

# Waterloo Unusual Sleep Experiences Questionnaire –VIIIa

## Technical Report

J. A. Cheyne

Department of Psychology

University of Waterloo

May 2002

The current report provides some basic descriptive information about the Waterloo Unusual Sleep Experiences Questionnaire. I make no attempt to explicitly discuss the theoretical and conceptual issues or their associated hypotheses addressed by our research. This report is primarily descriptive and psychometric and hence will emphasize the quantitative components. We do consider, however, the inclusion of the qualitative aspects of this instrument to be an important strength. The questionnaire is retrospective and asks respondents to reflect on past sleep paralysis (SP) episodes. The responses necessarily conflate episodes and the analyses reflect individual (respondent) differences in the aggregate experiences rather than characteristics of individual episodes. We have recently developed a concurrent version of the questionnaire, in which people report on individual episodes shortly after they occur. The standard (retrospective) version of the questionnaire is being validated against this more recent concurrent questionnaire.

The primary purpose in the development of this instrument has been to assess the frequency and intensity of the SP experience and of the qualitative features of the hallucinatory experiences that frequently accompany SP. One of the first goals of the project was to describe the structure of these hallucinatory experiences. Other objectives have been to investigate individual and situational factors associated with the occurrence and nature of the SP experience.

A list of our publications addressing the conceptual and theoretical issues is provided in the bibliography at the end of this report.

The Waterloo Unusual Sleep Experiences Questionnaire has undergone a variety of modifications over the last five years. The latest version, VIIIa, differs only in minor ways from previous versions. The major difference is in the assessment of SP frequency. Most previous versions had used a rather course-grained scale. Participants were asked if they had ever experienced a brief period of paralysis immediately prior to falling asleep or upon awakening, (1) Never, (2) Once, (3) Two to five times, (4) More than five times. As will be evident in later sections, most of our respondents experience many more than five episodes. In earlier versions we tried increasing the numbers beyond five, but many respondents remarked, quite reasonably, that it was impossible to estimate actual numbers of episodes experienced over a lifetime, particularly among those respondents who had experienced SP frequently and for a long period of time. The current scale attempts to accommodate the one time experient and those who have had only a few episodes as well as those who have regular experiences. The frequency options are: Once, several times in life, several times a year, monthly, weekly, several times a week. All versions of the questionnaire have employed a seven point Likert scale to assess the vividness or intensity of the overall experience as well as of the individual hallucinatory experiences. The end points are anchored, at the low end of the scale with the description “vague and suggestive, more like a hint of something,” and, at the high end with “a very clear and distinct impression, as clear as any everyday experience.” Different hallucinatory experiences have been added over succeeding versions based on the comments of our respondents and our interest in including as many sensory modalities as feasible without making the questionnaire

unreasonably long. We have also attempted to re-order the presentation of individual questions in different versions to control for order-of-question effects.

The current version assesses the following kinds of experiences: sensed presence, visual, auditory, and visual hallucinations, movement of bedcovers, pressure on the chest or other body part, difficulty breathing, pain, choking, smothering, motor movements (getting up, walking around, flipping light switches, etc.), floating, out-body experiences, falling, elevator feelings, flying, spinning sensations, autoscopy, tingling, shaking, feeling cold, and smelling odors. Five emotions and feelings during SP were also assessed: fear, anger, sadness, bliss, and erotic feelings. In addition to rating intensity, experiencers also indicated the relative frequency of each type of hallucination (Never, Occasionally, Frequently, and Always). These rather coarse-grained relative frequencies were used because respondents complained in earlier surveys that it was unrealistic for them to attempt to recall precise numbers or even proportions of times they experienced particular hallucinations. Both relative frequencies and vividness/intensity scales were used for all items. For a few items additional questions were asked. For the sensed presence, respondents were asked to indicate their impressions of the gender of the presence. The pressure question they were asked if the pressure felt like a passive weight or a person/creature sitting on them. For the auditory questions they were asked if the hallucination was just a noise, footsteps, or voices.

Other questions ask about time since last SP episode (within last few hours, last 24 hours, last week, last month, last six months, or last year), and age at the time of the first episode, how alert the respondent was during SP (7-point Likert scale). Two questions assess both normal sleeping position and position during SP. The options include On Back, Face Down, On Left Side, and On Right Side. There are also options for reporting that the position varies from

occasion to occasion or that the respondents simply do not remember. Several questions assess the timing of the episode (when falling asleep, when waking up, and/or during sleep, as well as whether SP episodes occurred during the main period of sleep and/or during naps (N.B., the responses were not constrained to be mutually exclusive). Respondents are asked whether they are able to open their eyes during the experience. One item asks about false awakenings. One section assesses whether respondents have ever been diagnosed for a variety of sleep-related disorders or symptoms (narcolepsy, sleep apnea, insomnia, cataplexy, daytime sleep attacks, frequent night waking), affective disorders (depression, anxiety, or panic disorder). Additional items in this section ask about hypokalemic paralysis, epilepsy, fibromyalgia, sexual and physical abuse, and PTSD. These are simply yes-no format. Individuals are also asked if they have noticed any conditions or medications associated with episodes. Sex, age, birth date, citizenship, ethnicity, and occupation are also assessed. Respondents are finally afforded a final opportunity to make general comments about their experiences and/ or the questionnaire itself. Respondents are also invited to leave email addresses if they are willing to be contacted by the researchers for further study.

The current report includes the 2973 completed survey forms received for version VIIIa by the end of May 13, 2002.

### *Respondent characteristics*

As for earlier versions of this instrument there is a slightly greater than 2:1 ratio of women to men (2001:972). The mean age of the sample is 29.16 (SD = 10.02) consistent with earlier versions. The median age is 27 and the mode is 22. The lower mode reflects the fact that

the sample is negatively skewed with a preponderance of younger respondents (See Figure 1).

The age distribution is very similar for women and men. For example, the mean age is 29 in both cases.

Each respondent was asked to estimate the age of first SP episode. Of the total, 2397 respondents estimated an exact age in years. Reported age of onset of SP episodes peaks in middle adolescent with a mean of 17, a median of 16 and a mode of 15. The 20s are the next most common period for SP onset followed by the early adolescent. It is also clear, however, that SP onset is being reported at all ages (Figure 2).

*Citizenship:* Approximately 80% of the respondents are US citizens and the remaining respondents are UK, Canadian, Australian, European, and Other in descending order of frequency. Ethnicity and occupational data have not yet been analyzed.

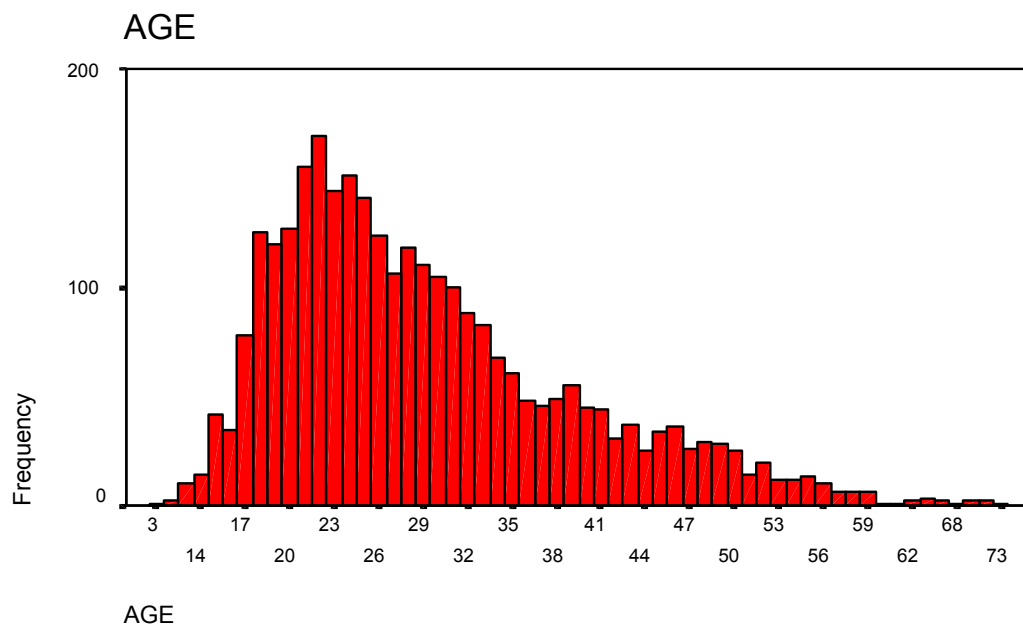


Figure 1: Age distribution of the sample

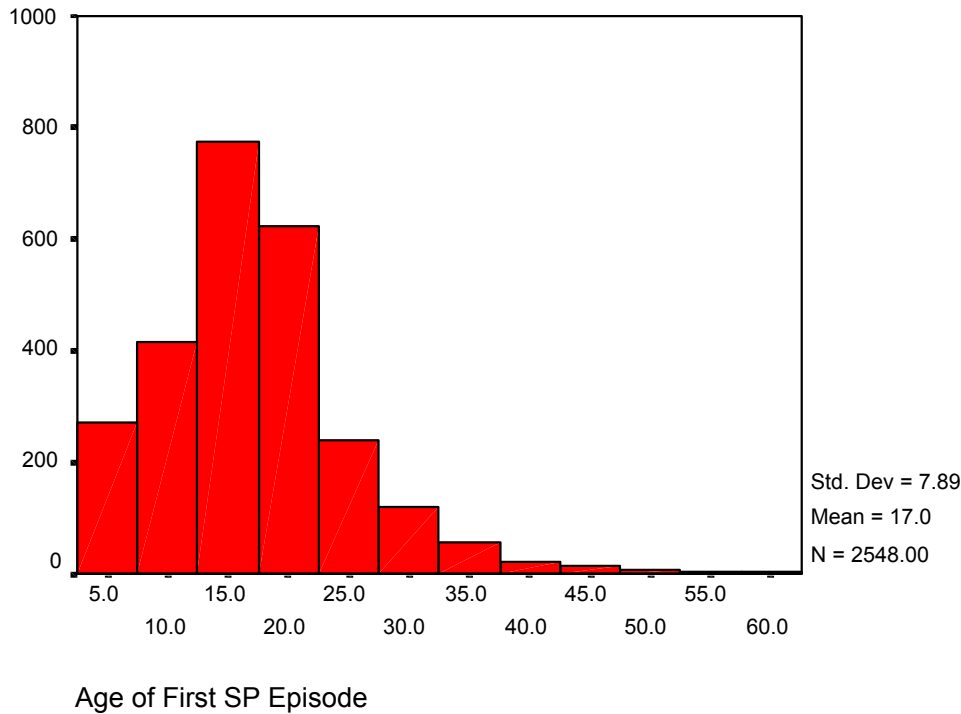


Figure 2: Frequency distribution for age of first SP experience

### *SP frequency and intensity*

Relatively few respondents to our questionnaire are one time experients. About one-third of experients have had one or several experiences and slightly more than a quarter report experiencing SP weekly or more frequently (Table 1). The most common category consists of those experiencing SP several times year. The mean intensity or vividness of the SP episodes was 6.18 (SD = 1.24). The median and mode were both 7. Indeed, a majority, almost 60%, selected the highest rating.

Frequency of SP Episodes	Frequency	Percent
Once	200	7
Several times in life	700	24
Several times a year	867	29
Monthly	622	21
Weekly	325	11
Several times a week	259	9
Total	2973	

Table 1: Frequencies and percentages of Respondents reporting different frequencies of SP episodes

### *SP Hallucinations*

The results for the hallucination types will be reported in groupings that correspond to the empirical factors that have been found in earlier studies. (The items do not appear in their groupings in the questionnaire.) The first set of hallucinations have been characterized as Intruder hallucinations because they are all interpretable (and frequently interpreted as) as indicating the presence of an intruder in the room. This category includes sensed presence, visual, auditory, and visual hallucinations, as well as movement of bedcovers. The second category of hallucinations is the Incubus. The Incubus hallucinations, named with the Latin term for the night creature that assaults the experient while sitting on her chest. These hallucinations include the impression of pressure on the chest, difficulty breathing, pain, choking, smothering or suffocating feelings (smothering was used in version VIIIa), and fear of dying. The third set of hallucinations involves proprioceptive and vestibular hallucinations, that is hallucinations of spatial, orientational, and temporal (STO) hallucinations of bodily position and movement. These

include: motor movements, floating, out-body experiences, falling, elevator feelings, flying and spinning sensations, and autoscopy. Additional hallucinations not associated with the major categories are presented separately. These include tingling sensations, shaking, feeling cold, and smelling odors. The order of presentation of the questions has been changed several times from version to version. Five emotions and feelings were assessed as well. These were fear anger, sadness, bliss, and erotic feelings.

### *Relative Frequency of Hallucinations*

For the analysis of relative frequencies those respondents reporting only one SP experience were eliminated.

*Intruder Hallucinations:* These hallucinations include the sensed presence, visual, auditory, and tactile hallucinations, and moving bedcovers. The results for the 2773 SP experiencers who reported multiple SP episodes are provided in Table 2. As we have found in previous studies the sensed presence is the most common Intruder hallucination (and most common hallucination overall) with almost 80% of respondents reporting having sensed a presence at least occasionally during SP. Approximately 60 % reported auditory and visual hallucinations, whereas only 41% reported tactile hallucinations, and 20 % movement of the bedcovers.

Hallucination Type	Sensed Presence		Tactile (Touch) Bedcovers		
	Auditory	Visual			
Relative Frequency:					
Never	21	40	44	59	80
Occasionally	28	25	30	22	13
Frequently	21	16	16	12	4
Always	30	19	10	8	3

Table 2: Percentage of respondents reporting different relative frequencies of five Intruder hallucinations

Respondents were also asked to indicate if they were able to assign a specific sex to the sensed presence. Only one-third (33.4%) was able to do so. Of these most (82%) perceived the presence to be male, although this depended somewhat on the sex of the respondent,  $\chi^2(1, N = 992) = 15.37, p < .001$ . Women were significantly more likely than men to see the sensed presence as male.

		Respondent		
		Sex:	Female	Male
Sex of Sensed Presence	Female	Frequency	118	65
		%	84	73
	Male	Frequency	633	176
		%	16	27

Table 3: Assigned sex of sensed presence for female and male respondents

Respondents were also asked to specify if the auditory hallucinations consisted of simple noises, footsteps, or voices. Slightly more than half of the auditory hallucinations involved hearing voices. Hearing footsteps was also remarkably common given its specificity. The different categories of sound were not mutually exclusive. One-third of respondents reporting auditory hallucinations reported more than one kind of sound.

	Frequency	Percent
Noise	793	46
Footsteps	509	29
Voices	882	51

Table 4: Frequencies and percentages of respondents reporting specific auditory hallucinations

*Incubus Hallucinations:* These hallucinations include pressure, thoughts of dying, breathing difficulties, pain, and smothering feelings. Approximately two-thirds of respondents reported feelings of pressure. Almost as many reported feeling that they might die. Slightly less than half reported difficulty breathing, one-quarter reported pain and fewer than 20% reported smothering sensations.

Hallucination Type	Pressure	Die	Breathing	Pain	Smother
Relative Frequency					
Never	32	34	54	73	81
Occasionally	25	27	22	15	12
Frequently	32	18	11	6	5
Always	25	21	12	5	3

Table 5: Percentages of respondents reporting different relative frequencies of Five Incubus Hallucinations

Respondents were also asked to indicate if the pressure felt like a simple weight on the chest or if it seemed more like a person or creature (incubus) sitting on the chest. Of those responding to this question, a substantial majority reported that the pressure felt like a weight on the chest and almost a quarter of the sample reported an incubus experience.

	Frequency	Percent
Weight	1238	63
Incubus	515	26

Table 6: Frequencies and percentages of respondents reporting pressure as a weight or as an incubus

*STO Hallucinations:* These hallucination include illusory motor movement involving locomotion, floating sensations, out-of-body experiences (OBEs), elevator sensations, flying, spinning, and the experience of seeing one's body lying on the bed from an outside perspective (autoscopy). Illusory movements were the most common of the STO hallucinations with slightly more than half of the respondents reporting motor movement. Forty to thirty percent of respondents reported OBEs, falling, and elevator experiences, while only about 20% reporting spinning sensations or autoscopy. Although the STO experiences are generally somewhat less common than the Intruder or incubus experiences they are far from rare.

Hallucination Type	Motor	Floating	OBE	Falling	Elevator	Flying	Spinning	Autoscopy
Relative Frequency								
Never	49	59	61	65	68	78	81	79
Occasionally	23	27	24	22	18	14	11	14
Frequently	17	10	10	9	9	6	5	4
Always	11	5	6	4	5	2	3	2

Table 7: Percentages of respondents reporting different relative frequencies of STO hallucinations

*Other Hallucinations:* There are a number of experiences that are not consistently associated with the three major categories. These are electric or tingling sensations, feelings of vibrations, feeling cold, and smelling odors. Tingling sensations were fairly common being reported by 60% or respondents. Vibrating sensations were somewhat less common. Feeling cold and especially smelling odors were relatively rare.

Hallucination Type	Tingling	Vibrating	Cold	Odors
Relative Frequency				
Never	40	66	82	94
Occasionally	17	16	12	5
Frequently	14	9	4	1
Always	29	10	3	1

Table 8: Percentages of respondent reporting different relative frequencies of other hallucinations

*Emotions and feelings:* A number of emotions and feelings were assessed. These were fear, anger, sadness, bliss, as well as erotic feelings. Fear is almost universal with 96% of respondents reporting fear. All other emotions and feelings are considerably less frequent but it is interesting to note that the experience of fear does not preclude the possibility of other emotions, including even bliss and erotic feelings.

Emotion Type	Fear	Anger	Sad	Bliss	Erotic
Relative Frequency					
Never	4	70	77	83	83
Occasionally	13	15	13	13	13
Frequently	20	8	4	3	3
Always	63	7	4	1	1

Table 9: Percentages of respondents reporting different relative frequencies of emotions and feelings

### *Intensity/Vividness of Hallucinations*

*Intensity (Vividness) of Major Hallucination Types:* All of the major types of hallucinations were rated as being very intense, the smallest mean being 5 on the 7-point scale (Table 7). The medians and modes were all 5 or greater. All distributions were negatively skewed. The most intensely rated hallucinations were feeling of pressure, sensed presence and auditory hallucinations. In general, there was a modest relation between frequency of hallucinations types and the intensity with which they were rated.

Intruder Hallucinations	Sensed		Tactile					
	Presence	Auditory	Visual	(Touch)	Bedcovers			
N	2299	1721	1615	1181	584			
Mean	5.86	5.77	5.56	5.66	5.24			
Std. Deviation	1.56	1.62	1.74	1.66	1.86			
Median	7	7	6	6	6			
Mode	7	7	7	7	7			
Skewness	-1.32	-1.23	-0.99	-1.06	-0.71			
Std. Error (Skew)	0.05	0.06	0.06	0.07	0.10			
Incubus Hallucinations	Pressure		Die Breathing		Pain	Smother		
N	1784	1925	1313	792	553			
Mean	5.98	5.61	5.31	4.80	5.28			
Std. Deviation	1.53	1.69	1.80	1.86	1.82			
Median	7	6	6	5	6			
Mode	7	7	7	7	7			
Skewness	-1.62	-1.04	-0.73	-0.29	-0.71			
Std. Error (Skew)	0.06	0.06	0.07	0.09	0.10			
STO Hallucinations	Motor	Floating	OBE	Falling	Elevator	Flying	Spinning	Autoscopy
N	1409	1180	1125	974	903	626	549	595
Mean	5.56	5.21	5.24	5.27	5.26	5.26	5.19	5.04
Std. Deviation	1.66	1.79	1.78	1.77	1.70	1.81	1.77	1.89
Median	6	5	6	6	6	6	6	5
Mode	7	7	7	7	7	7	7	7
Skewness	-0.90	-0.60	-0.66	-0.67	-0.59	-0.75	-0.55	-0.60
Std. Error (Skew)	0.07	0.07	0.07	0.08	0.08	0.10	0.10	0.10

Table 10: Descriptive statistics for intensity/vividness ratings of major hallucinations

*Intensity (Vividness) of Other Hallucinations:* Hallucinations not included in the major categories were also rated as quite vivid, although feelings of being cold and smelling odors were rated as somewhat less intense.

Other Hallucinations	Tingling	Vibrating	Cold	Odors
N	1746	997	542	181
Mean	5.76	5.23	4.57	4.62
Std. Deviation	1.62	1.78	1.81	1.97
Median	7	6	5	4
Mode	7	7	7	7
Skewness	-1.16	-0.64	-0.13	-0.19
Std. Error (Skew)	0.06	0.08	0.10	0.18

Table 11: Descriptive statistics for intensity/vividness of other hallucinations

*Intensity (Vividness) of Emotions and Feelings:* Fear was rated as extremely intense with the majority of respondents (68%) assigning a score of seven on the 7-point scale. All other emotions were assigned substantially lower intensity scores though all measures of central tendency for all categories were well above the midpoint of the scale.

Emotions and Feelings	Fear	Anger	Sad	Bliss	Erotic
N	2854	865	662	539	478
Mean	6.31	5.13	4.76	4.89	4.97
Std. Deviation	1.24	1.76	1.81	1.98	1.77
Median	7	5	5	5	5
Mode	7	7	7	7	7
Skewness	-1.95	-0.52	-0.26	-0.52	-0.43
Std. Error (Skew)	0.05	0.08	0.09	0.11	0.11

Table 12: Descriptive statistics intensity/vividness of emotions and feelings

*Eyes Open:* A substantial majority of respondents (70%) reported that they were able to open their eyes at least occasionally and over one-third reported that they could always open their eyes.

Eyes Open	Frequency	Percent
Never	896	30
Occasionally	544	18
Frequently	480	16
Always	1053	35

Table 13: Frequencies and Percentages of respondents reporting ability to open eyes during SP

*False Awakenings:* A majority of respondents (58%) reported false awakenings at least occasionally.

False Awakening	Frequency	Percent
Never	1262	42
Occasionally	1003	34
Frequently	506	17
Always	202	7

Table 14: Frequencies and percentage of respondents reporting false awakenings

*Position during SP:* Respondents reported that they were much more likely to be in the supine position than any other position during SP episodes,  $\chi^2(1, N = 2935) = 3162.97, p < .001$ , and more likely to be in the supine position and less likely to be in any other position during SP than during their normal attempts to fall asleep,  $\chi^2(1, N = 2935) = 3324.36, p < .001$ .

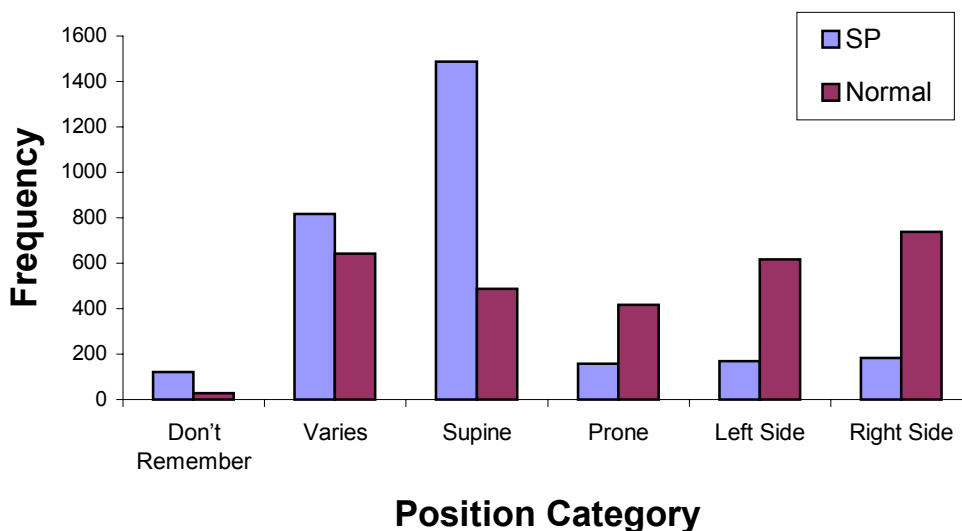


Figure 3: Frequencies of responses to questions about body position during SP and normal sleep

*Diagnoses/disorders:* Not surprisingly, there were a comparatively large number of respondents who reported that they had been diagnosed with narcolepsy. Although 1.72% is a very small proportion of the SP respondents it is between 10 and 30 times the rate of narcolepsy in the population. Cataplexy symptoms are less common than narcolepsy, whereas sleep attacks and especially problems with night waking are much more common reported. The rates for insomnia and for the affective disorder also seem fairly high.

*Diagnoses/disorders and Frequency of SP Episodes:* Narcolepsy and related symptoms of problems of state maintenance were all significantly related to frequency of SP episodes. Those reporting diagnoses/symptoms (Yes column in Table 15) reported significantly higher SP frequencies than those not reporting such symptoms (No column in Table 15). The only other significant finding for diagnosis/symptoms was a higher reported frequency of SP among those reporting hypokalemic paralysis (Yes column) than among those not reporting this potassium disorder (No column.). Affective disorder and trauma responses were unrelated to SP frequency.

Diagnosis/ Disorders			No	SP Frequency		Yes	sig.
	Frequency	Percent	Mean	SD	Mean	SD	
Narcolepsy	51	1.72	3.31	1.35	3.84	1.45	*
Cataplexy	23	0.77	3.31	1.35	4.39	1.34	*
Sleep Attack	181	6.09	3.30	1.35	3.61	1.39	*
Night Waking	578	19.44	3.29	1.35	3.46	1.36	*
Apnea	121	4.07	3.32	1.35	3.34	1.41	
Insomnia	564	18.97	3.31	1.35	3.38	1.37	
Depression	785	26.40	3.32	1.35	3.32	1.37	
Anxiety	459	15.44	3.31	1.36	3.36	1.34	
Panic Disorder	244	8.21	3.31	1.36	3.39	1.35	
Sexual Abuse	270	9.08	3.30	1.36	3.52	1.32	
Physical Abuse	168	5.65	3.31	1.35	3.43	1.37	
PTSD	161	5.42	3.32	1.35	3.39	1.35	
Hypokalemic Paralysis	21	0.71	3.31	1.35	4.10	1.48	*
Epilepsy	38	1.28	3.31	1.35	3.68	1.38	
Fibromyalgia	0	0.00					

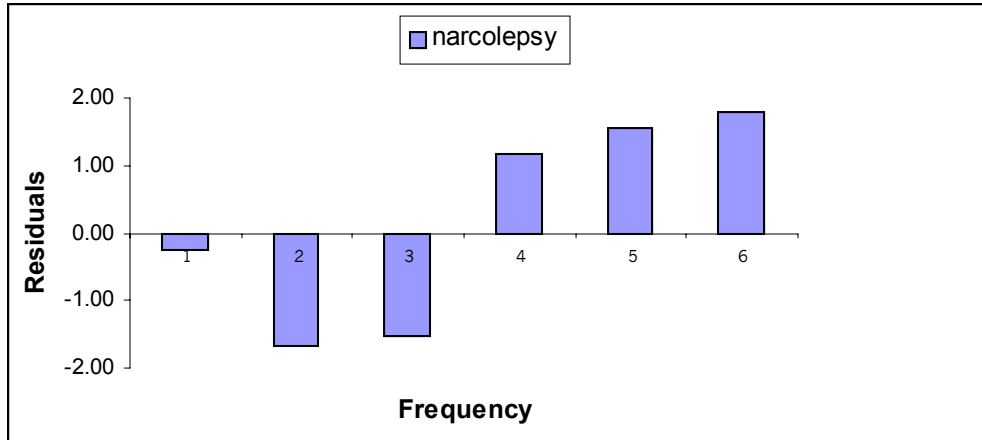
Table 15: Frequencies and percentages of affirmative responses to questions regarding sleep disorders and symptoms, affective disorders, trauma, hypokalemic paralysis, epilepsy and fibromyalgia. Means and SDs are for SP frequency for respondents who reported (Yes) or did not report (No) each category.

*Diagnosis/Symptoms and Frequency of SP hallucinations:* The effect of diagnosis/symptoms on frequency with which hallucinations from each major type of hallucinations occurred during SP episodes was also examined. The frequency score 0 = never, 2 = occasionally, 3 = frequently, 4 = always for hallucinations) all hallucination types within each category were summed to create a score for each of Intruder, Incubus, and STO hallucinations. Several significant differences between those reporting sleep difficulties and those not reporting sleep difficulties were found, most consistently for sleep disruptions. In all cases those reporting sleep difficulties reported a greater likelihood of experiencing hallucinations during SP than those not reporting sleep difficulties. On the other hand, it should also be noted that the effect sizes were quite small in all cases.

Similar results were obtained for affective disorders and trauma. Respondents reporting such problems generally reported a greater likelihood of hallucinations during SP than those not reporting such problems. Respondents reporting hypokalemic paralysis also reported a greater likelihood of Incubus and STO hallucinations during SP. The effects for epilepsy were not significant.

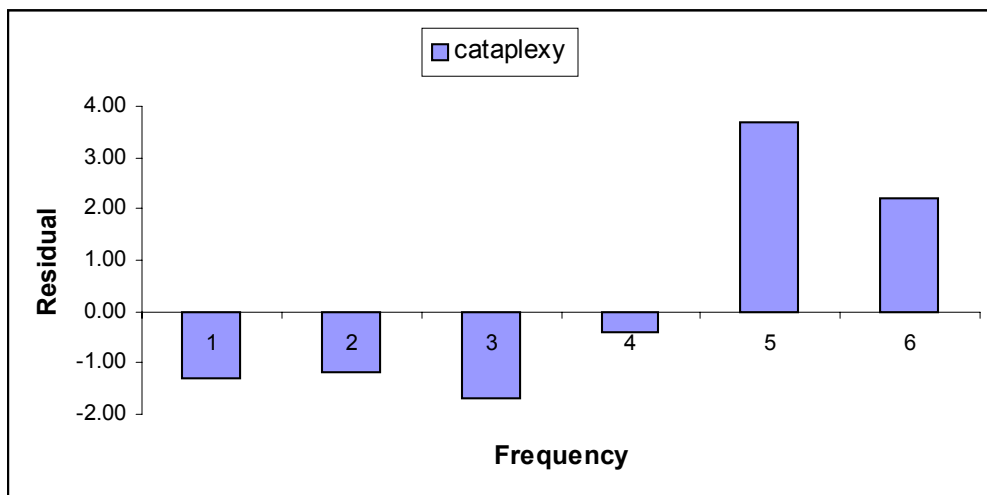
		Intruder		Incubus		STO	
		Mean	SD	Mean	SD	Mean	
Narcolepsy	No	4.62	3.23	4.15	3.22	4.03	4.06
	Yes	5.31	3.29	5.29*	3.36	4.54	4.35
Cataplexy	No	4.62	3.23	4.16	3.22	4.02	4.06
	Yes	6.48*	2.71	4.65	3.65	5.48	4.26
Sleep Attack	No	4.62	3.21	4.13	3.21	3.99	4.04
	Yes	4.83	3.44	4.66	3.34	4.68	4.28
Night Waking	No	4.50	3.19	4.00	3.14	3.87	3.93
	Yes	5.18 *	3.33	4.84*	3.45	4.70*	4.49
Apnea	No	4.62	3.22	4.14	3.21	3.99	4.03
	Yes	5.05	3.42	4.75*	3.41	4.98*	4.68
Insomnia	No	4.61	3.23	4.11	3.20	3.98	4.03
	Yes	4.76	3.21	4.40	3.32	4.27	4.19
Depression	No	4.51	3.15	3.96	3.11	3.87	3.99
	Yes	4.98*	3.42	4.75*	3.45	4.49*	4.22
Anxiety	No	4.60	3.18	4.05	3.17	3.90	4.00
	Yes	4.84	3.45	4.81*	3.43	4.78*	4.33
Panic Disorder	No	4.63	3.19	4.07	3.18	3.96	4.02
	Yes	4.65	3.58	5.22*	3.52	4.81	4.41
Sexual Abuse	No	4.54	3.18	4.04	3.16	3.91	3.96
	Yes	5.50*	3.52	5.41*	3.57	5.17*	4.77
Physical Abuse	No	4.58	3.21	4.07	3.16	3.96	4.03
	Yes	5.60*	3.32	5.69*	3.83	5.20*	4.41
PTSD	No	4.61	3.22	4.10	3.18	3.94	4.01
	Yes	5.01	3.38	5.36*	3.66	5.64*	4.64
Hypokalemic Paralysis	No	4.63	3.23	4.16	3.21	4.01	4.05
	Yes	5.75	3.19	5.90*	4.73	6.70*	5.07
Epilepsy		4.63	3.22	4.16	3.22	4.02	4.05
		5.03	3.61	4.66	3.47	5.08	0.63

Table 16: Diagnosis/Symptoms and the Means and SDs for frequency of Intruder, Incubus, and STO hallucinations. An asterisk associated with a mean indicates that it is significantly different from the mean directly above.



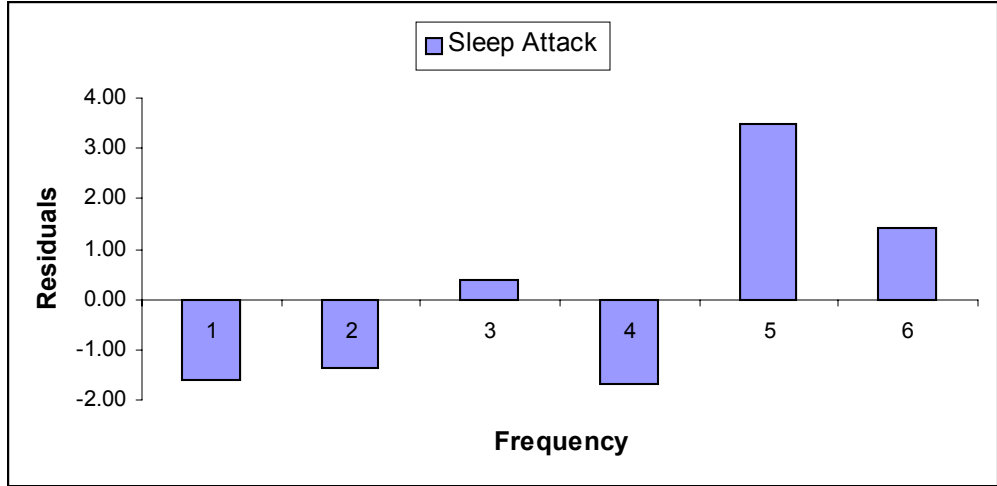
$\chi^2(5, N = 2973) = 9.90, p < .08$

Linear association:  $\chi^2(1, N = 2973) = 7.77, p < .01$

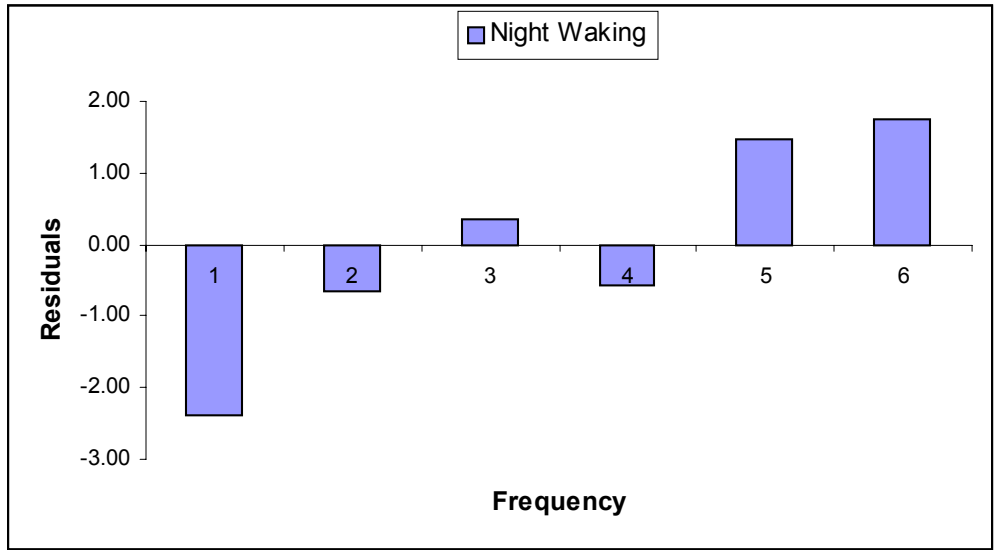


$\chi^2(5, N = 2973) = 21.43, p < .001$

Linear association:  $\chi^2(1, N = 2973) = 14.53, p < .001$



$\chi^2(5, N = 2973) = 18.82, p < .001$   
Linear association:  $\chi^2(1, N = 2973) = 9.09, p < .001$



$\chi^2(5, N = 2973) = 10.66, p < .06$   
Linear association:  $\chi^2(1, N = 2973) = 7.22, p < .01$

Figure 4: Residuals for each of four measures of sleep-wake regulation problems for each level of SP frequency (1 = Once, 2 = several times in life, 3 = several times a year, 4 = monthly, 5 = weekly, 6 = several times a week)

*SP during Naps and Main Sleep Period:* Respondents were asked to indicate if they experienced SP during naps as well as during their main period of sleep. Of the 2765 respondents who answered this question, slightly more than half (55%) reported that they experienced SP only during the main period of sleep, 13% reported SP only during naps, and almost a third (32%) reported experiencing SP during both naps and the main period of sleep. Respondents reporting only infrequent SP episodes were more likely to report experiencing SP only during their main period of sleep, whereas those reporting regular SP episodes, monthly or more often, were more likely to report SP during both naps and the main period of sleep (Table 17).

	Naps Only	Main Only	Naps + Main
Several times in life	-0.31	6.29	-6.40
Several times a year	0.54	2.41	-2.90
Monthly	0.80	-3.15	2.76
Weekly	-0.67	-3.19	3.82
Several times a week	-0.84	-5.23	6.08

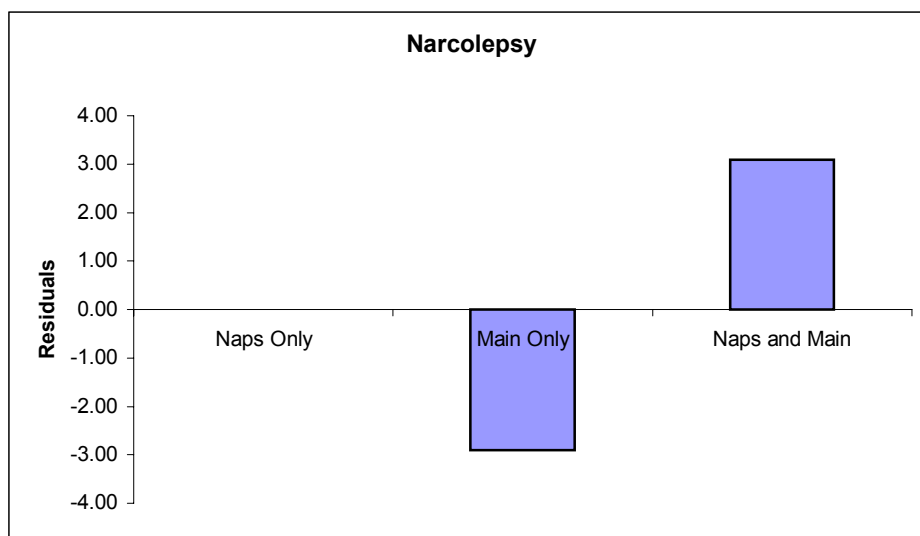
Table 17: Residuals for frequencies of respondents reporting different frequencies of SP for naps, main period of sleep, and for both

The relation between sleep problems involving regulation of sleep-wake transitions and SP episodes during naps and main periods of sleep was also examined (See Figure 6). Respondents reporting Narcolepsy and cataplexy were more likely to report SP episodes during both naps and the main period of sleep and less likely to report SP only during the main period of sleep than those not reporting these problems (Figure 6 A & B). Those reporting sleep attacks were more likely to report SP during naps and during both naps and the main period of sleep. The results for sleep interruptions were not significant but it is interesting to contrast the negative residual for naps with the significant positive residual for naps for those reporting sleep attacks (Figure 6 C & D).

\*                      \*                      \*

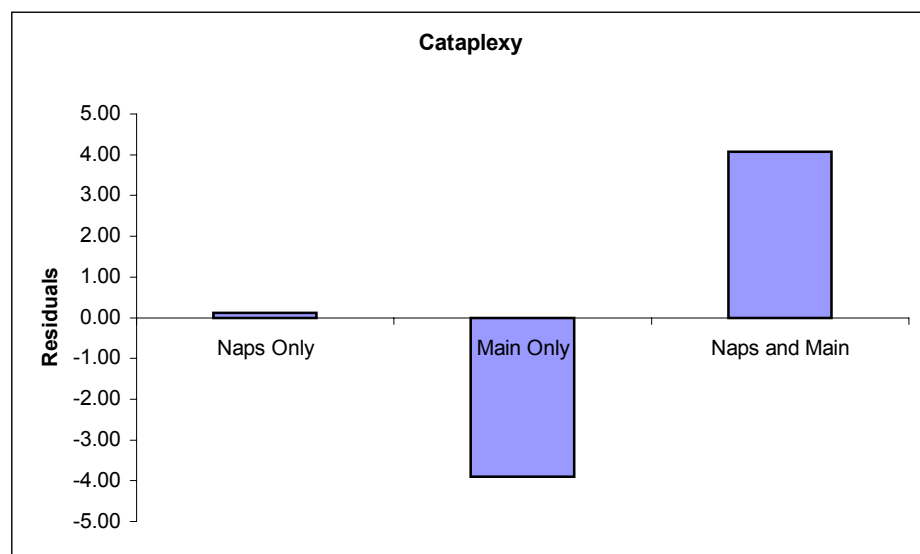
The results reported here are quite consistent with those found using earlier versions of the questionnaire. Respondents to our questionnaire are largely regular experiencers of WP. Many clearly experience frequent, vivid and varied hypnagogic and hypnopompic hallucinations during the episodes. We have learned much about the structure of these hallucinations and are beginning to gain a better understanding of some of the conditions and individual differences contributing to both the frequency and intensity of the experiences. Ongoing studies are attempting to replicate and extend these findings using prospective methods. Of particular interest at this time are factors involving the regulation and regularity of sleep-wake states in frequent experiencers of SP. I am very grateful to all those who have taken the time to respond to our questions and, in many cases, to describe in sometimes gripping detail their personal experiences.

A.



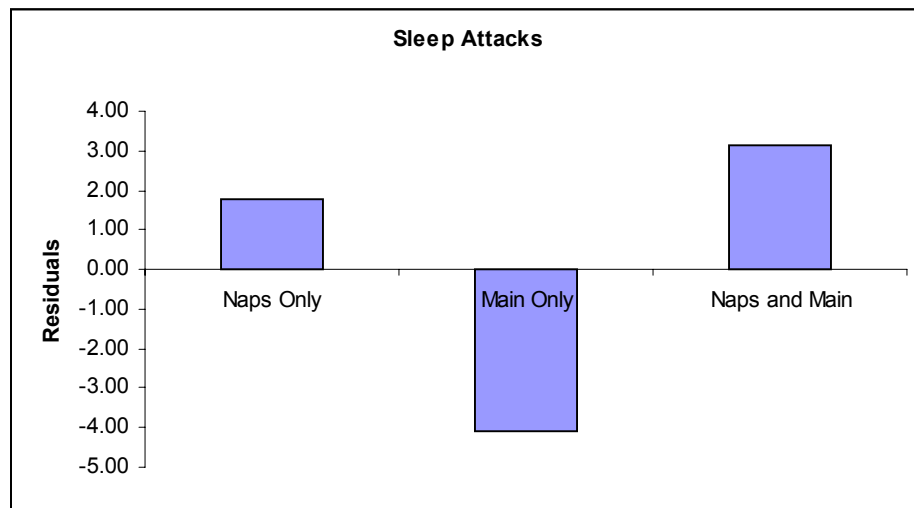
$$\chi^2(2, N = 2965) = 10.22, p < .01$$

B.



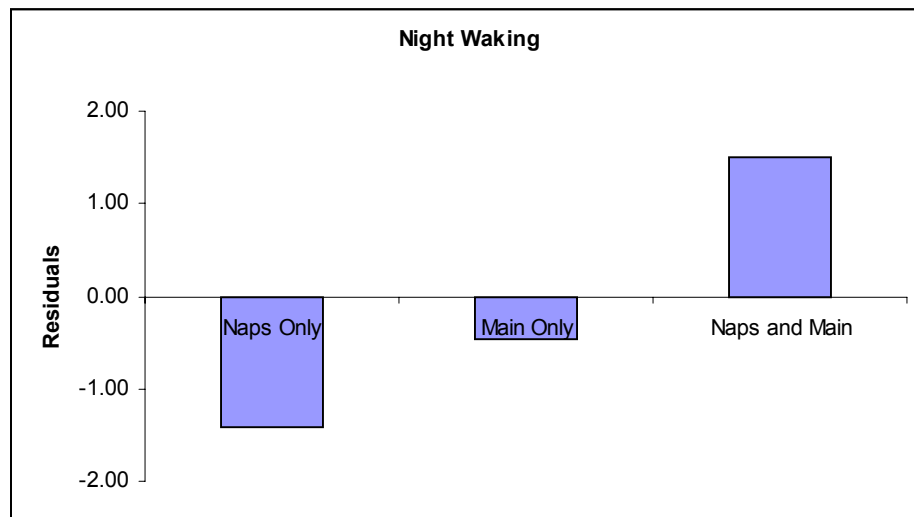
$$\chi^2(2, N = 2965) = 18.08, p < .001$$

C.



$$\chi^2(2, N = 2965) = 16.92, p < .001$$

D.



$$\chi^2(2, N = 2965) = 3.39, p < .18$$

Figure 6: Residuals for four measures of sleep-wake regulation problems for respondents report SP during Naps Only, Main Sleep Period Only, and both during Naps and Main Sleep Period

## Bibliography

Cheyne, J. A., Newby-Clark, I.R., & Rueffer, S.D. (1999). Sleep paralysis and associated hypnagogic and hypnopompic experiences. *Journal of Sleep Research*, 8, 313-318.

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

Cheyne, J. A. (2000). Play, dreams, and simulation. *Behavioral and Brain Sciences*, 23, 918-919.

Cheyne, J. A. (2001). The ominous numinous: Sensed presence and 'other' hallucinations. *Journal of Consciousness Studies*, 8, 133-150.

Cheyne, J. A. (2002). Situational factors affecting sleep paralysis and associated hallucinations: Position and timing effects. *Journal of Sleep Research*, 10, 1-9.

Newby-Clark, I. R., Rueffer, S. D., & Cheyne, J. A. (1999). Sleep Paralysis and associated Hypnopompic and Hypnagogic Experiences: Basic Experience and Subsequent Elaboration. Poster presented at Consciousness and Self, 3<sup>rd</sup> Annual Conference of the Society for the Scientific Study of Consciousness, June 4-7, London, Ontario.

Rueffer, S. D., Newby-Clark, I. R., & Cheyne, J. A. (1999). The Elaboration of Anomalous Conscious Experiences: Individual Differences in Hypnagogic and Hypnopompic Hallucinations during Sleep Paralysis. Poster presented at Consciousness and Self, 3<sup>rd</sup> Annual Conference of the Society for the Scientific Study of Consciousness, June 4-7, London, Ontario.