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Epstein, Dana Robin, M.S.

The University of Arizona, 1988

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MEASUREMENT OF SUBJECTIVE SLEEP CHARACTERISTICS
OF ADULT INSOMNIACS

by

Dana Robin Epstein

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A Thesis Submitted to the Faculty of the
COLLEGE OF NURSING
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
In the Graduate College
THE UNIVERSITY OF ARIZONA

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APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Joyce A. Verran
J. A. Verran
Associate Professor of Nursing

April 29, 1988
Date

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TABLE OF CONTENTS

	Page
LIST OF ILLUSTRATIONS.....	6
LIST OF TABLES.....	7
ABSTRACT.....	8
CHAPTER	
1. INTRODUCTION.....	9
Statement of the Problem.....	10
Instrumentation in Insomnia.....	15
Purpose of the Study.....	16
Significance of the Study.....	17
Summary.....	18
2. CONCEPTUAL FRAMEWORK.....	19
Supplementation.....	21
Wake After Final Arousal.....	24
Daytime Sleep, AM Sleep, and PM Sleep.....	24
Disturbance.....	29
Sleep Latency and Quality of Latency.....	29
Mid-Sleep Awakening, Wake After Sleep Onset, and Quality of Disturbance.....	35
Movement During Sleep.....	40
Soundness of Sleep.....	42
Effectiveness.....	44
Total Sleep Period and Total Sleep Time.....	44
Rest Upon Awakening.....	47
Subjective Quality of Sleep.....	47
Sleep Sufficiency Evaluation.....	48
Predictions in the Insomniac Population.....	48
Summary.....	49
3. RESEARCH METHODOLOGY.....	51
Research Design.....	51
Setting and Sample.....	51
Comparison Sample.....	53
Protection of Human Subjects.....	53
Data Collection Instrument.....	54
Data Collection Procedure.....	56
Data Analysis.....	57
Limitations of the Study.....	57
Summary.....	58

TABLE OF CONTENTS--Continued

	Page
4. RESULTS OF DATA ANALYSIS.....	59
Description of the Sample.....	59
Analysis of Reliability.....	61
Factor Analysis.....	63
Comparison of Sleep Characteristics Predictions..	65
Subjective Sleep Characteristics of Adult	
Insomniacs	70
Summary.....	72
5. CONCLUSIONS AND IMPLICATIONS.....	73
Interpretation of Findings Related to Research	
Questions.....	74
Reliability.....	74
Factor Analysis.....	74
Comparison of Healthy and Insomniac Samples...	76
Supplementation Subscale.....	76
Disturbance Subscale.....	77
Effectiveness Subscale.....	78
Subjective Sleep Characteristics.....	79
Supplementation Subscale.....	80
Disturbance Subscale.....	80
Effectiveness Subscale.....	81
Recommendations for Future Research.....	82
Implications for Nursing.....	83
Summary.....	84
APPENDIX A: Human Subjects Approval.....	85
APPENDIX B: Disclaimer.....	86
APPENDIX C: Demographic Information Questionnaire...	87
APPENDIX D: Participant Information Questionnaire...	88
APPENDIX E: Verran and Snyder-Halpern Sleep Scale...	90
APPENDIX F: Permission To Use Verran and Snyder-	
Halpern Sleep Scale.....	91
LIST OF REFERENCES.....	92

LIST OF ILLUSTRATIONS

Figure	Page
1. Taxonomy of the Verran, and Snyder-Halpern Sleep Scale	20

LIST OF TABLES

Table	Page
1. VSH Sleep Scale: Factors, Characteristics, and Definitions.....	22
2. Predictions for Insomniac Sample Compared to Healthy Sample.....	50
3. Adult Insomniac Sample: Description of Personal Characteristics (N=33).....	60
4. Adult Insomniac Sample: Means and Standard Deviations of Personal Sleep Habits (N ranges from 22 to 33).....	62
5. Adult Insomniac Sample: Reliability Estimates (N=87).....	64
6. Adult Insomniac Sample: Factor Analysis and Percentage of Variance (N=87).....	66
7. Predictions for Insomniac Sample Compared to Healthy Sample.....	67
8. Comparison of Healthy and Insomniac Samples: T-tests and Predictions (N=242).....	68
9. Adult Insomniac Sample: Subjective Sleep Characteristics (N ranges from 32 to 99).....	71

ABSTRACT

This study had two purposes: (1) to examine the reliability and validity of the Verran and Snyder-Halpern (VSH) Sleep Scale in measuring the subjective sleep characteristics of nonhospitalized adult insomniacs, and (2) to explore the 16 characteristics of sleep quality examined by the scale as they relate to insomnia. In addition, a comparison of previously established norms in a healthy group of sleepers was made with the insomniac sample.

The study utilized a descriptive design. The sample consisted of 33 adult insomniacs. Each participant completed the scale on three consecutive routine or workday mornings. Descriptive and inferential statistics were used to evaluate the data.

The VSH Sleep Scale evidenced adequate reliability and construct validity. Significant differences existed between the insomniacs and the healthy group on all but one sleep characteristic. The factors specified in the VSH Sleep Scale taxonomy remained essentially the same in the insomniac sample.

CHAPTER 1

INTRODUCTION

Many Americans suffer from sleep disorders. It is estimated that one-third of the population may have disturbed sleep (Mendelson, 1980). This study focused on the subjective measurement of insomnia which is "a chronic inability to obtain adequate sleep" (Bootzin & Nicassio, 1978, p.2). The use of the word adequate recognizes the important subjective quality of insomnia. People's need for sleep varies greatly (Kales & Kales, 1984). There is no table of norms to determine whether a person's time to fall asleep or amount of sleep are within normal limits (Spielman, 1986). Thus, the insomniac's subjective experience may be the essential component of the disorder (Bootzin & Engle-Friedman, 1981).

Two types of insomnia were addressed in this study. For the purposes of this study sleep onset insomnia was defined as greater than 45 minutes to fall asleep occurring at least four times per week for at least six months. Sleep maintenance insomnia was defined as wake time after sleep onset greater than 60 minutes or total sleep time less than six and one half hours per night occurring at least four times per week for at least six months.

An overview and statement of the problem are presented. The purpose of the study is discussed. Finally, the significance of the study is examined.

Statement of the Problem

Insomnia is the most common type of sleep disorder. A large portion of the general population experiences insomnia. Bixler, Kales, Soldatos, Kales, & Healy, (1979) estimated 32% of their Los Angeles metropolitan area sample (n=1006) had insomnia. 35% of a Florida sample (n=1645) was estimated to have insomnia (Karacan et al., 1976). A nationwide survey of 1,064,004 adults placed the estimate at 21% (Hammond, 1964).

Sleep disorders can begin in early life and continue for many years (Bixler et al., 1979). The prevalence of insomnia is higher in older persons and women (Bixler et al., 1979; Hammond, 1964; Karacan et al., 1976; McGhie & Russell, 1962; Tune, 1968). Older women complain of difficulty falling asleep and light sleep with frequent awakenings (Bixler et al., 1979; McGhie & Russell, 1962; Tune, 1968). The complaint of insomnia is also associated with psychological disturbances (Bixler et al., 1979; Johns, Egan, Gay, & Masterton, 1970; McGhie & Russell, 1962; Sweetwood, Grant, Kripke, Gerst, & Yager, 1980; Sweetwood, Kripke, Grant, Yager, & Gerst, 1976) and lower

socioeconomic status (Bixler et al., 1979; Karacan et al., 1976; McGhie & Russell, 1962; Simonds & Parraga, 1982; Weiss, Kasinoff, & Bailey, 1962). The environmental conditions associated with lower socioeconomic conditions may contribute to insomnia in this population (Kales & Kales, 1984). Insomnia was more prevalent in highly populated areas (Bixler, Kales, & Soldatos, 1979) where many persons of lower socioeconomic status might be found. Psychiatric outpatients had a higher prevalence of insomnia than nonpatients with a strong association found between the frequency and chronicity of the insomnia and the degree of psychiatric disturbance (Sweetwood, Grant, Kripke, Gerst, & Yager, 1980; Sweetwood, Kripke, Grant, Yager, & Gerst, 1976).

Several findings have evolved from surveys exploring the relationship of the duration of sleep to health and mortality rate. Approximately 7,000 persons surveyed associated seven or eight hours sleep with good health (Belloc & Breslow, 1972). Lower mortality rates were reported for men who estimated their sleep at eight hours per night (Belloc, 1973). This finding did not hold for women. A replication study with a subsample of Belloc and Breslow's subjects reiterated the finding that the health practices related to health status and mortality risk were predictive of health status nine years later in 1974

(Wiley & Comacho, (1980)). In a two year follow-up, men who estimated their sleep at less than four hours per night were up to ten times more likely to have died than those who estimated their sleep at 7 to 7.9 hours per night (Hammond, 1964). A methodological flaw of many of these studies is the lack of control for major diseases. When a study is controlled for major diseases, among other factors, the association between insomnia and mortality rate is not consistent (Kripke, Simons, Garfinkel, & Hammond, 1979), although on a six year follow-up, men estimating their sleep at less than four hours per night were 2.8 times more likely to have died as men who reported 7 to 7.9 hours per night. For women reporting less than four hours sleep per night the mortality rate was 1.5 times that of women who slept 7 to 7.9 hours per night within the six year follow-up. The researchers suggest that it is the use of sleeping pills and the shortened sleep duration, not the insomnia itself, which are the major mortality risk factors. Persons who often used hypnotics had a mortality rate 1.5 times that of persons who never used sleeping medication.

Kales and Kales (1984) have called for the inclusion of chronic insomniacs among the more than 30 million people disabled by chronic illness. More specifically they believe chronic insomnia should be in the category of

psychobehavioral disorders such as obesity and chronic pain. As with other chronic illnesses, insomnia takes its toll on the interpersonal relations of the sufferer. Kales and Kales note the large amount of secondary gains that insomniacs' symptoms provide for them. The symptoms excuse them from normal daily routines. Involvement in family activities decreases, sexual and marital interactions are affected, and parental responsibilities are ignored. Insomniacs are functioning overall at a lower level than normal with decreased alertness and concentration. Insomnia can be reinforced when insomniacs learn to use their symptoms in a manipulative and avoidant fashion.

Certain predisposing factors may play a role in the onset of insomnia (Healey et al., 1981). As children, insomniacs were more emotionally upset, less content with their parents, and less satisfied with their family lives. Their dissatisfaction was demonstrated by increased illnesses and somatic complaints with a focus on eating and sleeping. Kales and Kales (1984) have suggested that adults who "were emotionally deprived in childhood, which led them to feel inadequate, insecure, and dependent as adults" (p. 46) are at risk for developing insomnia. Therefore, these individuals use their illness in such a way that they more often expect nurturance from others and

actually feel entitled to it. The sincere helping efforts by family members can provide secondary gains for the insomniac and lead to a situation whereby everyone is engulfed in the sick role and a stable but dysfunctional family unit develops. Finally, the insomniac's symptoms affect job performance, many times leading to dismissal and the resulting impact on society in terms of unemployment and other compensatory measures.

There is a high prevalence of psychopathology associated with insomnia. The Minnesota Multiphasic Personality Inventory (MMPI) has been used to study the personality patterns of insomniacs (Kales, Caldwell, Preston, Healy, & Kales, 1976; Kales, Caldwell, Soldatos, Bixler, & Kales, 1983). Insomniacs' personality profiles are marked by neurotic depression, rumination, chronic anxiety, inhibition of emotions, and an inability to express anger. The most outstanding psychologic characteristic is the internalization of emotions as a method to handle stress and conflicts. A diagnostic study utilizing the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) found a high level of psychiatric diagnoses among insomniacs (Tan, Kales, Kales, Soldatos, & Bixler, 1984). The most common psychiatric diagnoses were dysthymic disorder and compulsive personality disorder or trait. Axis III diagnoses of physical disorders and

conditions occurred less frequently but when these diagnoses were made they were always associated with significant psychopathology.

Considering the family, social, and health care provider roles in chronic insomnia and their research findings, the Kales research team has suggested abandoning the "disease model" concept of treatment and adapting instead a biopsychosocial model to understanding and treating insomnia (Kales, et al., 1982; Kales, Bixler, et al., 1984; Kales, Caldwell, Soldatos, Bixler, & Kales, 1983; Kales, Kales, et al., 1984; Tan, Kales, Kales, Soldatos, & Bixler, 1984).

Instrumentation in Insomnia

A variety of insomnia studies have been conducted using objective instrumentation which involves costly and time consuming methods. Sleep questionnaires are the most common method of measuring sleep (Bootzin & Engle-Friedman, 1981). Sleep questionnaire data reflect the person's view of the insomnia problem which is important in a subjective phenomenon such as this. Subjective insomnia instrumentation also plays an important role in assessment and evaluation. There is no other way to obtain information about the insomniac's perception of the problem or to find out if treatment interventions have

been effective (Bootzin & Engle-Friedman, 1981). Large groups of people can be surveyed with this inexpensive method. Unfortunately, the retrospective nature of sleep questionnaires may give way to some sources of bias.

Usually each research group will develop its own sleep questionnaire for use in their sleep studies, but some researchers (e.g. Evans, 1977; Johns, 1975; Parrot & Hindmarch, 1978, 1980; Webb, Bonnet, & Blume; 1976) have reported factor analyses and normative data (Bootzin & Engle-Friedman, 1981). Most reports of insomnia research lack reliability estimates and validity determination for the subjective sleep instruments used in the studies. The Verran and Snyder-Halpern (VSH) Sleep Scale (Snyder-Halpern & Verran, 1987), developed by nurse scientists, may have more clinical usefulness in sleep research due to its brevity, ease of use, and reported reliability and validity.

Purpose of the Study

This research study had two purposes. First, the study proposed to examine the reliability of the Verran and Snyder-Halpern (VSH) Sleep Scale (Snyder-Halpern & Verran, 1987; Verran, 1987) in measuring the subjective sleep characteristics of nonhospitalized adult insomniacs. Second, the 16 characteristics of sleep quality examined

by the scale were explored as they relate to insomnia. Specifically, the four research questions asked in this study were:

1. Is the VSH Sleep Scale reliable in an insomniac sample?
2. Do the factors specified in the VSH Sleep Scale taxonomy remain the same in an insomniac sample?
3. Do sleep characteristics of insomniacs, as measured by the VSH Sleep Scale, differ from the sleep characteristics of a healthy (normal sleepers) group previously measured by the VSH Sleep Scale, in a way predictable from the literature?
4. What are the subjective sleep characteristics of subjects with sleep onset latency and sleep maintenance insomnia?

Significance of the Study

Although nursing research exists concerning the sleep-wakefulness rhythm (Floyd, 1983) and sleep in hospitalized patients (e.g. Helton, Gordon, & Nunnery, 1980; Hilton, 1976; Snyder-Halpern, 1985), there is a paucity of nursing research in the area of insomnia despite its prevalence and strong biopsychobehavioral components. Considering the high prevalence of insomnia in the general population, nurses can be expected to

encounter insomniacs in multiple clinical settings. Increased knowledge of insomnia for nurses is sorely needed. In addition, the development and testing of instruments to be used by nurses has been identified as a priority in nursing research (Ventura, Hinshaw, & Atwood, 1981). More specifically, a reliable and valid subjective instrument for use in sleep disturbance research can facilitate our understanding of insomnia and add to developing a knowledge base in nursing.

Summary

This chapter presented the statement of the problem. The purpose and significance of the study were discussed. The need for instrumentation in insomnia was presented.

The high incidence of insomnia, the impact on all aspects of the insomniac's life, and the strong association with psychopathology comprise the immense scope of the insomnia problem. Nurses need to better understand this important sleep disturbance and nursing has an obligation to examine insomnia since it has seldom been addressed in our discipline from a research viewpoint. Nursing is in need of instrumentation for use in research in insomnia. Valid and reliable instrumentation to describe the subjective sleep characteristics of insomniacs will aid nursing research and ultimately client care.

CHAPTER 2

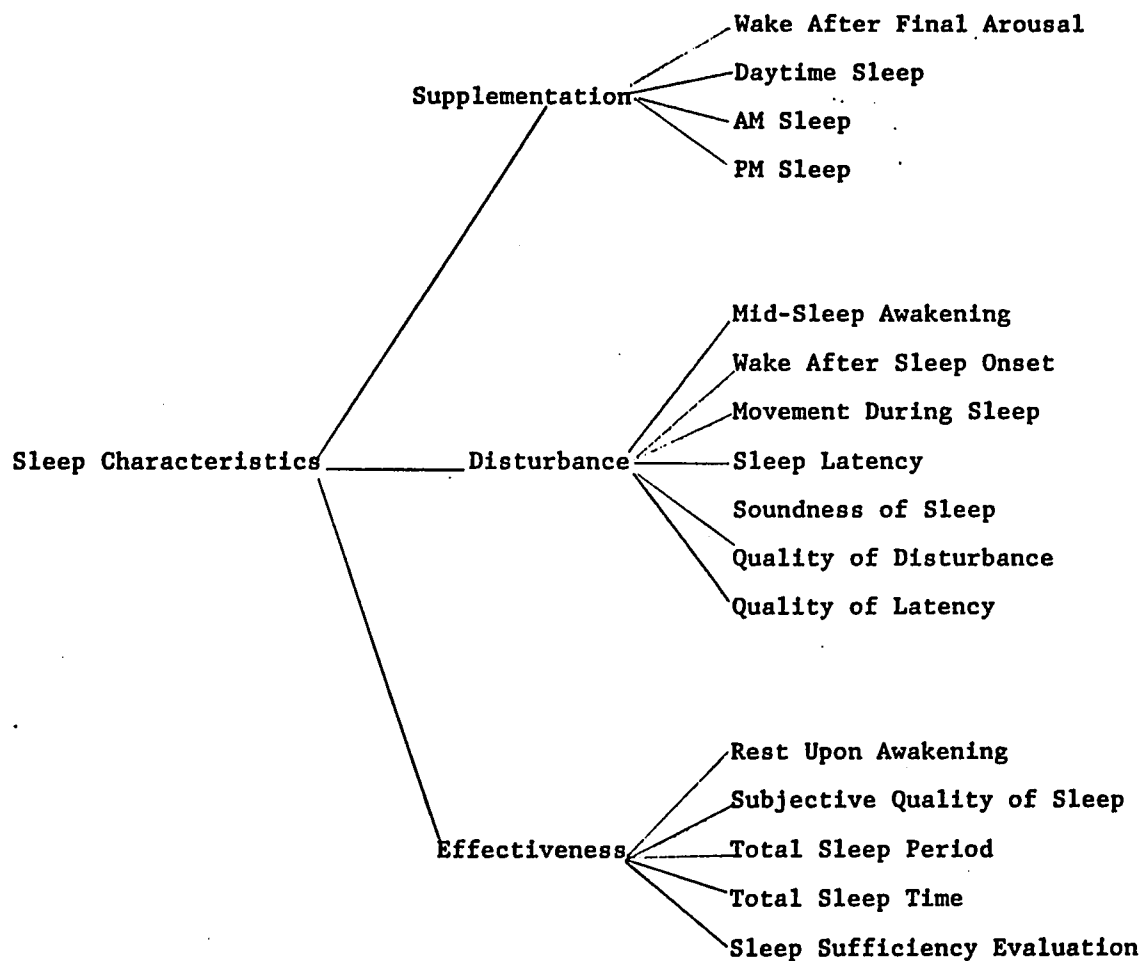
CONCEPTUAL FRAMEWORK

Among the many rhythmic phenomena exhibited by humans, nursing has long recognized the importance of their unique and changing sleep-wake rhythms (Rogers, 1970; Rogers, 1986). Disturbances, such as insomnia, can occur in the ordered arrangement of the sleep-wake rhythm.

The constant rhythmical energy interchange between humans and their environment and its effect on the sleep-wakefulness rhythm is noted in the subjective reports of insomniacs. As the life process evolves in its nonrepetitive unidirectional flow, changes occur in the pattern of the sleep-wakefulness rhythm. For example, it is widely known that the sleep-wake pattern changes over the lifespan, such that the pattern becomes more complex and more sleep-wake cycles may be experienced within a 24 hour period than earlier in the lifespan. Rogers (1986) notes the acceleration of human rhythms in today's society. In insomnia this may be manifested in the sleep pattern and in patterns of temporal perspective as well (Borkovec, 1982). Alterations in the sleep-wake pattern may be experienced as problematic for the individual and can be subjectively measured.

A taxonomy of sleep factors (Figure 1) provided the framework for the subjective measurement of the experience

FIGURE 1
Verran and Snyder-Halpern Sleep Scale
Taxonomy of Factors and
Related Sleep Characteristics



of insomnia. The taxonomy consists of three factors: (a) supplementation; (b) disturbance; and (c) effectiveness. The supplementation factor contains four sleep characteristics, the disturbance factor contains seven sleep characteristics, and the effectiveness factor contains five sleep characteristics. The factors, sleep characteristics, and definitions as developed by Snyder-Halpern and Verran (1987) are presented in Table 1. The sleep characteristics, or variables, included in the taxonomy are discussed in relation to insomnia. Both objective and subjective data are presented. Where no data was found to support a variable in the insomniac population, the variable remains the same as for normal sleepers.

Supplementation

This section presents a discussion of the sleep characteristics in the supplementation subscale. Objective and subjective findings from the literature were reviewed. The sleep characteristics were examined as they relate to insomnia. An emphasis was placed on the applicability of the insomniac's self-report to the sleep scale items. Finally, a prediction was made as to how the participants would answer each subscale item based on the discussion of the literature.

Table 1

VSH Sleep Scale: Factors, Characteristics, and Definitions

Factor/Characteristic	Definitions
<u>Supplementation</u>	
Wake After Final Arousal (WAFA)	Estimate of amount of time in bed from initial morning arousal to final awakening.
Daytime Sleep (DTS)	Estimate of amount of time asleep during the morning and afternoon other than the primary sleep period.
AM Sleep (AMS)	Estimate of amount of time asleep during the morning other than the primary sleep period.
PM Sleep (PMS)	Estimate of the amount of time asleep during the afternoon other than the primary sleep period.
<u>Disturbance</u>	
Mid-Sleep Awakening (MSA)	The number of awakenings during the sleep period.
Wake After Sleep Onset (WASO)	Estimate of the amount of time spent awake during the total sleep period (TSP).
Movement During Sleep (MDS)	Subjective estimate of the amount of movement during sleep.
Sleep Latency (SL)	Estimate of the amount of time from settling down to sleep until falling asleep.

Table 1 (continued)

VSH Sleep Scale: Factors, Characteristics, and Definitions

Factor/Characteristic	Definitions
Soundness of Sleep (SS)	Subjective estimate of sleep depth.
Quality of Disturbance (QD)	Subjective estimate of sleep disturbance due to awakenings.
Quality of Latency (QL)	Subjective estimate of difficulty in going to sleep.
<u>Effectiveness</u> Rest Upon Awakening (RUA)	Subjective estimate of how rested the person is upon awakening.
Subjective Quality of Sleep (SQS)	Individual estimate of sleep time along dimensions of satisfaction, quality, and disturbance in sleep.
Total Sleep Period (TSP)	Estimate of total time from settling down for sleep to awakening in the morning (TST + WASO).
Total Sleep Time (TST)	The estimate of the amount of time spent in actual sleep during the total sleep period (TSP).
Sleep Sufficiency Evaluation (SSE)	Estimate of adequacy of amount of sleep.

Wake After Final Arousal (WAFA)

In reviewing the insomnia literature, data pertinent to this variable was not found. The amount of time people spend in bed from initial morning arousal to final awakening is an issue in the measurement of sleep. The lack of information available suggests that its measurement has not been examined or that it is not specifically relevant to insomniacs. No prediction on how insomniacs would respond to this variable could, therefore, be made.

Daytime Sleep (DTS), AM Sleep (AMS), and PM Sleep (PMS)

In the insomnia literature it is daytime sleepiness, not the amount of AMS or PMS, which is more commonly discussed. Daytime sleepiness will be explored here as it relates to insomniacs. Two factors, quality of sleep and circadian phase have been implicated in daytime sleepiness (Coleman, 1982). Daytime sleepiness is commonly measured by the Multiple Sleep Latency Test (MSLT). The MSLT was used, among other measures, in the studies reported here except where noted. It includes four to seven 20 minute opportunities every two hours per day for the subject to fall asleep. The starting time varies but approximates 0800 to 1000. If insomniacs were to obtain daytime, AM or PM sleep (DTS, AMS, PMS), the MSLT would provide the

opportunity to measure it.

It seems logical that lack of nighttime sleep would result in daytime sleepiness. Seidel and Dement (1982) found that chronic insomniacs did not necessarily suffer daytime sleepiness as a consequence of poor sleep, and in fact found varying levels of daytime sleepiness among their 75 chronic insomniacs. While chronic insomniacs exhibited worse sleep than normal subjects during the night, they experienced about the same degree of daytime sleepiness (Seidel et al., 1984). Dorsey and Bootzin (1987, in press) found that the more difficulty both insomniacs and noncomplaining sleepers had with a previous night's sleep, the longer it took to fall asleep on the MSLT. A study by Stepanski, Lamphere, Badia, Zorick, & Roth (1984) revealed no difference in daytime sleepiness between insomniacs and normal sleepers but found that the long awakenings (30 seconds or more) predicted daytime sleepiness. This cannot be due just to changes in total sleep time since there was only a small correlation between total sleep time and daytime sleepiness in insomniacs. The researchers therefore believe consolidated sleep over a shorter period of time, for instance six hours, is better than longer periods of sleep, such as seven hours, with multiple long awakenings (30 seconds or more).

The above studies point to other mechanisms constituting the abnormal response to a chronic loss of sleep. They reveal a heterogeneous component to insomnia. While some insomniacs have daytime sleepiness, many do not. For those insomniacs experiencing daytime sleepiness, if their nighttime sleep could be improved, the daytime sleepiness might be resolved. This has been supported by studies using schedule changes for normal sleepers and hypnotics for insomniacs (Carskadon and Dement, 1979; Carskadon and Dement, 1981). The insomniac who has no daytime sleepiness complaint could be considered a subjective insomniac. These individuals have an honest complaint of insomnia but no apparent psychopathology or sleep laboratory evidence to support the complaint (Association of Sleep Disorders Centers, 1979). It has been suggested that these individuals: (a) have increased mental activity during sleep which gives them a sense of being awake, (b) that they have some expectation of a normal amount of sleep to which they are unable to conform, (c) have inaccurate estimations of the time spent asleep (Association of Sleep Disorders, 1979). Seidel and Dement (1982) have proposed an abnormal response to inadequate sleep or a circadian rhythm of alertness which overwhelms the effects of sleep loss as possible explanations for the fully alert insomniac.

Another possible explanation comes from Monroe's (1967) classic study of good and poor sleepers. He found that poor sleepers were more highly aroused physiologically. The physiological-hyperactivity hypothesis, often referred to as chronic activation, could contribute to both daytime sleepiness and reduced sleep at night.

Self descriptions by insomniacs reveal they are less refreshed upon awakening, more tired during the day, and less fatigued at bedtime (Mendelson, Garnett, Gillin, & Weingartner, 1984). Kales, Kales, et al. (1984) also report that insomniacs feel worse than control subjects in the morning. They complain of feeling both physically and mentally tired, sleepy, and groggy. The researchers believe that the daytime and nighttime difficulties experienced by the insomniacs are related more to the high prevalence of psychopathology in this population rather than sleeplessness and fatigue. Although sleeplessness and fatigue may be factors, Kales, Kales, et al. (1984) have noted that the behavior of chronic insomniacs does not change much when drugs are used to improve sleep for intermediate or long periods of time.

Along with DTS, AMS, and PMS sleep, it is interesting to look at what insomniacs are involved with during the day. Marchini, Coates, Magistad, & Waldum (1983) found insomniacs think about bed, their physical environment,

and different types of passive relaxation, while good sleepers think about interpersonal relationships with their families, daily activities, everyday problems, work, and their personal appearance. Good sleepers were more involved with others, their work, and studying, while insomniacs spent more time shopping, relaxing, and watching television. Insomniacs were significantly more depressed, quiet, mentally and physically inactive, uncomfortable, calm, indifferent, and enjoying themselves less on self-report. Kales, Kales, et al., (1984) reported that insomniacs felt much worse than control subjects in the morning complaining of sleepiness, feeling tired both physically and mentally, depression, anxiety, tension, and irritability. According to the insomniacs' self-reports, these daytime complaints appear to have impacted adversely on the personal, social, and working aspects of their lives.

Although insomniacs complain of feeling more tired than normal sleepers during the day, the literature indicates there is no objective difference in daytime sleepiness between the two groups. Several explanations have been presented. The high prevalence of psychological problems in this population has also been considered.

Disturbance

This section contains a discussion of the sleep characteristics contained in the disturbance subscale. Objective and subjective findings from sleep and insomnia research studies were presented for each sleep characteristic in the subscale. An emphasis was placed on the applicability of the insomniac's self-report to the sleep scale items. Predictions were made as to how the participants would answer each subscale item based on the discussion of the literature.

Sleep Latency (SL) and Quality Of Latency (QL)

A review of the insomnia literature revealed sleep onset latency to be the most common index of insomnia. Freedman and Sattler (1982) found onset latency to be the only significant sleep stage abnormality in insomniacs and the finding is substantiated in a 1986 study by Freedman. Difficulty falling asleep was the most common complaint of the 100 chronic insomniacs evaluated by Kales, Kales, et al. (1984), while a longer sleep onset latency was the sleep characteristic which distinguished insomniacs from control subjects.

It has been established that insomniacs overestimate sleep onset (Carskadon, et al., 1976). Seidel et al. (1984), listing EEG and subjective reports of sleep,

indicate chronic insomniacs' estimate of sleep onset is more than twice that of the EEG value. The estimation of sleep latency by the insomniacs in the study was four times greater than the normal control group's estimate. More women than men reported difficulty falling asleep.

Hauri and Olmstead (1983) argue that subjective estimates of sleep onset by insomniacs is possible if they are given a suitable criterion. Based on the clinical EEG data gathered, they found that insomniacs do not start the basic process of sleeping until they are into at least 15 minutes of solid sleep. Solid is defined as "the first epoch scored as stage 2 that is followed by at least 15 min (sic) of uninterrupted sleep" (Hauri and Olmstead, 1983, p. 14). When insomniacs were able to use the 15 minute criterion their estimates of sleep onset were as accurate as good sleepers' estimates who used a more traditional criterion. Hauri and Olmstead believe the insomniac's task of estimating sleep onset is more difficult than the good sleeper's task since the insomniac must often estimate time intervals ranging from 30 minutes to two hours. They propose the first sign of solid sleep as the indicator of sleep onset in insomniacs.

Coates et al. (1983) questioned insomniacs and normal sleepers at various times during EEG recorded sleep. They found insomniacs tend to report being awake during sleep

onset and normal sleepers tend to report being drowsy or asleep. Like Hauri and Olmstead (1983), this research team has also suggested a different EEG scoring system for insomniacs.

It appears that self-reports of insomniacs can be used to measure sleep onset latency. Coates et al. (1982) used a multitrait-multimethod analysis to show that self-reports of minutes to sleep onset "provide a valid and reliable index for insomniacs" (Coates et al., 1982, p.352). They found that insomniacs' self-reports indicate the degree of sleep difficulty. Several studies by a group of insomnia researchers report significant relationships between self-monitored and electrophysiologically measured sleep onset latencies and support the use of self-monitored sleep onset latency (Haynes, Adams, & Franzen, 1981; Haynes, Adams, West, Kamens, & Safranek, 1982; Haynes, Fitzgerald, Shute, & O'Meara, 1985; Van Egeren, Haynes, Franzen, & Hamilton, 1983).

Several explanations for insomniacs' subjective estimation of sleep onset have been proposed. It has been hypothesized that insomniacs are in a state similar to sensory deprivation in stage 2 and REM sleep (Coates et al., 1983). This state leads to miscalculations of elapsed time. Partial corroboration for the explanations

comes from several studies.

Bonnet and Moore (1982) describe subjective sleep onset as "relatively lengthy period during which perception of state is blurred and uncertain." (p. 267). Insomniacs have been found to be less responsive to external stimulation than matched controls. As they lie in bed trying to go to sleep, they seem to withdraw perceptually from sensory input while engaging in excessive cognitive activity such as worrying and rumination. For instance, it took twice the duration of a loud tone during movement and intermittent waking time to cause insomniacs to acknowledge they were awake than normal sleepers (Mendelson, Garnett, Gillin, & Weingartner, 1984).

Heightened cognitive activity in insomniacs may cause them to inaccurately estimate the passage of time since information processing during the presleep period may be increased (Borkovec, 1982). A study by Lichstein and Rosenthal (1980) found insomniacs cited cognitive factors more often than somatic factors as causing their sleep disturbance. This also lends support to the cognitive theory of insomnia and to cognitive interventions for the treatment of insomnia.

In the study by Marchini, Coates, Magistad, & Waldum (1983), the insomniacs differed in waking activities and

had more self-centered thoughts. Lack of external stimulation, solitary activities, and self-centered thoughts suggest a lack of both behavioral and cognitive motivation as compared to normal sleepers. Low levels of stimulation or sensory input may be comparable to sensory deprivation. As sensory deprivation increases there is a reduction in total sleep time (Potter & Heron, 1972). Sleep disturbances and perhaps physiological hyperactivity might be related to the sensory deprivation analogy described above.

A significant relationship has been reported to exist between the content of presleep cognitions and sleep onset latency (Van Egeren, Haynes, Franzen, & Hamilton, 1983). The same study also found a significant relationship between sleep onset latency and attributions of sleep onset difficulties. Subjects who had sleep onset latency problems perceived their sleep difficulties as uncontrollable.

Objective data using polysomnography indicates there is a significant difference between insomniacs and good sleepers in latency to sleep onset with insomniacs having longer sleep onset latencies. This finding has been supported by many insomnia researchers (Coates et al., 1982; Frankel, Coursey, Buchbinder, and Snyder, 1976; Gillin, Duncan, Pettigew, Frankel, and Snyder, 1976;

Karacan, Williams, Salis, and Hirsch, 1971; Monroe, 1967).

It has been noted that insomniacs have a greater sleep latency than normal sleepers in all age groups (Kales, Bixler, et al., 1984).

In contrast to the polysomnography studies, Franklin (1981) used a hand-held switch activated clock to determine an objective estimate of sleep onset latency. He compared the results with subjective and spouse estimates of latency. The subjective reports were longer than both the spouses' and the switch activated clocks' estimates. Although innovative and interesting, the results must be interpreted with caution as the measure has not been validated against EEG data.

Sleep onset latency is an important characteristic of the sleep of insomniacs. Objective and subjective reports of insomniacs' sleep onset latency have been discussed. In addition, arguments for changing the EEG criteria by which insomniacs are judged have been presented. Insomniacs' reports appear to reflect the quality of their sleep disturbance. Based on the research presented, self-reports of sleep onset latency can be used to index the amount of time it takes an insomniac to fall asleep. However, persons who complain only of difficulty maintaining sleep may not identify sleep latency and quality of latency as problematic.

Mid-sleep Awakening (MSA), Wake After Sleep Onset (WASO), and Quality Of Disturbance (QD)

The variables MSA and WASO are comparable to the insomniac's complaint of sleep maintenance. Kales, Bixler, et al. (1984) define sleep maintenance as the "wake time after sleep onset and number and durations of awakenings" (p. 45). Sleep maintenance appears to be less of a problem than sleep onset latency (Kales, Kales, et al., 1984). The QD variable is included in this section in reference to the insomniac's estimate and attributions of disturbed sleep due to awakenings. Mid-sleep awakenings and the amount of time spent awake after sleep onset could impact on the insomniac's estimate of how much his or her sleep was disrupted.

The number of mid-sleep awakenings experienced by insomniacs as compared to control subjects is debated in the literature. Coates, et al. (1982) and Beutler, Thornby, and Karacan (1978) found no differences between insomniacs and control subjects. Monroe (1967) and Carskadon et al. (1976) found insomniacs had more awakenings than control subjects. Engle-Friedman and Bootzin (1981) reported that insomniacs had an increased number of awakenings both subjectively and objectively. Researchers have found that insomniacs often underestimate mid-sleep awakenings (Carskadon et al., 1976). Kales,

Bixler, et al. (1984) found that as their insomniac and control subjects' ages increased there was an increase in the number of nightly awakenings. Although many researchers have associated age with sleep disturbances, Kales, Bixler, et al. were the first to relate age and night wakefulness.

In exploring the relationship of sleep complaint to sleep continuity and periodic movements in sleep, Rosenthal et al. (1984) found that during the night insomniacs subjects had increased wakefulness and longer duration of wake time after awakening compared to daytime sleepiness subjects. They believe the sleep fragmentation pattern of insomniacs consists of infrequent but long mid-sleep awakenings.

Self-reports of insomniacs indicated increased awakenings and significantly longer time to return to sleep after awakening as compared to the noninsomniacs (Haynes, Fitzgerald, Shute, & O'Meara, 1985) . This data was gathered during afternoon naps. Self-reports of time required to return to sleep after nighttime awakenings were six times longer for insomniacs than for the noninsomniacs. Although sensitivity to environmental stimuli has been implicated in mid-sleep awakening and difficulty returning to sleep after awakening, no significant differences were found between normal sleepers

and insomniacs and their auditory awakening thresholds in several studies of insomnia (Bonnet & Johnson, 1978; Johnson, Church, Seales, & Rossiter, 1979; Haynes, Fitzgerald, Shute, & O'Meara, 1985).

A study looking at subjects with excessive daytime sleepiness and those with insomnia found insomniacs had significantly more wake time during sleep (Lavie et al., 1982). The researchers also found recurrent microarousals during the light sleep of stages 1 and 2 using polysomnography.

Some studies have reported that insomniacs overestimate minutes awake after sleep onset (Carskadon, Dement, & Mitler, 1976; Frankel, Coursey, Buchsbinder, & Snyder, 1976). Insomniacs often report having been awake when they are awakened from early nonrapid eye movement (NREM) sleep (Rechtschaffen and Monroe, 1969). Slama's study (cited in Borkovec, 1979) found that insomniacs when awakened from a nap during stage 2 sleep report being asleep less often than good sleepers. Borkovec et al (1981) replicated Slama's (cited in Borkovec, 1979) study. Their findings support Slama's and indicate that insomniacs report the presence of sleep less often than good sleepers both during stage 2 of naps and during stage 2 of nighttime sleep. When insomniacs and good sleepers were awakened from stage 2 sleep during the night and

daytime naps, the insomniacs reported significantly less sleep experience (Borkovec, Lane, & Van Oot, 1981).

Although no difference was found between insomniacs and good sleepers in terms of number of awakenings, Coates, et al. (1982) found significant differences in amount and percentage of wake time after sleep onset. Insomniacs had greater difficulty returning to sleep after awakening (Coates, et al.). Insomniacs experience more variability in wake time after sleep onset from night to night than control subjects (Kales, Bixler, et al., 1984).

The insomniacs in the Kales, Kales, et al. (1984) study reported much greater levels of sleep disturbance than normal sleepers. They reported disturbances by environmental stimuli such as noise or a bed partner, somatic stimuli such as the need to urinate or physical pain, and cognitive stimuli such as personal problem worries, what tasks they'll be involved in the next day, and dreams or nightmares. A significant number of insomniacs state they are frightened during the night.

A possible explanation for MSA and WASO can be found in the work of several researchers. De la Pena (1978) hypothesized that insomnia may be associated with hypoarousal or hyperarousal at the physiological, cognitive, and emotional level. What insomniacs do, feel, and think during the day has been investigated (Marchini,

Coates, Magistad, & Waldum, 1983). Insomniacs were found to be more relaxed, calm, and unconcerned, they had less physical and mental energy, and were less involved with others than normal subjects. They researchers suggest that insomniacs may be hypoactive during the day and hyperactive at night. Studying the same group of insomniac subjects, Coates, et al. (1983) reported increased mental activity as compared to good sleepers. The Association for Sleep Disorders Centers (1979) lists increased mentation during sleep resulting in a feeling of being awake as one of the possible bases for insomnia. Lichstein and Rosenthal's 1980 survey of 296 insomniacs found insomniacs attribute their sleep disturbance to cognitive arousal.

The primary complaint of insomniacs, sleep onset latency, discussed earlier, is once more supported; in this case it is difficulty falling asleep after mid-sleep awakenings. Once again physiological hyperactivity, sensory deprivation, and internalization of emotions could play a factor in sleep maintenance as has been hypothesized in sleep onset latency. So it seems that for insomniacs the difficulty is the length rather than the number of awakenings. Based on the research presented, insomniacs' subjective reports should reflect increased awakenings during sleep, increased wake time after sleep

onset, and sleep disturbance due to awakenings.

Movement During Sleep (MDS)

Despite an extensive review of the literature, subjective reports by insomniacs of movement during sleep were not found. Movement during sleep as measured in the sleep laboratory is widely discussed in the literature. This view of movement during sleep will therefore be discussed.

Periodic movements in sleep (PMS), also known as nocturnal myoclonus, are "stereotyped, repetitive movements of the lower extremities that occur during sleep" (Coleman, 1982, p.265). There was not a statistical difference in the prevalence of PMS in five diagnostic groups of patients with sleep disorders including insomnia (Coleman, Pollak, & Weitzman, 1978). Kales et al. (1982) reported no significant difference between insomniacs and normal controls for nocturnal myoclonus. Coates et al. (1982) found no significant difference between good sleepers and insomniacs for movement time in minutes and body movements during home polysomnography of night sleep. Some researchers have placed the prevalence of nocturnal myoclonus as the cause of insomnia to be as high as 20% (Dement and Zarcone, 1977). More recent studies conducted by Kales &

associates' research team found in a controlled study of a large sample of insomniacs that nocturnal myoclonus is not related to the complaint of insomnia (Kales et al., 1982). The results of two earlier studies by this research team support their findings (Soldatos, Bixler, Kales, et al., 1976; Bixler, Soldatos, Scarone, et al., 1978).

Rosenthal et al. (1984) have offered two hypotheses concerning PMS and insomnia. The first hypothesis indicates that those who are more sensitive to stimuli during sleep will awaken for longer periods of time and therefore complain of insomnia. The second hypothesis looks at insomnia on a continuum with excessive sleepiness. At first PMS results in prolonged awakenings and complaints of insomnia. With continued PMS a person develops a chronic mild sleep loss with resultant shorter awakenings or a shift to stage I sleep. The individual then begins to complain of excessive daytime sleepiness.

Dzvonik et al. (1986) explored the temporal relationship between leg jerk movements and body position. They found an association between the termination of leg jerk episodes and the commencement of major body movements. One might think that these stimuli would induce arousal but the data indicated that full awakening was not necessary in order to terminate leg jerk episodes. PMS elicits electroencephogram (EEG) signs of arousal but

the EEG activity is not abnormal and the sleeper may or may not awaken (Coleman, 1982).

Since no subjective data was available regarding the MDS variable and insomnia, no conclusion can be made regarding the insomniac's self-report of MDS. Although conflicting reports appear in the literature, the more recent consensus appears to be that although periodic movements occur during sleep, they do not occur more often in insomniacs nor are they a cause of insomnia.

Soundness Of Sleep (SS)

The insomnia research which best addresses the SS variable includes the sleep stages in insomnia and the material discussed under the MSA, WASO, and QD variables. In order to understand the sleep stages in insomnia, a review of the stages of normal sleep is presented.

The information presented regarding normal sleep is based on standardized criteria established by international sleep researchers (Rechtschaffen & Kales, 1969). Sleep has been divided into five stages: REM and NREM (stages 1, 2, 3, and 4) sleep. Researchers monitor subjects' brain wave activity using the electroencephalogram (EEG), eye activity by the electrooculogram (EOG), and muscle tone by the electromyograph (EMG). The different stages of sleep are characterized by

certain patterns of EEG activity, eye movements, and muscle tone. Stage 1 is considered a transition stage. During stage 2 sleep onset begins. Stages 3 and 4 are referred to as slow wave sleep during which sleep deepens. REM sleep resembles stage 1 but has the lowest level of muscle tone of the entire sleep period. REM and NREM cycles occur approximately every 90 minutes.

There are varying reports regarding sleep stage patterns in insomniacs. Several studies indicate insomniacs have less stage 4 sleep than normal controls (Coates et al., 1982; Frankel, Coursey, Buchsbinder, & Snyder, 1976; Gaillard, 1978), while one study indicates they have more (Karacan, Williams, Littell, & Salis, 1973). REM sleep was decreased in poor sleepers although they had a similar number of REM periods (Monroe, 1967, Rechtschaffen & Monroe, 1969). Kales and Bixler (1975) have found the same amount of sleep stages in insomniacs and normal controls. They indicate that insomniacs had greater night-to-night variability of REM sleep than normal controls. Slow wave sleep (stage 3 and 4) is the deepest sleep, while REM and stage 2 are the lightest. This is based on auditory awakening thresholds (Rechtschaffen, Hauri, & Zeitlin, 1966) which, as established previously, do not differ between insomniacs and normal sleepers (Bonnet & Johnson, 1978; Johnson,

Church, Seals, & Rossiter, 1979; Haynes, Fitzgerald, Shute, & O'Meara, 1985). It has been established that insomniacs often report having been awake when awakened from early NREM sleep (Rechtschaffen & Monroe, 1969). This phenomenon also occurs during stage 2 sleep (Borkovec et al., 1981; Borkovec, Lane, & Van Oot, 1981). Insomniacs tended to identify REM sleep as "light sleep" while stage 4 sleep time was associated with a report of deeper sleep. Based on the variables discussed in previous sections and the present discussion, it appears that insomniacs would probably report sleeping lightly.

Effectiveness

This section contains a discussion of the sleep characteristics contained in the effectiveness subscale. Research findings were reviewed for each sleep characteristic. An emphasis was placed on the applicability of the insomniac's self-report to the sleep scale items. Finally, a prediction was made as to how the participants would answer each subscale item based on the discussion of the literature.

Total Sleep Period (TSP) and Total Sleep Time (TST)

Of the two variables, TST and TSP, TST is the variable most commonly discussed in the insomnia literature. To explore the TSP variable, one would have

to consider the total sleep time of insomniacs and any time spent awake in bed. Time spent awake in bed has been discussed previously in regard to the variables WASO and MSA. A review of TSP in insomniacs is therefore omitted in lieu of the previous discussions of the aforementioned variables and the following discussion of TST.

Several studies discuss the idea that it may be the overall night-to-night variability of insomnia rather than the absolute amount of sleep which is the crucial element in the insomnia complaint (Coates et al., 1982; Frankel, Coursey, Buchbinder, & Snyder, 1976; Kales, Bixler, et al., 1984). This variability is expressed by insomniacs as "an attitude of pessimistic uncertainty about how "bad" any given night is going to be" (Frankel, Coursey, Buchbinder, & Snyder, 1976, p. 621).

Subjective reports by insomniacs indicated that they experienced considerably less total sleep time than normal control subjects (Kales, Kales, et al., 1984, Kales, Bixler, et al., 1984). Chronic insomniacs averaged about 90 minutes less total nocturnal sleep time than noncomplaining subjects by subjective report (Seidel et al., 1984). Insomniacs have been found to underestimate total sleep time (Carskadon, Dement, & Mitler, 1976; Frankel, Coursey, Buchbinder, & Snyder, 1976). Insomniacs' subjective estimates of total sleep time were

significantly below the objective recordings (Carskadon et al., 1976).

Chronic insomniacs averaged about 44 minutes less total nocturnal sleep time than noncomplaining subjects by polysomnography (Seidel et al., 1984). Insomniacs demonstrated significantly reduced total sleep time (Frankel, Coursey, Buchbinder, & Snyder, 1978). Objectively, there was a significant difference between female and male insomniacs with the women obtaining less total sleep time (Carskadon et al., 1976). The polysomnographic data presented by Mendelson, Garnett, Gillin, and Weingartner (1984) showed a tendency towards decreased total sleep. Patients complaining of insomnia in Rosenthal et al.'s (1984) study showed less total sleep time. The insomniacs in Kales, Bixler, et al.'s (1984) study had more total wake time since they had significantly longer mean duration of nightly awakenings than the controls in all age groups. Engle-Friedman and Bootzin's (1981) insomniac subjects also had more total wake time objectively. Subjective reports of insomniacs reveal they acquire much less total sleep time than normal subjects (Kales, Kales, et al., 1984). The night-to-night variability among insomniacs' total sleep time was high (Carskadon et al., 1976).

Although subjective reports of insomniacs

underestimate TST, objective reports show significant reductions in total sleep. Subjective reports may not be accurate, but they should reflect the reduced sleep time experienced.

Rest Upon Awakening (RUA)

This variable is reflected in the insomniac's report of how he or she feels in the morning. This was discussed under the DTS variable therefore it will be only briefly reviewed here.

Mendelson, Garnett, Gillin, and Weingartner (1984) found insomniacs felt less refreshed upon awakening. Insomniacs felt worse in terms of physical and mental tiredness and fewer insomniacs than controls felt rested (Kales, Kales, et al., 1984). Although the conclusion in the DTS variable section was that insomniacs do not differ from normal controls in the amount of daytime sleepiness, their strong complaints point to other explanations which have been deliberated in the DTS section.

Subjective Quality Of Sleep (SQS)

The possibility that insomniacs have a higher expectation than normal sleepers of a normal amount of sleep was reviewed under the DTS variable section. This could contribute to their complaints of sleep difficulty and therefore affect their estimates of satisfaction with

sleep time. On the other hand, although insomniacs report increased levels of sleep disturbances, they desire the same amount of sleep as normal sleepers (Kales, Kales, et al., 1984). This may indicate a perceptual or objective discrepancy but not unrealistic expectations about sleep requirements as has been suggested by some researchers. Self-reported estimates of poor sleep quality have been positively correlated with increased awareness of environmental stimuli (Van Egeren, Haynes, Franzen, & Hamilton, 1983). Quality and disturbance of sleep time were also considered in the MSA, WASO, QD, TST, and TSP variables sections.

Sleep Sufficiency Evaluation (SSE)

Based on the material presented in the DTS, MSA, WASO, QD, QL, SL, TST, and TSP variables sections, one would expect the estimate of SSE to be lower in insomniacs than in normal sleepers. The degree of sleep difficulty experienced by insomniacs should be reflected in the SSE variable.

Predictions in the Insomniac Sample

Insomnia is a heterogeneous and complex problem. Valid and reliable methods of measuring this disorder are needed. Many of the variables in the VSH Sleep Scale are relevant to insomnia therefore the study tested this

subjective instrument in an insomniac sample. A summary of predictions as to how insomniacs would answer the questions compared to a healthy (normal sleepers) sample is presented in Table 2.

Summary

The insomnia research findings pertinent to the VSH Sleep Scale taxonomy variables were presented. The three subscales, supplementation, disturbance, and effectiveness, and their respective sleep characteristics provided the format for the discussion. Although both objective and subjective data were presented, an attempt was made to emphasize the applicability of the insomniac's self-report to the variables.

Table 2

Predictions for Insomniacs Compared to Healthy Population

Sleep Characteristic	Prediction Onset Insomniacs	Prediction Maintenance Insomniacs
<u>Supplementation</u>		
Wake After Final Arousal	no prediction	no prediction
Daytime Sleep	no prediction	no prediction
AM Sleep	no prediction	no prediction
PM Sleep	no prediction	no prediction
<u>Disturbance</u>		
Mid-Sleep Awakenings	increased	increased
Wake After Sleep Onset	longer	longer
Movement During Sleep	no prediction	no prediction
Sleep Latency	longer	same
Soundness of Sleep	lighter	lighter
Quality of Disturbance	increased	increased
Quality of Latency	increased	same
<u>Effectiveness</u>		
Rest Upon Awakening	less	less
Subjective Quality of Sleep	worse	worse
Total Sleep Period	less	less
Total Sleep Time	less	less
Sleep Sufficiency Evaluation	less	less

CHAPTER 3

RESEARCH METHODOLOGY

This chapter delineates the research design, setting, study sample, and procedure for protection of human subjects. The data collection instrument and data collection protocol are described. Limitations of the study are explored. Finally, the data analysis plan is examined.

Research Design

This research study employed a descriptive design to test a subjective sleep instrument, the VSH Sleep Scale, in an adult insomniac sample and to determine the subjective sleep characteristics of adult insomniacs. The design included a comparison of previously established norms in a healthy sample with the insomniac sample of this study.

Setting and Sample

A convenience sample of 33 insomniac subjects aged 18 and older who were nonhospitalized and living in the community were asked to participate in this study. The participants were recruited through newspaper advertisements. The minimum age of 18 was selected based on a review of insomnia research studies. Additional

criteria for participation in the study were: (a) the insomniac participants were able to read and understand the scale items, (b) the subjects reported an absence of central neurological trauma (c) they were not taking any medications which interfered with sleep. Due to their inherent sleep difficulties, shift workers were excluded. No attempt was made to exclude insomniacs taking sleeping medication since many insomniacs use them. If the hypnotic was effective, persons in this situation would probably not have volunteered to participate. If the hypnotic was not effective, persons in this situation were probably likely candidates. No attempt was made to exclude persons with psychological disturbances due to the high prevalence of insomnia among these individuals as discussed in chapter 1. Psychotic individuals were excluded due to their disturbed thought processes. The investigator used her skills as a psychiatric-mental health nurse clinician to make judgements regarding exclusion.

An attempt was made to obtain 15 adults with difficulty initiating sleep and 15 adults with difficulty maintaining sleep. Sleep onset criteria were: (a) greater than 45 minutes to fall asleep, (b) occurs on the average of four times per week for at least six months, and (c) is considered a problem by the participant. Sleep

maintenance criteria were: (a) wake after sleep onset greater than 60 minutes or total sleep time less than six and one half hours per night, (b) occurs on the average of four times per week for at least six months, and (c) is considered a problem by the participant. The criteria were based on a review of the insomnia literature for criteria for inclusion of subjects in studies of both sleep onset and sleep maintenance insomnia.

Comparison Sample

A data set for a healthy (normal sleepers) sample (Verran & Snyder-Halpern, 1985) previously tested with the VSH Sleep Scale was used for comparison with the insomniac sample. The data was collected on 48 healthy subjects over three days yielding 144 days of data. The subjects had a mean age of 40.53 years with a standard deviation of 15.06. 52% of the subjects were female and 48% were male.

Protection of Human Subjects

The investigator obtained approval for the study from the University of Arizona College of Nursing Human Subjects Committee (Appendix A). Participants were provided with a verbal explanation of the study and a written disclaimer (Appendix B). By completing the scales, the subject agreed to participate in the study. All subjects were informed that their identity and

responses would remain confidential. Code numbers were used to identify each questionnaire packet. The data and any information bearing the participant's name were kept under lock and were accessible only by the investigator. The investigator was available to answer any questions that arose. The participants were free to choose not to answer any questions and they could withdraw from the study at any time without affecting the investigator-subject relationship. The participants were informed that there were no known risks to this study. The subject may have benefited from the study by having the opportunity to talk to someone about their insomnia and to know that nurses have an interest in helping them with a serious problem.

Data Collection Instruments

Three instruments were used to collect data from the participants: the Demographic Information Questionnaire (Appendix C), the Participant Information Questionnaire (Appendix D) and the VSH Sleep Scale (Appendix E). The VSH Sleep Scale was developed to measure the subjective sleep characteristics of adults in clinical and nonclinical sleep settings. The VSH Sleep Scale is a visual analog instrument consisting of 15 items and utilizing a 10 mm. response line for each item. The

taxonomy (Figure 1) of the scale includes 15 characteristics of sleep quality which examine the subjective concepts of disturbance, effectiveness, and supplementation (Snyder-Halpern & Verran, 1987, Verran & Snyder-Halpern, 1987).

The Disturbance Subscale evidences a theta reliability of .87 with healthy subjects and .86 with hospitalized subjects. The Effectiveness Subscale has a theta of .75 and .89 for healthy and hospitalized subjects respectively. The total VSH Sleep Scale has a theta reliability of .88 for healthy adults and .91 for hospitalized adults. It has moderate evidence for convergent validity (Verran & Snyder-Halpern, 1987).

The Demographic Data Form was developed by the investigator to gather demographic information on each participant. The Participant Information Questionnaire was developed by the investigator to evaluate the subjects' routine sleep patterns and general physical and mental health. This information also served as a written record of the participant's fulfillment of the study criteria. The Participant Information Questionnaire was based on items in questionnaires used by Dr. Joyce Verran, College of Nursing, University of Arizona and Dr. Richard Bootzin, Department of Psychology, University of Arizona in their respective sleep research studies (R. R. Bootzin,

personal communication, February, 1987; J. A. Verran, personal communication, February, 1987).

Data Collection Procedure

When the investigator was contacted by a person interested in becoming a participant, the investigator provided the prospective subject with a verbal explanation of the study including what the participant would be required to do. The demographic data form was used to obtain information on sample characteristics. The investigator obtained some preliminary information from the prospective participant during the first contact in order to ascertain eligibility for the study. An appointment was made to meet with the participant to explain the VSH Sleep Scale.

The participants were asked to complete a scale within the first two hours after arising on three consecutive weekdays when they were following their usual sleep routines. Weekend days or days off were not the recommended times to complete the scales. The participants were provided with three stamped self-addressed return envelopes and asked to mail each scale on the morning of completion. This process ensured that the respondents completed the scales each morning and helped to reduce the possibility of comparing scores. The postmarks on the return envelopes were used as

corroboration that the scales were mailed each day. The demographic data form and the participant information questionnaire were returned with the first scale. If no response was received within two weeks, a follow-up telephone call was made.

Data Analysis

Descriptive and inferential statistics were used to analyze the data. Individual days of data collection were treated as single units of analysis yielding a total of 99 days of data from the 99 participants.

The first research question, concerning the reliability of the subscales, was examined by computing coefficient theta for a scale with nonparallel items. The second research question, addressing the factors in the taxonomy for this sample, was examined with factor analysis using a common factor extraction method with varimax rotation. Descriptive statistics and t-tests were performed to address the third research question concerning the predictions for insomniacs as compared to a healthy sample. The fourth research question, regarding the subjective sleep characteristics of the two types of insomniacs, was addressed using descriptive statistics.

Limitations of the Study

Several limitations were foreseeable. There was a

lack of random sampling and therefore this bias may have compromised the study. Another problem was the influence of response set biases. For instance, insomniacs may have had a normal night's sleep on one of the three data collection days but felt that they should respond as though it was a difficult night's sleep. Participants may have felt the need to respond in an extreme way in order to demonstrate the scope of the sleep problem even though the previous night may only have been moderately difficult. Insomniacs may have described themselves as tired in the morning (when they answered the scale) and may also have tended to overestimate and underestimate certain variables of their sleep as discussed in chapter 2. These factors may have influenced their responses.

Summary

This chapter has presented the research methodology of the proposed study. The use of a descriptive design was discussed. The criteria for inclusion in the study of nonhospitalized adult insomniac subjects were reviewed. The data collection instrument was explored in terms of the taxonomy, reliability, and validity. The procedure for protection of human subjects was examined. The data collection procedure and data analysis methods were presented. Finally, the limitations of the study were discussed.

Chapter 4

RESULTS OF DATA ANALYSIS

The statistical analysis of the data collected during this study is presented in this chapter. The results are presented in five sections. The first section is the description of the sample. The second, third, fourth, and fifth sections address the four research questions proposed in Chapter 1. The second section is the analysis of the reliability of the VSH Sleep Scale in an insomniac sample. The third section presents the factor analysis of the VSH Sleep Scale in an insomniac sample. The fourth section is the comparison between the insomniac sample and a healthy group. The fifth section presents the subjective sleep characteristics of the insomniac subjects.

Description of the Sample

The investigator was unable to obtain the equal amount of onset and maintenance insomniacs proposed a priori, therefore, the subjects are described and analyzed as one group of insomniacs.

This study utilized an adult insomniac sample. Table 3 summarizes the personal characteristics of the sample. The sample consisted of 33 subjects, 24 women and 9 men. Each day of data collection was treated as a single unit

Table 3. Adult Insomniac Sample: Description of Personal Characteristics (N=33)

Variable	Frequency	Percentage
Sex		
Female	24	72.7%
Male	9	27.3%
Marital Status		
Single	11	33.3%
Married	12	36.4%
Widowed	2	6.1%
Separated	0	0.0%
Divorced	8	24.2%
Work/School		
Full time	13	39.4%
Part time	6	18.2%
None	11	33.3%
Ethnicity		
Black	1	3.0%
Caucasian	27	81.8%
Hispanic	0	0.0%
Native American	3	9.1%
Oriental	1	3.0%
Other	0	0.0%
Education		
8th grade or less	0	0.0%
Some high school	3	9.1%
High school graduate	1	18.2%
Trade/Business school	0	9.1%
Some college	13	39.4%
College graduate	3	9.1%
Graduate or professional degree	5	15.2%
Income		
Less than \$10,000	9	27.3%
\$10,000-\$19,999	6	18.2%
\$20,000-\$29,999	8	24.2%
\$30,000-\$39,999	2	6.1%
\$40,000-\$49,999	2	6.1%
\$50,000-\$59,999	2	6.1%
\$60,000 and over	1	3.0%

of analysis yielding a total of 99 days of data. The majority of subjects were married or single. The ethnic background of the sample was primarily Caucasian. Most subjects had either full time employment or full time student status, or they had no employment nor were they students. The majority of participants were at least high school graduates and a large number had attended college. 15 subjects had an income of \$19,999 or less, 15 had an income of \$20,000 or more and 3 did not answer the question. The mean age of the sample was 45.47 with a 16.09 standard deviation and a range of 18-72. Table 4 summarizes the subjects' personal sleep habits surveyed by the Participant Information Questionnaire. The usual hours of sleep for the subjects were from 10 pm to 6 am. In summary, the sample consisted of primarily single or married middle aged Caucasian females with a minimum of a high school education.

Analysis of Reliability

To address the first research question regarding the reliability of the VSH Sleep Scale, subscale internal consistency was estimated using alpha and theta coefficients. For the reliability analysis, the item soundness of sleep (SS) and sleep sufficiency evaluation (SSE) are reversed scored to more logically fit on the

Table 4. Adult Insomniac Sample: Means and Standard Deviations Personal Sleep Habits

Usual length of time (minutes) to fall asleep (N=31)

\bar{X} 82.68

SD 54.07

Number of times per week it takes this long to fall asleep (N=32)

\bar{X} 5.47

SD 1.65

Length of time during which falling asleep has been a problem (N=24)

\bar{X} 182.96 Months (15.25 years)

SD 198.22 Months (16.52 years)

Number of times subjects awoken during the night (N=30)

\bar{X} 3.03

SD 3.57

Length of time during which waking during the night has been a problem (N=22)

\bar{X} 144.82 Months (12.07 years)

SD 188.83 Months (15.74 years)

Length of time (minutes) subjects usually stay awake once awakened during the night (N=30)

\bar{X} 65.23

SD 60.06

Length of time actually spent asleep during the night (excluding time awake spent in bed) (N=33)

\bar{X} 316.82 Minutes (5.28 hours)

SD 105.78 Minutes (1.76 hours)

theoretical subscales. Therefore higher scores for SS indicate lower soundness of sleep and higher scores for SSE indicate greater sleep sufficiency. Table 5 summarizes the results of internal consistency. A coefficient alpha level of $\geq .70$ was used to determine the adequacy of internal consistency (Cronbach, 1951; Nunnally, 1978). A theta level of $\geq .70$ was utilized as an acceptable criterion level (Nunnally, 1978). Values of internal consistency for all subscales exceeded the criteria level and were sufficient evidence of internal consistency.

Factor Analysis

The research question addressed by this section asked if the factors specified in the VSH Sleep Scale taxonomy remain the same in an insomniac sample. Factor analysis was performed using a common factor extraction method with varimax rotation. Several criteria were utilized for the evaluation of extracted factors: (a) eigenvalue of 1.00 or greater (Kim & Mueller, 1978), (b) all the items should have substantial loadings on the one factor ($> .40$), (Armour, 1974), and (c) all or most of the items should have higher loadings on the one component than on subsequent components (a difference of $> .20$), (Carmines & Zeller, 1979). As with the reliability analysis,

Table 5. Adult Insomniac Sample: Reliability Estimates
(N=87)

Subscale	Cronbach's Alpha Standardized	Theta
Supplementation	.85	.86
Disturbance	.79	.82
Effectiveness	.75	.81

soundness of sleep (SS) and sleep sufficiency evaluation (SSE) were reversed scored. Three factors resulted from varimax rotation which is in accordance with the theoretical dimensions of the scale. Factor loadings and percentage of variance explained by each factor are shown in Table 6. Two items, soundness of sleep (SS) and sleep sufficiency evaluation (SSE), loaded inappropriately according to the theoretical dimensions of the VSH Sleep Scale. A total of 63% of the variance was accounted for by the factors.

Comparison of Sleep Characteristics Predictions

To address the third research question, the subjective sleep characteristics of a healthy sample, previously described in Chapter 3, were compared to the insomniac sample tested in this study. t-tests were performed to ascertain any significant difference between the two samples on each of the 16 sleep characteristics of the VSH Sleep Scale. Predictions were made in Chapter 2 regarding how onset insomniacs and maintenance insomniacs would answer each item in comparison with the healthy sample. A new prediction table is presented in Table 7 because, as discussed previously, the two types of insomniacs were combined and the statistical analyses were performed for one group.

Table 8 summarizes the means and standard deviations

Table 6. Adult Insomniac Sample: Factor Analysis and Percentage of Variance (N=87)

Subscale Item	Factor 1	Factor 2	Factor 3
<u>Supplementation</u>			
Daytime Sleep (DTS)		.82	
AM Sleep (AMS)		.80	
PM Sleep (PMS)		.71	
Wake After Final Arousal (WAFA)		.53	
<u>Disturbance</u>			
Mid-Sleep Awakening (MSA)	.75		
Wake After Sleep Onset (WASO)	.54		
Movement During Sleep (MDS)	.70		
Sleep Latency (SL)	.56		
Soundness of Sleep (SS)			<u>-.51</u>
Quality of Disturbance (QD)	.74		
Quality of Latency (QL)	.75		
<u>Effectiveness*</u>			
Rest Upon Awakening (RUA)			.72
Subjective Quality of Sleep (SQS)			.92
Total Sleep Time (TST)			.61
Sleep Sufficiency Evaluation (SSE)	<u>-.62</u>		
* TSP = Not included due to this characteristic being a linear combination of two other characteristics			
_____ = Theoretically inappropriate loading			
Percentage of Variance	29.3%	23.7%	10.3%

Table 7. Prediction for Insomniac Sample Compared to Healthy Sample

Subscale Sleep Characteristic	Prediction for Insomniac Sample Compared to Healthy Sample
<u>Supplementation</u>	
Wake After Final Arousal (WAFA)	No prediction
Daytime Sleep (DTS)	No prediction
AM Sleep (AMS)	No prediction
PM Sleep (PMS)	No prediction
<u>Disturbance</u>	
Mid-Sleep Awakening (MSA)	Increased
Wake After Sleep Onset (WASO)	Longer
Movement During Sleep (MDS)	No prediction
Sleep Latency (SL)	Longer
Soundness of Sleep (SS)	Lighter
Quality of Disturbance (QD)	Increased
Quality of Latency (QL)	Increased
<u>Effectiveness</u>	
Rest Upon Awakening (RUA)	Less
Subjective Quality of Sleep (SQS)	Worse
Total Sleep Period (TSP)	Less
Total Sleep time (TST)	Less
Sleep Sufficiency Evaluation (SSE)	Less

Table 8. Comparison of Healthy and Insomniac Samples: t-tests and Predictions (N=242)

Subscale Sleep Characteristics	Healthy Subjects (N=144) \bar{X} SD	Insomniac Subjects (N=98) \bar{X} SD	t-test	Prediction	Differences for Insomniacs
<u>Supplementation</u>					
Wake After Final Arousal (WAFA)	30.31 33.88	19.69 29.63	2.50*	No prediction	Less WAFA
Daytime Sleep (DTS)	4.95 13.09	10.97 20.51	-2.77*	No prediction	More DTS
AM Sleep (AMS)	None	15.43 29.15	None	No prediction	
PM Sleep (PMS)	None	15.71 27.18	None	No prediction	
<u>Disturbance</u>					
Mid-Sleep Awakening (MSA)	34.22 29.42	48.39 31.53	-3.56*	Supported	More MSA
Wake After Sleep Onset (WASO)	22.08 18.59	39.84 24.19	-6.43*	Supported	More WASO
Movement During Sleep (MDS)	34.40 24.08	49.78 31.81	3.99*	No prediction	More MDS
Sleep Latency (SL)	17.06 20.46	47.89 35.20	-8.56*	Supported	More SL
Soundness of Sleep (SS)	70.26 24.55	46.21 31.45	-6.64*	Supported	Less SS
Quality of Disturbance (QD)	23.61 24.70	51.83 30.81	7.68*	Supported	More QD
Quality of Latency (QL)	16.51 25.06	55.10 33.54	-10.18*	Supported	More QL

* Significantly different at 1 tailed $p \leq .05$

<u>Effectiveness</u>						
Rest Upon Awakening (RUA)	67.21 23.57	39.66 29.17	8.06*	Supported	Less RUA	
Subjective Quality of Sleep (SQS)	70.36 25.06	39.27 27.80	9.01*	Supported	Less SQS	
Total Sleep Period (TSP)	83.09 20.50	87.87 29.10	-1.5	Not Supported	More TSP	
Total Sleep Time (TST)	61.01 17.56	48.93 23.43	4.56*	Supported	Less TST	
Sleep Sufficiency Evaluation (SSE)	30.88 30.31	55.58 31.84	-6.08*	Supported	Less SSE	

* Significantly different at 1 tailed $p \leq .05$

for the two samples, the results of the t-tests, whether or not the predictions were supported, and the differences for the insomniacs on each of the sleep items. The items soundness of sleep (SS) and sleep sufficiency evaluation (SSE) were not reversed scored for this analysis, therefore higher scores of SS indicate greater soundness of sleep while higher SSE scores indicate lower sleep sufficiency. Two items, AM sleep (AMS) and PM sleep (PMS), were not part of the VSH Sleep Scale at the time it was administered to the healthy subjects. Therefore, there are no means and standard deviations in Table 8 on the AM sleep and PM sleep items for healthy subjects. The t-tests were significant for all items except the total sleep period (TSP). The predictions made in Chapter 2 were supported with the exception of the total sleep period item.

Subjective Sleep Characteristics of Adult Insomniacs

The fourth research question proposed to examine the subjective sleep characteristics of onset and maintenance insomniacs. As discussed previously, the two types of insomniacs were combined and statistical analyses were performed on the one group. Table 9 summarizes the mean and standard deviation for each item on each of the three days of data collection and for the total of the three

Table 9. Adult Insomniac Sample: Subjective Sleep Characteristics

Subscale Sleep Characteristic	Day 1	Day 2	Day 3	Total
	\bar{X} (n) SD	\bar{X} (n) SD	\bar{X} (n) SD	\bar{X} (n) SD
<u>Supplementation</u>				
Wake After Final Arousal (WAFA)	18.59 29.26 (n=32)	17.49 26.90 (n=33)	22.97 33.03 (n=33)	19.69 29.63 (n=98)
Daytime Sleep (DTS)	11.49 20.78 (n=33)	11.24 20.43 (n=33)	10.18 20.95 (n=33)	10.97 20.51 (n=99)
AM Sleep (AMS)	17.75 32.33 (n=32)	14.09 26.96 (n=32)	14.42 28.69 (n=31)	15.43 29.15 (n=95)
PM Sleep (PMS)	11.06 24.04 (n=32)	17.18 27.06 (n=33)	18.76 30.23 (n=33)	15.71 27.18 (n=98)
<u>Disturbance</u>				
Mid-Sleep Awakening (MSA)	50.69 32.45 (n=32)	42.34 29.97 (n=32)	52.26 32.21 (n=31)	48.39 31.53 (n=95)
Wake After Sleep Onset (WASO)	39.00 25.62 (n=33)	38.19 22.09 (n=32)	42.27 25.12 (n=33)	39.84 24.17 (n=98)
Movement During Sleep (MDS)	45.06 32.60 (n=33)	51.12 29.43 (n=33)	53.15 36.68 (n=33)	49.78 31.81 (n=99)
Sleep Latency (SL)	50.00 27.79 (n=33)	47.48 45.69 (n=33)	46.13 30.26 (n=32)	47.89 35.20 (n=98)
Soundness of Sleep (SS)	48.46 32.37 (n=33)	44.55 30.96 (n=33)	45.64 31.86 (n=33)	46.21 31.45 (n=99)
Quality of Disturbance (QD)	55.27 31.74 (n=33)	48.16 30.77 (n=32)	51.94 30.44 (n=33)	51.83 30.81 (n=98)
Quality of Latency (QL)	65.47 30.53 (n=32)	48.56 34.39 (n=32)	51.39 34.07 (n=33)	55.10 33.54 (n=97)
<u>Effectiveness</u>				
Rest Upon Awakening (RUA)	38.46 28.30 (n=33)	43.47 29.71 (n=32)	37.18 30.00 (n=33)	39.66 29.17 (n=98)
Subjective Quality of Sleep (SQS)	39.97 25.02 (n=33)	41.94 26.79 (n=33)	35.91 31.69 (n=33)	39.27 27.80 (n=99)
Total Sleep Period (TSP)	86.73 24.65 (n=33)	86.79 28.51 (n=33)	90.09 34.13 (n=33)	87.87 29.10 (n=99)
Total Sleep Time (TST)	47.72 21.87 (n=33)	51.31 21.36 (n=32)	47.82 27.12 (n=33)	48.93 23.43 (n=98)
Sleep Sufficiency Evaluation (SSE)	58.46 32.02 (n=33)	50.73 30.73 (n=33)	57.55 33.15 (n=33)	55.58 31.84 (n=99)

days. The means and standard deviations were quite similar across the three days. The standard deviations are large and this is a typical characteristic of the scale. Researchers have found large standard deviations when testing the scale in other populations (Lindell, 1988; Snyder-Halpern & Verran, 1987). Large standard deviations indicate a wide variability across populations.

Summary

This chapter included a description of the personal characteristics and usual sleep habits of the adult insomniac sample on which the VSH Sleep Scale was tested. The remaining portion of the chapter presented the results of the data analysis according to the four research questions addressed by the study. Analysis of subscale reliability was determined by alpha coefficients and theta coefficients. The results of the factor analysis using a common factor extraction method with varimax rotation were presented. Differences in subjective sleep characteristics between the insomniac sample and a healthy sample were summarized. Finally, the subjective sleep characteristics of the adult insomniac sample were presented.

Chapter 5

CONCLUSIONS AND IMPLICATIONS

This research study had two purposes. The first purpose was to examine the reliability of the Verran and Snyder-Halpern (VSH) Sleep Scale in measuring the subjective sleep characteristics of nonhospitalized adult insomniacs. The second purpose was to explore the 16 characteristics of sleep quality examined by the scale as they relate to insomnia. Specifically, the research addressed the following questions:

1. Is the VSH Sleep Scale reliable in an insomniac sample?
2. Do the factors specified in the VSH Sleep Scale taxonomy remain the same in an insomniac sample?
3. Do the subjective sleep characteristics of insomniacs, as measured by the VSH Sleep Scale, differ from the subjective sleep characteristics of a healthy (normal sleepers) group previously measured by the VSH Sleep Scale, in a way predictable from the literature?
4. What are the subjective sleep characteristics of subjects with insomnia?

The fourth research question was revised because, as discussed previously, the two types of insomniacs were

combined into one group for the statistical analysis.

This chapter includes the interpretation of the results, conclusions reached, and implications for nursing. The following format is utilized: (a) interpretation of the reliability of the research instrument, (b) interpretation of the factor analysis of the scale, (c) interpretation of the comparison of the sleep characteristics of insomniac subjects and a healthy group in light of the predictions made from the literature, (d) interpretation of the subjective sleep characteristics of insomniac subjects, (e) implications for future research, and (f) implications for nursing.

Interpretation of Findings Related to Research Questions

Reliability of VSH Sleep Scale

Theta was used as the primary coefficient since subscale items are not parallel. The theta scores all fell within an acceptable range. Based on the statistical analysis, the VSH Sleep Scale appears to be a reliable measure in an insomniac sample.

Factor Analysis of VSH Sleep Scale

Varimax rotation resulted in three factors. The factor loadings resemble the theoretical dimensions of the VSH Sleep Scale with two exceptions. Sleep sufficiency evaluation (SSE) loaded on the disturbance subscale

instead of the effectiveness subscale and soundness of sleep (SS) loaded on the effectiveness subscale instead of the disturbance subscale.

It was pointed out in the conceptual framework of this study that SS is more closely associated with disturbance variables such as MSA, WASO, and QD, which is also the theoretical grouping of the variables. One possible explanation for SS loading on the effectiveness subscale is that insomniacs may believe that if they slept soundly then their sleep was effective or, as is more likely, if they did not sleep soundly then they believe it was ineffective. This makes sense in light of the fact that insomnia is a highly subjective phenomenon in which people believe they are unable to obtain adequate sleep (Bootzin & Engle-Friedman, 1981; Bootzin & Nicassio, 1978). Insomniacs complain of feeling both physically and mentally tired in the morning (Kales, Kales, et al., 1984). Thus, if insomniacs awaken feeling tired, then they would believe they did not sleep soundly and their sleep was ineffective. Of course this argument does not rule out that the insomniacs' sleep was disturbed, but instead offers a possible explanation for why, in the case of insomniacs, soundness of sleep is more associated with effectiveness items than disturbance items.

Increased awakenings and increased duration of

awakenings cause insomniacs to view their sleep as disturbed. This would in turn influence how insomniacs view the SSE item which is the adequacy of the amount of sleep obtained. If sleep is disturbed then most likely the amount obtained is inadequate. This may explain why SSE loaded on the disturbance factor rather than the effectiveness factor.

The close linkage of the factor loadings to the taxonomy of the VSH Sleep Scale offers support for the construct validity of the instrument in an insomniac sample. The percentage of variance scores indicate that the factor loading explained 63% of the difference among the subjects.

Comparison of Healthy and Insomniac Samples

Supplementation subscale. No predictions were made for the supplementation subscale. The AM sleep and PM sleep variables were not included in the VSH Sleep Scale at the time it was tested with a healthy sample. There were significant differences between healthy and insomniac subjects on the wake after final arousal (WAFA) and daytime sleep (DTS) variables. Insomniacs spent more time awake from initial morning arousal to final awakening and slept more during the day than did healthy subjects.

Explanations can be offered for the significant

differences on the WAFA and DTS variables. Researchers have found insomniacs experience a significantly longer time to return to sleep after awakening than noninsomniacs (Coates, et al., 1982; Haynes, Fitzgerald, Shute, & O'Meara, 1985). Insomniacs may opt to spend less time in bed trying to go back to sleep after the initial morning arousal based on their prior experiences of difficulty falling back to sleep once awakened. They may believe that since it is morning and they have a hard time falling back to sleep anyway, they may as well stay up. This may explain the lower WAFA score for the insomniacs. The literature reviewed in Chapter 2 indicated that there is no objective difference in daytime sleepiness between insomniacs and normal sleepers. However, subjective reports of insomniacs indicate they feel more tired during the day than noninsomniacs. The insomniacs may be obtaining more daytime sleep, at least subjectively, and therefore have higher DTS scores on the VSH Sleep Scale which is a subjective measure. Of course, it must be kept in mind that the DTS score is quite low for the insomniacs, so whatever daytime sleep they do obtain is minimal.

Disturbance subscale. Significant differences were found between both samples on all variables in the

disturbance subscale. All predictions made in Chapter 2 were supported in the statistical analysis. No prediction was made for the movement during sleep variable. It took longer for the insomniac group to fall asleep and they had more trouble falling asleep than the healthy group. Insomniacs slept more lightly, had more trouble with disrupted sleep, and had more mid-sleep awakenings. The insomniacs spent more time awake after sleep onset. Although no prediction was made for movement during sleep, insomniacs had more movement than the healthy subjects. The review of the objective sleep literature in Chapter 2 indicated that although periodic movements occur during sleep, they do not occur more often in insomniacs nor are they a cause of insomnia. It is known that insomniacs spend more time awake during the night than normal sleepers (Haynes, Fitzgerald, Shute, & O'Meara, 1985; Rosenthal, et al., 1984) and therefore the participants may have had more opportunities to subjectively assess increased movement during the sleep period than the healthy group.

Effectiveness subscale. Significant differences were found between both samples on all variables in the effectiveness subscale except the total sleep period (TSP). All predictions made in Chapter 2 were supported

in the statistical analysis with the exception of TSP. Insomniacs had less total sleep time, felt they did not have enough sleep, and awoke feeling less rested than the healthy subjects. The quality of sleep for the insomniac sample was worse than for the healthy sample. The analysis of the TSP variable indicated that the period of time from settling down for sleep to awakening in the morning was slightly longer for the insomniacs as compared to the healthy group but not at a statistically significant level. Kales, Kales, et al. (1984) report that insomniacs desire the same amount of sleep as normal sleepers. Although insomniacs didn't actually obtain the same amount of sleep as the healthy subjects, they may spend the same amount of time in bed, from settling down for sleep to the final awakening, trying to obtain it. This explanation might account for the finding of no difference between the groups on the TSP variable.

Subjective Sleep Characteristics

The VSH Sleep Scale appears to have actually measured the subject's previous night sleep. If the subjects were becoming accustomed to the scale, one would expect to see a gradual change in scores in the same direction across the three days. There are some changes in scores but they are scattered among the items and do not show any

consistently gradual change in one direction across days. The following discussion of the subjective sleep characteristics of insomniacs is arranged by subscale.

Supplementation subscale. The scores on the supplementation items were quite low. As discussed in Chapter 2, insomniacs do complain of feeling more tired than normal sleepers during the day but there was no objective difference in daytime sleepiness between the two groups when insomniacs and normal sleepers were offered the opportunity to sleep during the day (Seidel et al., 1984; Stepanski, Lamphere, Badia, Zorick, & Roth, 1984). In summary, it appears that the insomniacs minimally supplement their sleep during the day.

Disturbance subscale. Insomniacs had a moderate amount of wakefulness during the night as indicated by the mid-sleep awakening (MSA) scores. The range of the endpoints of the WASO item is from not awakening to staying awake for ten hours. Therefore, each centimeter of the 10 centimeter visual analogue line can theoretically represent an hour of wake time. The insomniacs' scores on the wake after sleep onset (WASO) item indicate they averaged four hours of wake time. The conceptual framework of the study supports the report of increased wake time and increased mid-sleep awakenings in

insomniacs. The literature indicated that movement during sleep did not occur more often in insomniacs than normal sleepers nor was it related to the complaint of insomnia. However, with the increased number of awakenings and increased wake time after sleep onset, it is not surprising that insomniacs believe they experience a moderate amount of movement. In fact, one would almost expect higher scores than were received based on the amount of disturbance subjectively experienced. It took insomniacs a moderate amount of time to fall asleep and they had a moderately high amount of trouble falling asleep. The literature substantiates the difficulty insomniacs experience falling asleep. Insomniacs' sleep was only moderately sound and they experienced a moderate amount of trouble with disrupted sleep. The results are similar to the findings from the literature discussed in Chapter 2. In summary, the subjective sleep characteristics of the insomniacs indicate they experienced a substantial amount of disturbed sleep.

Effectiveness subscale. Insomniacs spent a large amount of time settling down for sleep to awakening in the morning (TSP). However, they only spent a moderate amount of time in actual sleep (TST). These findings reflect those of the literature presented in the conceptual

framework of this study. The scores on the rest upon awakening (RUA) item indicate that the insomniacs did not feel rested or refreshed upon awakening. Insomniacs scored below the midpoint between having had a bad or good night's sleep. Complaints of feeling tired in the morning and of having had a poor night's sleep support the reports of other studies of insomniacs presented in Chapter 2. Insomniacs indicated that the adequacy of the amount of sleep obtained was moderate. However, as discussed earlier, the adequacy of the amount of sleep obtained was still significantly less than that obtained by a healthy group. The results obtained are consistent with those obtained in other insomnia studies. In summary, it appears that insomniacs do not obtain an effective night's sleep.

Recommendations for Further Research

Some recommendations for further research can be made based on the findings of this study. The study should be replicated in order to further examine the factors specified in the taxonomy. A larger sample size should be used if possible. Retesting would provide the opportunity to see if the items load in the same manner, and more specifically, to check the consistency of the findings of reversed SS and SSE loadings on the factor analysis. A

theoretically and empirically based taxonomy which specifically describes an insomniac population could then be developed.

The sleep scale and the taxonomy was developed using the sleep patterns of healthy persons. Characteristics specific to insomnia may emerge in a qualitative study. Interviews with insomniacs might be a valuable aid to further development of the sleep scale for this population.

Some researchers have suggested that the overall night to night variability is the crucial factor in insomnia rather than the amount of sleep obtained. Further statistical analysis of the data could be conducted to examine the night to night variability in the subjective sleep characteristics of this insomniac sample.

Implications for Nursing

This study has contributed to answering the priority call for the testing of instruments developed by nurse scientists (Ventura, Hinshaw, & Atwood, 1981). Further testing and adaptation will increase the potential for the instrument's use in clinical nursing research studies.

There is a dearth of nursing research in insomnia. This study contributes to the knowledge base in nursing and to nursing practice by providing nurses with

information regarding the subjective sleep characteristics of nonhospitalized adult insomniacs. Hopefully, this will heighten nurses' awareness of the components of insomnia and increase their ability to recognize insomnia in their clients.

Summary

The purpose of this study was to test the reliability of the VSH Sleep Scale in a nonhospitalized adult insomniac sample and to examine the 16 characteristics of sleep quality measured by the scale. The subjective sleep characteristics of the insomniacs were presented. The findings were interpreted and discussed. The implications for further research and nursing were explored. The VSH Sleep Scale evidenced adequate reliability and construct validity in an insomniac sample. Significant differences existed between the insomniacs and the healthy sample on all but one sleep characteristic. The factors specified in the VSH Sleep Scale taxonomy remained essentially the same in the insomniac sample.

APPENDIX A
HUMAN SUBJECTS APPROVAL



THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721
COLLEGE OF NURSING

MEMORANDUM

TO: Ms. Dana R. Epstein
FROM: Linda R. Phillips, PhD, RN, FAAN *LRP*
Acting Director of Research
DATE: July 9, 1987
RE: Human Subjects Review:

Your project has been reviewed and approved as exempt from University review by the College of Nursing Ethical Review Subcommittee of the Research Committee and the Director of Research. A consent form with subject signature is not required for projects exempt from full University review. Please use only a disclaimer format for subjects to read before giving their oral consent to the research. The Human Subjects Project Approval Form is filed in the office of the Director of Research if you need access to it.

We wish you a valuable and stimulating experience with your research.

LRP/ms

APPENDIX B

Disclaimer

Study: Measurement of Subjective Sleep Characteristics of Adult Insomniacs

The purpose of this study is to test a sleep questionnaire with insomniacs and evaluate the sleep patterns of adults with insomnia. You are being asked to voluntarily complete the Verran and Snyder-Halpern Sleep Scale within the first two hours after arising on three consecutive days. It takes about 10 minutes to complete a scale. The study also involves completing a demographic data form and a participant information questionnaire. Each of the three Verran and Snyder-Halpern Sleep Scales will be mailed to the investigator on the morning of completion in a stamped self-addressed envelope provided for you. The demographic data form and the participant information questionnaire will be mailed to the investigator with the first completed Verran and Snyder-Halpern Sleep Scale.

By responding to the questionnaires, you will be giving your consent to participate in the study. Your name is not on the questionnaires, and only the investigator will have access to your responses. All questionnaire material will be treated with anonymity and confidentiality. You may choose not to answer some or all of the questions, if you so desire. Whatever you decide, the investigator-participant relationship will not be affected in any way. There are no known risks to this study. You may ask questions and receive answers about the study at any time by calling the investigator at the number listed below.

I appreciate your providing this information and look forward to sharing study results with you.

Dana R. Epstein, R.N.
Investigator

APPENDIX C

Demographic Data FormFor Research
Use
Card_(1)Study: Measurement of the Subjective Sleep Characteristics
of Adult Insomniacs

Date_____

Participant #_____

ID#_(2-4)

Age_____

Sex: Male_____ Female_____

(5-6)(7)

Marital Status

1. Single_____
2. Married_____
3. Widowed_____
4. Separated_____
5. Divorced_____

Working/School

1. Full time_____
2. Part time_____
3. None_____

(8)(9)

Ethnic Origin

1. Black_____
2. Caucasian_____
3. Hispanic_____
4. Native American_____
5. Oriental_____
6. Other_____

_(10)

Education (check highest level)

1. 8th grade or less_____
2. some high school_____
3. high school graduate_____
4. trade/business school_____
5. some college_____
6. college graduate_____
7. graduate or professional degree_____

_(11)

Gross Family Income

1. below 10,000_____
2. 10,000-19,999_____
3. 20,000-29,999_____
4. 30,000-39,999_____
5. 40,000-49,999_____
6. 50,000-59,999_____
7. 60,000 & above_____

_(12)

Would you be willing to participate in future insomnia
research studies? Yes_____ No_____

APPENDIX D

Participant Information Questionnaire

Study: Measurement of the Subjective Sleep Characteristics
of Adult Insomniacs

For Research
Use
ID# _____

1. What are your normal sleeping hours? _____ to _____ (13-16)
_____ (17-20)
2. How long does it generally take you to fall asleep?
_____ hours and _____ minutes (21-23)
3. Do you consider this a problem for you? YES _____ NO _____ (24)
If YES: How long has this been a problem for you? _____ months
_____ years (25-27)
4. How many times per week does it take you this long to fall
asleep? _____ (28)
5. How many times do you awaken during the night? _____ (29-30)
6. Do you consider this a problem for you? YES _____ NO _____ (31)
If YES: How long has this been a problem for you? _____ months
_____ years (32-34)
7. How long do you usually stay awake once awakened during
the night? _____ hours and _____ minutes (35-37)
8. How much total time do you actually spend asleep during
the night (exclude time awake spent in bed)? _____ hours and
_____ minutes (38-40)
9. Do you consider the amount of sleep you get to be a
problem for you? YES _____ NO _____ (41)
10. Are you currently taking any medication? YES _____ NO _____ (42)
If YES: What medication(s) are you taking, how much, how
often, and for what purpose? (use back of sheet if needed)

11. Do you take any pills, drugs, alcohol, or foods to help
you sleep? YES _____ NO _____ (43)
If YES: Please specify which you use, the names, how much
you take, and how often. (use back of sheet if needed) _____

12. Have you worked a night shift with daytime sleeping within the last 2 months? YES___ NO___ (44)

13. Are you planning to work the night shift and sleep during the day within the next 2 months? YES___ NO___ (45)

14. In your opinion, are you currently experiencing any stress which might disrupt your normal sleep patterns? YES___ NO___ (46)
If YES: Please describe (use back of sheet if needed)

15. How would you describe your present health? POOR FAIR AVERAGE GOOD EXCELLENT (47)

16. How would you describe your present mental health? POOR FAIR AVERAGE GOOD EXCELLENT (48)

17. Are you currently experiencing any acute or chronic physical or mental illness? YES___ NO___ (49)
If YES: Please describe (use back of sheet if needed)

DAY _____

VERRAN AND SNYDER-HALPERN SLEEP SCALE

Directions:

Answer each question by placing a vertical mark across the answer line at a point which BEST REFLECTS YOUR OPINION.

Example: Happy _____ | _____ Sad

Answer all of the following questions about your last night's sleep. Consider the night's sleep to begin from the time you first tried to go to sleep to the time you were finally "up" in the morning.

1. Did not awaken	_____	Was awake ten hours	_____ (35-37)
2. Had no sleep	_____	Excluding time awake, had ten hours of sleep	_____ (38-40)
3. Did not sleep during the day yesterday	_____	Slept ten hours during the day	_____ (41-43)
4. Did not sleep yesterday morning	_____	Slept off and on yesterday morning	_____ (44 - 46)
5. Did not sleep yesterday evening	_____	Slept off and on yesterday evening	_____ (47 - 49)
6. Fell asleep immediately	_____	Did not fall asleep	_____ (50 - 52)
7. Slept lightly	_____	Slept deeply	_____ (53-55)
8. Had no trouble with disrupted sleep	_____	Had a lot of trouble with disrupted sleep	_____ (56 - 58)
9. Didn't wake at all	_____	Was awake off and on all night	_____ (59 - 61)
10. Had no trouble falling asleep	_____	Had a lot of trouble falling sleep	_____ (62 - 64)
11. Didn't move	_____	Tossed all night	_____ (65 - 67)
12. Awoke exhausted	_____	Awoke refreshed	_____ (68 - 70)
13. After morning awakening, stayed awake	_____	After morning awakening, dozed off and on	_____ (71 - 73)
14. Had a bad night's sleep	_____	Had a good night's sleep	_____ (74 - 76)
15. Had enough sleep	_____	Did not have enough sleep	_____ (77 - 79)

9/84 (Revised 2/85) (Revised 6/86)

Scale # _____ (34)

____ (1) Card

____ (2-4) ID

____ (5-12) Repeat

VERRAN AND SNYDER-HALPERN SLEEP SCALE

APPENDIX E.

APPENDIX F

PERMISSION TO USE
VERRAN AND SNYDER-HALPERN
SLEEP SCALE

REQUEST FORM

I request permission to copy the Verran-Snyder-Halpern (VSH) Sleep Scale for use in my research entitled, Measurement of Subjective Sleep

Characteristics of Adult Insomniacs

In exchange for this permission, I agree to submit to Dr. Verran or Dr. Snyder-Halpern, a copy of each data collection tool (i.e., subject information questionnaire, subject information questionnaire chart form, and VSH Sleep Scale) for each subject tested. These data will be used to establish a normative data base for clinical populations. No other use will be made of submitted data. Credit will be given to me in reports of normative statistics that make use of data I submitted for pooled analyses.

Dana R. Epstein

(Signature)

7/6/87

(Date)

Position and Full Address
of Investigator(s)

Dana R. Epstein

Masters Student College of Nursing

University of Arizona

Permission is hereby granted to copy the VSH Sleep Scale for use in the research described above.

Joyce A. Verran

Joyce A. Verran, Ph.D., R.N.

OR

Rita Snyder-Halpern

Rita Snyder-Halpern, Ph.D., R.N.

July 6, 1987

(Date)

(Date)

Please send two signed copies of this form to:

Joyce A. Verran, Ph.D., R.N.
College of Nursing
University of Arizona
Tucson, Arizona 85721
(602) 626-6205 or
(602) 626-6154

OR

Rita Snyder-Halpern, Ph.D., R.N.
St. Joseph's Hospital Centers
15855 Nineteen Mile Road
Mt. Clemens, Michigan 48044
(313) 263-2642

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