitten in your lap and that you would pet the kitten.

During this suggestion, I felt like I was seeing a kitten:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Vll. Forgetting the Suggestion

You were told that you would be unable to remember any of the suggestions you had been given until you heard a tap and the words "Now you can remember everything". You were told that you would be unable to remember the suggestions even when you were asked to try to remember.

During this suggestion, I forgot the suggestions:

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

PLEASE DO NOT RETURN TO EARLIER PAGES

SECTION ON SUBJECTIVE, INNER EXPERIENCES

In this section we are interested in a particular class of subjective, inner experiences. We want to find out about the extent to which you experienced your outward behaviour to each suggestion as happening automatically and without a feeling of effort. For example, take a person whose outward behaviour is to not bend their arm when they are told that the arm is stiff and unable to bend. Such a person may have felt that his or her arm was unable to bend. For this person it may have felt like the arm became stiff and unable to bend all by itself. In other cases, however, a person may not bend their arm even though they know that they could have bent it if they chose to. This person would have had the feeling of voluntarily choosing not to bend the arm. Remember, one type of experience is no better and no worse than the other. We are equally interested in finding out about experiences that feel automatic and also about those that feel voluntary. All we are interested in is getting at the truth about what people experience. So, please be honest in answering each of the following questions. Please answer every question. Make sure you do not skip any questions.

For each question choose the one answer that best describes your experience.

1. Arm Rising (Right Arm)

You were told that your arm was light and rising in the air.

During this suggestion, my arm felt like it rose in the air by itself. I experienced that

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: if you chose to lift your arm voluntarily, or if your arm did not feel like it rose by itself, you should choose alternative (a)

11. Arms Moving Apart

You were told that your outstretched arms were moving apart.

During this suggestion, my arms felt like they were moving apart by themselves. I experienced this

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: If you chose to move your arm voluntarily, or if your arms did not feel like they moved by themselves, you should choose alternative (a).

111. Arm Rigidity (Left Arm)

You were told that your outstretched arm was becoming stiff and unable to bend.

During this suggestion my arm felt like it was unable to bend. I experienced this

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: If you chose voluntarily to not bend your arm, or if your arm did not feel unable to bend you should choose alternative (a).

IV. Arm Heaviness (Right Arm)

You were told that your arm and hand were too heavy to lift from the table.

During this suggestion, my arm felt unable to be lifted. I experienced this

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: If you chose voluntarily to not lift your arm, or if your arm did not feel unable to lift you should choose alternative (a).

V. Experiencing Music

You were told that you would hear the song Jingle Bells.

During this suggestion the tune Jingle Bells seemed to occur automatically, without any effort on my part. I experienced that

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: If experiencing the tune seemed to take a good deal of effort on your part, or if you did not experience the tune choose alternative (a).

VI. Experiencing a Kitten

You were told that you would see a kitten in your lap.

During this suggestion the image of a kitten seemed to occur automatically, without any effort on my part. I experienced this

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: If getting an image of a kitten seemed to take a good deal of effort, or if you did not get an image at all choose alternative (a).

Vll. Forgetting the suggestion

You were told that you would be unable to remember the suggestion you have been given.

During this time the suggestions seemed to disappear automatically from my memory. They seemed to just go away by themselves. I experienced this

- (a) Not at all
- (b) To a slight degree
- (c) To a moderate degree
- (d) To a great degree

Remember: If forgetting the suggestions seemed to require effort on your part, if you had to "try and forget", or if you felt that you did not forget anything, you should choose alternative (a).

Appendix M
Sleep Paralysis Interview

1) In mass testing, you were given the following description: "I was falling asleep but was still awake (or I had just woken up) when I discovered that I felt paralyzed and could not move. However, I could open my eyes and look around the room. I was not dreaming because I could see the actual room that I was in from the perspective where I was lying."

You said that you had this experience at least once. Please describe the last time you had this experience in as much detail as possible.

Note: If subject leaves out any information such as when it happened, if it happened when they were falling asleep or waking up, how long it lasted etc, ask them about it. Also, if subjects say a word or phrase that I can't understand, ask for clarification.

2) Can you remember what your life conditions were before you had this experience...were they the same as usual or unusual? If subjects responds unusual ask: In what ways were your life conditions unusual?

3) Were you on any type of medication, drugs or alcohol before the experience?

4) Have you had more than one of these experiences?

If subject says no go to Question 5.

If subject says yes:

a) About how many times have you had this?

b) How have these experiences been similar to each other?

c) How have these experiences differed from one another?

d) Can you remember what your life conditions were before the other times that you had this? Were they the same as usual or unusual?

5) Have you had any other unusual experiences?

6) Is there anything that I haven't asked you about this experience that I read to you that you think might be important?

Appendix N
Debriefing

Thank-you for your cooperation in this study. This study is attempting to better define the experience of sleep paralysis. Sleep paralysis consists of paralysis before sleeping or just after waking up and accurate perception of the room you are in.

We are also interested in comparing subjects with sleep paralysis and those without on a questionnaire that assesses dissociative experiences.

If you have experienced sleep paralysis you also took part in an interview. This interview was conducted in order to obtain a complete picture of the sleep paralysis experience and its associated features.

If you have any questions or ethical concerns regarding this experiment, please contact any of the following:

Primary Investigators: Stacey McNulty 788-2600 x2684

Faculty Advisor: Dr. N.P. Spanos 788-2600 x2683

Chair of Ethics Committee: Dr. L. Paquet 788-2600 x2692

Chair of Psychology Dept.: Dr. W. Jones 788-2600 x2648

Appendix O
Telephone Script for Narcoleptics

My name is Stacey McNulty and I am a Ph. D. student working with Dr. Roger Broughton at the Ottawa General Hospital. We thought and hoped that you might be interested in participating in a brief questionnaire study. If you will bear with me a couple of minutes, I will tell you a little about it.

This study would involve filling out a series of questionnaires that would be sent to your home. You would complete them and return them in a stamped envelope provided to you.

The questionnaires will ask you questions to assess sleep experiences, personality, abilities, and imagery vividness.

One questionnaire will ask you whether you have been a victim of various types of abuse and some of the questions will be personal and sensitive. Of course if you decide to participate in the study, you have the option of not answering any questions that you do not feel comfortable with. It will take about 1 1/2 hours to complete the questionnaire.

All of the information that you give us in the questionnaires will be kept strictly confidential. The questionnaires that you return to us will not contain your name. There will only be a number. At no stage will we identify your responses with your name. If you do not wish to be involved in this study, it will not affect any aspect of your management or treatment at the Ottawa General Hospital.

Would you be interested in participating?

Yes _____ No _____

If no is answered: I really appreciate you taking the time to consider this study. Thank you.

If yes is answered: I will send the questionnaires to you as soon as possible. Do you have any questions? Thank you.

Appendix P

Advertisement For Control Subjects

Carleton University Researcher is looking for volunteers for a questionnaire research study. The questionnaires would assess personality, imagery, sleep behavior and past abuse experiences. Some questions are quite sensitive and personal. All information is strictly confidential. If you are interested in receiving more information call Stacey at 788-2600 ext.2684.

Appendix Q***Telephone Script for Controls Subjects***

My name is Stacey McNulty and I am a Ph. D. student working at the Ottawa General Hospital. If you will bear with me a couple of minutes, I will tell you a little about it.

This study would involve filling out a series of questionnaires that would be sent to your home. You would complete them and return them in a stamped envelope provided to you.

The questionnaires will ask you questions to assess sleep experiences, personality, abilities, and imagery vividness.

One questionnaire will ask you whether you have been a victim of various types of abuse and some of the questions will be personal and sensitive. Of course if you decide to participate in the study, you have the option of not answering any questions that you do not feel comfortable with. It will take about 1 1/2 hours to complete the questionnaire.

All of the information that you give us in the questionnaires will be kept strictly confidential. The questionnaires that you return to us will not contain your name. There will only be a number. At no stage will we identify your responses with your name.

Would you be interested in participating?

Yes_____ No_____

If no is answered: I really appreciate you taking the time to consider this study. Thank you.

If yes is answered: Ok, I have to ask you one question to see whether you qualify for the study. Have you ever been diagnosed with narcolepsy? I will send the questionnaires to you as soon as possible. Could I get your address to send you the questionnaires? Do you have any questions? Thank you.

Appendix R
Informed Consent

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

This is a research project aimed at examining the relationship between sleep phenomena and various psychological measures.

You will be asked to complete a series of questionnaires at home that assess facets of personality, abilities, and drug use. One questionnaire will ask whether you have been a victim of types of abuse. Some of the questions on potential abuse are quite personal and sensitive and may be somewhat discomfoting. The questionnaires will take approximately 1 1/2 hours to complete. No travel to the hospital is required.

Your participation is completely voluntary without remuneration and you have the freedom and right to withdraw from this study at any time without question or any negative effects from the investigator or the Ottawa General Hospital. You may also refuse to answer any questions that you do not wish to answer. If you do not wish to be involved in this project this will not affect any aspect of your management or treatment at the Ottawa General Hospital. There are no known risks or benefits to you by participating in this project. This project has been approved by both the Research Ethics Board of the Ottawa General Hospital and the Ethics Board at Carleton University.

All information will be strictly confidential and will be used for research purposes only. Data will be coded such that your name is not associated with the data and this coded data will be made available only to researchers associated with this project. You will be able to receive information about the study at any time and will receive a copy of the consent form.

Research personnel: The following people are involved in this research project and may be contacted at any time: Stacey McNulty 788-2600 x2684 or Dr. R. Broughton 737-6634.

Should you have any ethical concerns about this research please contact Dr. L. Paquet, Chair, Dept. of Psychology Carleton University Ethics Committee 788-2600 x2692 or Dr. W. Jones, Chair, Department of Psychology, Carleton University 788-2600 x2648.

I have read the above and understand the conditions of my participation. My signature indicates that I agree to participate in this experiment.

Signature of participant _____

Date _____

Appendix S***Inter-item Reliabilities in the Current Sample (Study 2)***

	Alpha
SCL-90: Interpersonal sensitivity	.78
Anxiety	.89
Hostility	.80
Obsessive-compulsive	.89
Depression	.89
Phobic anxiety	.90
Paranoid ideation	.78
AE-III: Physical punishment	.80
Perception of discipline	.78
Negative family atmosphere	.81
Parental rejection	.83
VMIQ	.89
Absorption	.75
Perceptual aberration	.84
Magical ideation	.83
PPI: Liberal beliefs	.86
Paranormal beliefs	.88
Temporal lobe lability	.84
ICMI	.83
DES	.91

Appendix T
Narcolepsy Questionnaire

1) In what year were you first diagnosed as having narcolepsy? _____

Daytime Naps: *Try to remember a 'typical' day that you had in the last week and answer the following questions with that day in mind.*

Please show time of falling asleep and estimates minutes asleep.

Nap 1.. Fell asleep at _____ am/pm. Slept for ____ min.
Nap 2.. Fell asleep at _____ am/pm. Slept for ____ min.
Nap 3.. Fell asleep at _____ am/pm. Slept for ____ min.
Nap 4.. Fell asleep at _____ am/pm. Slept for ____ min.

(use an additional page if necessary.)

MEDICATION RECORD: Please list any medications that you took on the 'typical' day that you chose.

NIGHT SLEEP: Think of the night sleep that you had before the typical day that you just described and answer the following questions.

I was in bed and tried to fall asleep at _____ am/pm.
I fell asleep within about _____ minutes.
I remember awakening in the night about _____ times.
My total time awake during the night was about _____ minutes.
I finally awoke from my night's sleep at _____ am/pm.

DAYTIME SLEEPINESS: Think of the typical day that you chose when you answer the following questions.

How likely are you to doze off or fall asleep in the following situations, in contrast to just feel tired? Even if you have not done some of these things recently try to work out how they would have affected you. Use the following scale to chose the most appropriate number for each situation:

0 = would never doze 2 = moderate chance of dozing
1 = slight chance of dozing 3 = high chance of dozing

SITUATION	Chance of dozing
Sitting and reading.....	_____
Watching TV.....	_____
Sitting, inactive in a public place.....	_____
As a passenger in a car for an hour without a break.....	_____
Lying down to rest in the afternoon when circumstances permit	_____
Sitting and talking to someone	_____
Sitting quietly after a lunch without alcohol .	_____
In a car, while stopped for a few minutes in the traffic	_____

CATAPLEXY: (brief loss of muscle tone/paralysis following sudden stimulus such as surprise or emotion.) Think of the typical day that you have chosen. Please estimate the likelihood of any of the following causing you to lose partial or complete control of your muscles, flop or fall. Please put a cross on the line that corresponds to what you experience, if necessary estimated. For example, if a good joke makes you sometimes, but not always feel weak, the cross to question 1 would be in the middle of the line.

(1) Telling a good joke myself, when I am standing up
Never-----Always

(2) Listening to a good joke, when I am standing up
Never-----Always

- (3) Suddenly seeing a long forgotten friend or acquaintance, when I am standing up
 Never-----Always
- (4) A very sudden, extremely loud noise behind me, when I am standing up
 Never-----Always
- (5) If I was captain of a world football team, about to score a goal
 Never-----Always
- (6) If I was very angry, if I was standing up
 Never-----Always

Please answer the following questions that also concern cataplexy.

- 1) During the cataplexy do you usually see anything unusual (dreamlike or hallucination)?

 Yes No

If yes describe what you see. _____

- 2) During the cataplexy do you hear usually anything unusual?

 Yes NO

If yes describe what you hear. _____

- 3) During the loss of muscle tone do you usually have any unusual body sensations (for example, tingling, tightness or pressure)?

 Yes No

If yes describe the sensation. _____

HALLUCINATIONS: In this case consider hallucinations that occur when you are not having a cataplexy attack.

1) How often do you have hallucinations?

- a) Daily.
- b) Less than daily.
- c) Less than once per week.
- d) Less than once per month.

2) How long do they usually last for? _____ minutes.

3) Do you often have a visual hallucination?

____ Yes ____ No

If yes describe what you see. _____

4) Do you have hallucination that affect you hearing. That is do you hear anything unusual?

____ Yes ____ NO

If yes describe what you hear. _____

AMNESIA:

1) Do you ever have more or less prolonged episodes of behaviour for which you later have no recall (amnesic automatic behaviour)?

____ Yes ____ No

2) How long do these usually last for? ____ Minute(s).

3) How many times per week would you estimate that you have this amnesia? _____ Times

VISION:

1) Do you often have episodes of blurred vision?

____ Yes ____ No

2) Do you often have episodes of double vision?

____ Yes ____ No

Appendix U
Debriefing

DO NOT READ UNTIL AFTER YOU HAVE
FINISHED ANSWERING ALL OF THE
QUESTIONNAIRES.

PLEASE KEEP THIS PAGE ONLY

Thank-you for your cooperation in this study. We are interested in comparing narcoleptic subjects with control subjects a number of psychological dimensions such as imagery vividness, family life and psychological adjustment.

This study is also attempting to assess whether physical, emotional and sexual abuse is related to sleep paralysis in narcoleptic subjects. Haga (1989, in Nordisk Psykiatrisk Tidsskrift, 43 (6) pages 515-520) hypothesized that sleep paralysis in subjects without narcolepsy reflected past sexual trauma. There is no evidence to date that this hypothesis is true in either narcoleptic patents or subjects without narcolepsy. In the event that the questionnaire on abuse has caused you any personal distress, the following information is provided to aid you. Additionally, we may be contacted to answer any questions that you may have or to otherwise aid you.

Services for Victims of Abuse:

24 Hour Helplines:

Distress Center 238-3311

Rape Crisis Center 729-8889

Sexual Assault Support Center 234-2266

If you have any questions or ethical concerns regarding this experiment, please contact any of the following:

Primary Investigators: Stacey McNulty 788-2600 ext.
2684

Faculty Advisor: Dr. R. Broughton 737-8155

Chair of Ethics Committee, Carleton University: Dr. L.
Paquet 788-2600 x2692