# A BEHAVIORAL INTERVENTION TO ENHANCE THE SLEEP-WAKE PATTERNS OF OLDER ADULTS WITH INSOMNIA 

by

Dana Epstein

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A Dissertation Submitted to the Faculty of the<br>COLLEGE OF NURSING<br>In Partial Fulfillment of the Requirements<br>For the Degree of<br>DOCTOR OF PHILOSOPHY<br>In the Graduate College<br>THE UNIVERSITY OF ARIZONA

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A behavioral intervention to enhance the sleep-wake patterns of older adults with insomnia

Epstein, Dana Robin, Ph.D.<br>The University of Arizona, 1994

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As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Dana R. Epstein
entitled $\qquad$ Sleep-Wake Patterns of Older Adults With Insomnia
and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy/Nursing

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#### Abstract

The research study evaluated the effectiveness of a behavioral intervention for sleep maintenance insomnia in older adults. Twenty-two elders who spent 60 minutes or more awake during the night on a minimum of three nights per week for at least six months received treatment. The study utilized an experimental design with repeated measures. The subjects were randomly assigned to either an immediate or delayed (waiting list control) treatment group. Subjects completed daily sleep diaries and several other measures. The behavioral intervention was a treatment package consisting of sleep restriction therapy, stimulus control instructions, sleep education, and an optional daytime nap. A sixweek treatment program consisting of four weekly classes and two weekly telephone interventions was implemented.

Between and within group differences were identified using repeated measures analysis of variance (ANOVA). Post-hoc analyses were performed to identify significant differences. The between group analysis of sleep behaviors revealed an improvement in wake after sleep onset and sleep efficiency for the immediate treatment group. After intervention, the delayed treatment group improved on the same sleep behaviors as well as total sleep time. The therapeutic improvement was maintained at the three month follow-up. Sleep-wake impairment, dysfunctional cognitions, and presleep anxiety were reduced for both groups. The mood measures indicated that the subjects were not depressed prior


to treatment and remained nondepressed following intervention. State and trait anxiety levels decreased. Favorable ratings for therapy evaluation were received. The majority of subjects felt they were compliant with treatment and had corresponding decreases in wake after sleep onset. In addition to statistical significance, the clinical significance of the study was established.

Insomnia in older adults can be effectively treated using nonpharmacological intervention. Replication of the study is warranted as well as analysis to examine moderating factors affecting treatment outcomes. An effort should be made to increase the demographic diversity of subjects in future studies. Alternative treatment implementation modalities and settings other than the community should be considered for further research.

## CHAPTER ONE

## THE PROBLEM OF INSOMNIA IN OLDER ADULTS AND ITS SIGNIFICANCE

Insomnia is a major health problem and frequent complaint of older adults. This research addressed the problem of insomnia in the elderly by evaluating the effectiveness of a behavioral intervention for the treatment of sleep maintenance insomnia. Chapter One substantiates the need for treatment outcome studies of insomnia in an older population. The chapter also provides an overview of the problem of insomnia in later life, the clinical significance of insomnia, and concludes with a statement of the purpose of the study.

The overview of the problem describes the prevalence of sleep problems of older adults, their most common sleep difficulties, sleep architecture and its changes in an older population, factors influencing insomnia in older adults, and a theoretical perspective of insomnia. The clinical significance of the problem examines the current treatment modalities, the paucity of research in the treatment of insomnia in older persons, and the lack of a scientific approach by nursing to the treatment of sleep problems of older adulthood.

## Overview of the Problem

Insomnia refers to "a heterogeneous set of problems reflecting a disturbance of the sleep process" (Bootzin, Engle-Friedman, \& Hazelwood, 1983, p.81). The Association of Sleep Disorders Centers (ASDC) (1990) distinguishes among three types of insomnia: (1) transient and situational insomnia, (2) short-
term or subacute, and (3) persistent or chronic insomnia. Transient and situational insomnia is commonly prompted by an acute emotional arousal or conflict and lasts less than one month. Short-term or subacute insomnia lasts from one to six months. Persistent insomnia may result from a situational insomnia but develops due to maladaptive sleep behaviors and dysfunctional cognitions about sleep (Morin, 1993). The persistent sleep difficulty lasts longer than six months.

Insomnia encompasses difficulty with sleep onset latency, sleep maintenance, and early morning awakening that is both subjectively and objectively determined. Sleep maintenance insomnia can consist of increased time awake while in bed after initial onset, increased difficulty in returning to sleep once awakened, and frequent awakenings. For the purpose of the research, sleep maintenance insomnia of the persistent type was studied. Persistent sleep maintenance insomnia is defined as 60 minutes or more of time spent awake after sleep onset on at least three nights per week for a minimum of six months. The definition is based on the inclusion criteria extracted from the literature on insomnia treatment outcome studies conducted with older adults with sleep maintenance insomnia. The sleep difficulties of older people are discussed from both a subjective and objective perspective in the following two sections.

## Insomnia Among Older Adults: Common Sleep Difficulties, Prevalence, and

## Consequences

Research indicates that sleep difficulty increases with age. The most common sleep complaints of elders are increased sleep onset latency, an increase in the frequency and duration of awakenings during the night, frequent early morning awakenings, excessive daytime sleepiness, and dissatisfaction with sleep (Dement, Miles, \& Carskadon, 1982; Miles \& Dement, 1980). A national survey of noninstitutionalized adults ( $n=3,161$ ) found that the prevalence of serious insomnia (trouble falling asleep and staying asleep that is quite bothersome) increased from $14 \%$ in 18 to 34 year old persons to $25 \%$ in 65 to 79 year old individuals (Mellinger, Balter \& Uhlenhuth, 1985). A total of $45 \%$ of persons between 65 and 79 years of age reported some difficulty sleeping during the preceding 12 months. A survey of a Florida county revealed that $13 \%$ of the residents experienced sleep problems "often" or "all the time", while $23 \%$ of persons over 60 years of age complained of the same frequency of sleep problems (Karacan et al., 1976).

Sleep maintenance insomnia, the focus of the research, is indicated by increased time spent awake after the initial onset of sleep (wake after sleep onset [WASO]). If sleep is disturbed frequently, the older person may begin to accumulate increases in time spent awake during the night. Marked increases in complaints of wake after sleep onset (WASO) and complaints of light, disturbed sleep have been reported by older adults (Miles \& Dement, 1980). Sleep efficiency
(SE) decreases with age (Coleman et al., 1981). SE is the percentage of time asleep while in bed and is calculated using total sleep time and total time in bed. The frequency of daytime napping increases with age (Zepelin, 1973). Older persons have also been found to spend an excessive amount of time in bed (TIB) (Dement, Miles, \& Carskadon, 1982). TIB is the amount of time spent in bed from the time one gets into bed at night until one gets out of bed in the morning.

The sleep difficulties experienced by older persons can impact on daytime functioning (Miles \& Dement, 1980). The sleep fragmentation of older adults is reflected in a decrease in total sleep time (TST). TST is the amount of time spent asleep after the initial onset of sleep until the person gets out of bed in the morning. Sleep fragmentation and decreased TST are related to decreased daytime well-being (Carskadon, Brown, \& Dement, 1982). The older person has trouble staying alert and awake during the day (Carskadon, Brown, \& Dement, 1982; Roth, Hartse, Zorick, \& Conway, 1980). Insomnia can interfere with daytime functioning through its impact on mood, health, relationships, and job performance (Lacks, 1987).

In addition to insomnia's effect on daytime functioning, other adverse consequences can result from sleep difficulties. A recent study found that insomnia is a strong predictor of mortality and nursing home placement for community dwelling elderly (Pollak, Perlick, Linsner, Wenston, \& Hsieh, 1990). These findings support previous research which indicates that an older person's
sleep difficulty is a salient factor in caretakers' decisions to place the elder in institutional care (Pollak \& Perlick, 1987; Sanford, 1975).

A recent meta-analysis addressing gender differences in sleep behavior of persons 58 years of age and older provides gender related findings on some of the outcome variables important to the proposed study (Rediehs, Reis, \& Creason, 1990). There were no gender differences between men and women in TST. TIB was greater among older men. The meta-analysis showed that older men have more WASO, particularly in the later part of the night.

## Sleep Architecture and Its Changes in Older Adults

Sleep is defined as "an active and complex state, not unlike a building with various components," therefore the term "sleep architecture" is used "to describe the stages and cycles of sleep and their interrelationships." (Hauri, 1982, p.6). In order to understand the changes that occur in the sleep architecture of older persons, it is necessary to examine the sleep architecture of persons without sleep difficulties. The younger adult's sleep architecture best exemplifies sleep patterning that is free of sleep difficulty. The following discussion of sleep stages is based on the younger adult's sleep patterning (e.g., Rechtschaffen \& Kales, 1968; Kales \& Kales, 1984).

Researchers use a variety of electrophysiological measurements called polysomnography to study sleep. Polysomnography includes a minimum of three types of electrophysiological activity measurement: the electroencephalogram
(EEG) or electrical activity of the brain, the electro-oculogram (EOG) or eye movements, and the electromyogram (EMG) or muscle tension. In addition, an electrocardiogram (ECG) or electrical activity of the heart, additional EMG measures, and certain types of respiratory function tests can be performed during sleep depending on the problem under evaluation.

Typically there are five stages of sleep: Stages 1 through 4 and rapid eye movement (REM) sleep. Movement through the stages of sleep occurs in a fairly regular fashion. When persons get into bed and close their eyes, polysomnography measures EEG waves that are described as alpha waves. Alpha waves or an alpha state is associated with wakefulness or resting. The alpha state lasts for approximately five minutes. The disappearance of alpha waves is a good measure of the first stage of sleep, Stage 1.

Stage 1 is a transition stage consisting of theta waves that occur at a slower frequency than alpha waves. Persons in Stage 1 sleep describe a feeling of drifting off to sleep. Stage 2 is usually considered the stage of sleep onset. If persons are awakened after several minutes in Stage 2, they will usually state they were asleep. Stage 2 is characterized by two EEG events: the occurrence of sleep spindles and $K$ complexes.

Stages 3 and 4 are referred to as slow wave or delta sleep. The characteristic distinguishing Stages 3 and 4 is the amount of delta waves occurring
in each stage. Stages 3 and 4 sleep occur predominantly early in the night and are followed by REM sleep.

REM sleep consists of mixed frequency EEG activity that resembles alpha sleep but is characterized by frequent episodes of rapid eye movement. REM sleep occurs approximately every 90 to 100 minutes during the night. There is an increase in REM sleep toward the end of the night.

Non REM (NREM) sleep consists of Stages 1 through 4. NREM sleep comprises about the first 70 to 100 minutes of sleep, followed by REM sleep. The four stages of sleep followed by a REM sleep episode is considered a sleep cycle. Sleep cycles are repeated about four to six times per night.

Age related differences occur in the cycling of sleep stages. Polysomnographic studies confirm the subjective sleep complaints of older adults, particularly the increase in the frequency of awakenings and the difficulty falling back to sleep (Reynolds et al., 1985; Webb, 1982; Webb \& Campbell, 1980). In addition to an increase in awakenings, polysomnography has also demonstrated a decrease in the deep or slow-wave sleep (Stages 3 anid 4) of the elderly. The reduction in deep sleep is due in part to a decrease in the amplitude of the EEG waves so that they do not meet the criterion for scoring as slow wave sleep (Agnew, Webb, \& Williams, 1967; Feinberg, Koresko, \& Heller, 1967; Kales, 1975; Prinz, Obrist, \& Wang, 1975; Webb \& Dreblow, 1982).

## Factors Influencing Insomnia in Older Adulthood

It is commonly assumed that insomnia is a normal developmental process in the older adult. However, a number of factors may be associated with sleep difficulties in later life. The following discussion supports the premise that sleep difficulties in older persons may have a variety of influences.

Health related problems. Older individuals may experience health related problems that impact on the quantity and quality of their sleep. Painful conditions such as arthritis can disrupt the sleep of older adults (Vitiello \& Prinz, 1988). Cardiovascular problems (Kales \& Kales, 1975; Williams, 1978), respiratory disorders (Fleetham et al., 1982; Giblin, Garmon, Anderson, \& DeLancey, 1980; Montplaisir, Walsh, \& Malo, 1982) and gastrointestinal disorders (Dragstedt, 1959) are some of the health problems associated with sleep difficulty.

Sleep related disorders. Older adults may complain of insomnia although the underlying problem is a sleep disorder such as sleep apnea, nocturnal myoclonus, or periodic movements in sleep. Thirty-nine percent of older persons evaluated at sleep disorder centers are diagnosed with sleep apnea, a sleep related respiratory disturbance (Coleman et al., 1981). The frequent arousals associated with sleep apnea result in daytime consequences such as excessive daytime sleepiness and cognitive and perceptual-motor deficits (Guilleminault \& Dement, 1978; Yesavage, Bliwise, Guilleminault, Carskadon, \& Dement, 1985). Nocturnal myoclonus (periodic jerking of the legs during sleep) increases with age
and was found in between $18 \%$ and $25 \%$ of older adults seen in sleep disorder centers (Coleman et al., 1981; Kales \& Kales, 1984). Restless legs syndrome is experienced as a creeping, crawling sensation in the lower legs. The majority of persons suffering from restless legs syndrome also experience nocturnal myoclonus (Moore \& Gurakar, 1988).

Stress. The experience of stressful life events is a major factor in the development of insomnia (Healey et al., 1981). Older adulthood is a time of many changes in lifestyle and the occurrence of important life events. The aging process, chronic illness, and issues of death and dying are some examples of stressful events for the older person. Therefore, life stress may disturb the sleep patterns of the elderly.

Depressant and stimulant substances. Alcohol, nicotine, and caffeine are sleep interfering substances. The central nervous system depressant properties of alcohol may facilitate sleep onset but will suppress REM sleep and cause fragmented sleep with frequent awakenings. Withdrawal from alcohol produces rebound insomnia on the nights following withdrawal. Nicotine and caffeine are central nervous system stimulants that produce a lighter and more fragmented sleep (Bonnet, Webb, \& Barnard, 1979; Soldatos, Kales, Scharf, Bixler, \& Kales, 1980).

Environmental factors. There are no ideal environmental circumstances for sleep. The sleep literature includes a number of findings that suggest the influence
of enviroriment on sleep. When temperatures are over 24 degrees C , there is more movement during sleep, more awakenings, less deep sleep, and less dream sleep (Hauri, 1982). Noise can decrease the amount of deep sleep and increase the frequency of awakenings (Sanchez \& Bootzin, 1985). Sensitivity to noise increases with age (Roth, Kramer, \& Tinder, 1972). Older persons are more easily awakened by noise (Zepelin, McDonald, \& Zammit, 1984) and they have more difficulty falling back to sleep once awakened (Webb \& Campbell, 1980).

Medication. Prescription and nonprescription drugs can have a disruptive effect on sleep. Medications stay in the body and remain active for longer periods of time in older persons due to their decreased kidney and liver metabolism and diminished circulatory time (Albert, 1981; Greenblatt, Sellers, \& Shader, 1982). There is also the risk for potential toxic interactions from multiple medication use (Miles \& Dement, 1981) possibly resulting from older adults' tendency to utilize the services of several physicians, exchange drugs with friends, and substitute drugs (Hemminki \& Heikkila, 1975). Anti-hypertensive, anti-seizure, and antiparkinsonian medication, diuretics, bronchodilators, steroids, and beta-blockers are examples of drugs that can disturb sleep (Kales \& Kales, 1984, Karacan \& Williams, 1983). Hypnotics, prescribed to promote sleep yet known for their disruptive effects, are discussed in the section on current treatment modalities.

Lifestyle of the older adult. A study of what people with insomnia (age range 20-65 years) do, think, and feel during the day revealed that they have a
more sedentary lifestyle and are more preoccupied with self than good sleepers (Marchini, Coates, Magistad, \& Waldum, 1983). Sleep researchers studying older persons with insomnia have commented on their inactive lifestyle (Bootzin \& EngleFriedman, 1987). The inactivity of older adults is compounded by their inability to maintain sleep and wakefulness states resulting in daytime sleepiness and a tendency to take more naps (Carskadon, Brown, \& Dement, 1982; Webb \& Swinburne, 1971). Retirement and the lack of scheduled activities may inhibit the establishment of consistent sleep and wake times.

Circadian rhythm. Evidence suggests that age related changes in the circadian rhythms of the older person may be responsible for sleep changes (Miles \& Dement, 1980). Circadian rhythms are body rhythms that take about 24 hours to complete, such as the sleep-wake cycle, endocrine secretion, and normal body temperature in humans. The circadian rhythms appear to be closely related. Changes in one circadian rhythm may affect the pacing of other circadian rhythms. Humans rely on zeitgebers (cues of time) such as meal times, work periods, clocks, social behaviors of significant others, sunrise, and sunset to synchronize circadian rhythms. Desynchronization of circadian rhythms may interfere with the establishment of optimal sleeping times. Persons who nap during the daytime or sleep late in the morning may develop circadian rhythm disturbances (Hauri, 1970). The changes in the lifestyle of older adults may affect the presence of zeitgebers in their lives thereby impacting on circadian rhythms. When
desynchionization of circadian rhythms occurs due to weak zeitgebers, sleep becomes increasingly variable and difficult (Czeisler, Weitzman, Moore-Ede, Zimmerman, \& Knauer, 1980). Older persons may experience a breakdown in their biphasic sleep-wake pattern to shorter, more frequent sleep-wake periods over 24 hours (Miles \& Dement, 1980). This polyphasic sleep-wake pattern resembles the pattern of a young child.

Sleep habits. Poor sleep habits can help maintain insomnia even if the sleep difficulties were initially caused by other factors such as physical illness or situational stress. A number of bedtime activities are incompatible with falling asleep for people with insomnia (Bootzin, 1972, 1976, 1977; Bootzin \& Nicassio, 1978). Activities performed in the bedroom such as reading, talking on the telephone, watching television, snacking, listening to music, and most disturbing of all, worrying, can interfere with sleep onset and the return to sleep after a nighttime awakening. The activities become associated with the bed and bedroom as cues for arousal rather than sleep. The arousal in turn produces anxiety and frustration from repeated attempts to fall asleep or to fall back to sleep.

## Theoretical Perspective of the Development of Insomnia

Several theoretical bases have been utilized to explain the development of insomnia. Physiological arousal, cognitive arousal, performance anxiety, emotional arousal, and stimulus control are commonly identified theoretical perspectives (Lacks, 1987). Recently a more comprehensive theory has been proposed that
conceptualizes insomnia as the interaction of psychophysiological arousal and learned maladaptive habits (Hauri, 1983, 1989; Hauri \& Fisher, 1986; Lacks \& Morin, 1992).

A strictly physiological or somatic arousal hypothesis has not been supported. It is not clear whether sleep difficulty is an antecedent, covariate, or consequence of increased physiological arousal (Bootzin \& Nicassio, 1978). Hauri (1979) has proposed that higher levels of physiological activity, such as muscle tension, may be a result of the experience of insomnia rather than a causative factor.

Cognitive arousal appears to play a greater role in sleep difficulty than physiological arousal. Persons with insomnia have negative, worrisome presleep cognitions (Borkovec, Lane, \& van Oot, 1981; Coursey, Buchsbaum, \& Frankel, 1975), racing, intrusive thoughts at bedtime (Borkovec, 1982), and are more likely to attribute their sleep difficulties to cognitive arousal rather than somatic factors (Lichstein \& Rosenthal, 1980). Cognitive arousal has a stronger correlation with measures of sleep difficulty than physiological arousal (Coren, 1988; Nicassio, Mendlowitz, Fussell, \& Petras, 1985).

Learned maladaptive habits are an important component in the development of sleep difficulties. This conceptualization of insomnia places sleep difficulty within an operant paradigm (Bootzin, 1972). The bed and bedroom are no longer discriminative stimuli for sleep due to their association with activities
incompatible with sleep such as eating, watching television, and worrying. The bed, bedroom, and bedtime become cues for arousal rather than sleep (Bootzin, Epstein, \& Wood, 1991).

Therefore, in addition to the cognitively aroused nature of persons with insomnia and the physiological arousal experienced as a result of insomnia, persons with sleep difficulty may also have conditioned arousal as a result of learned maladaptive habits. Other sleep incompatible behaviors such as excessive time in bed and poor sleep hygiene due to certain lifestyle habits can also contribute to the insomnia problem. With a foundation of multifaceted arousal, sleep incompatible behaviors, and maladaptive habits, the person with insomnia tries harder and harder to sleep which increases anxiety, raises autonomic arousal, and makes sleep more difficult to obtain.

A theory of psychophysiological arousal and learned maladaptive behaviors can be applied to older adults with sleep maintenance insomnia. What must be understood is the progression of the insomnia problem for the older person. Any one or combination of the factors discussed as influencing insomnia can be considered as the cause(s) of the sleep problem, i.e. the antecedents. The complex nature of insomnia makes it more likely that there is an interaction of factors at work, especially in the older adult who is likely to suffer from health disturbances, take multiple medications, and experience lifestyle changes. Despite the cause(s) of insomnia, once the older person begins to experience insomnia,
the elements of psychophysiological arousal and maladaptive learned habits come into play and contribute to the development of a persistent insomnia problem. Pyschophysiological arousal and maladaptive learned habits maintain the insomnia and are often referred to as perpetuating factors in persistent insomnia. Perpetuating factors become the targets of treatment.

## Clinical Significance of the Problem

## Current Treatment Modalities

Several treatments for persistent insomnia in older persons exist. The pharmacological treatment of insomnia is not linked to the psychophysiological arousal and learned maladaptive habits theory discussed earlier. Pharmacological treatment is a medical approach to the insomnia problem. Psychophysiological arousal and learned maladaptive habits are the targets of the behavioral treatments.

Pharmacological treatment. The most common treatment of insomnia is hypnotic drugs. The use of hypnotics is troublesome for the older person and a problem of great concern for nurses. It is estimated that about one-half of the persons seen by physicians for the complaint of insomnia receive a prescription for a hypnotic drug (Bixler, Kales, Kales, Scharf, \& Leo, 1976). A survey by the United States Public Health Service (1976) of skilled nursing facilities found that $94 \%$ of the 98,505 patients surveyed had been prescribed hypnotics. A national survey reported that $69 \%$ of persons using psychotherapeutic prescription
medication for sleep were 50 to 79 years of age (Mellinger, Balter \& Uhlenhuth, 1985).

The positive correlation between age and sleep apnea (episodes of cessation of respiration during sleep) (Bliwise, Carskadon, Carey, \& Dement, 1984; Bixler et al., 1982) indicates the need for caution with the prescription of hypnotics for older adults. The use of hypnotics by older individuals puts them at risk for toxic side effects (Albert, 1981), potential toxic interactions from multiple medication use (Miles \& Dement, 1980) and the exacerbation of existing physical disorders (Institute of Medicine, 1979). Furthermore, the majority of benzodiazepines, the most commonly prescribed hypnotic, are not effective beyond two weeks (Kales \& Kales, 1984). Tolerance to hypnotics can develop quickly and withdrawal is characterized by the syndrome of drug withdrawal insomnia or rebound insomnia. Rebound insomnia may reinforce the person with insomnia's belief that the medication is necessary leading to increased dependence on drugs for sleep (Kales, Scharf, \& Kales, 1978). Older adults with insomnia are clearly in need of nonpharmacological treatments for their sleep difficulties.

Behavioral treatment of insomnia. Behavioral outcome research has focused primarily on sleep onset insomnia in young and middle aged adults. Reviews of controlled investigations using behavioral interventions have demonstrated reasonable success in the treatment of insomnia in young and middle aged people (Borkovec, 1982; Lacks, 1987, Lichstein \& Fischer, 1985;

Turner, 1986). Although there appears to have been some reluctance to include older people in insomnia treatment outcome studies, behavioral gerontology literature indicates that interventions used effectively with young persons work for older individuals as well (Carstensen, 1988). From the first investigation in 1983 to the present, only 11 studies have examined the nonpharmacological treatment of sleep onset latency and/or sleep maintenance insomnia in older adults. An extensive review of the studies is included in Chapter Two. The findings indicate that cognitive-behavioral interventions are effective in the treatment of older persons with insomnia.

Psychophysiological arousal in elders with insomnia has been addressed through the use of relaxation based methods and cognitive restructuring techniques. Relaxation strategies reduce the somatic arousal that results from the inability to fall asleep or fall back to sleep. Cognitive restructuring techniques are designed to diminish intrusive, racing, negative thoughts that prevent the onset of sleep or the return to sleep.

Learned maladaptive sleep habits and the resultant conditioned arousal have been targeted by stimulus control instructions. Stimulus control instructions assist the older adult to learn to perform activities associated with arousal in places other than the bedroom. The bed becomes associated with sleep and the arousal of frustration with the inability to sleep is reduced. The establishment of a
consistent sleep pattern ensures falling to sleep or back to sleep quickly thereby strengthening the cues of the bed and bedroom for sleep.

The older person's sleep incompatible behavior of spending excessive time in bed is the focus of sleep restriction therapy. Sleep restriction therapy limits the time in bed to the actual amount of time slept. Sleep is consolidated and becomes more efficient. This intervention is particularly appropriate for older adults who experience a decrease in sleep efficiency with aging.

The complexity of insomnia requires a multifactor approach. Intervention outcome studies of the elderly have used treatment packages that incorporate several cognitive and behavioral strategies. A multicomponent method ensures that the factors maintaining the older person's insomnia are targeted.

## Nursing Research in Sleep and Insomnia

Insomnia is clearly a disturbing problem for older adults. Changes in their sleep architecture and the incidence of complaints regarding sleep quantity and quality demand the attention of health care professionals. Unfortunately, the perspective of many clinicians is that the sleep difficulties of older persons are a part of normal development. The problem is therefore ignored, overlooked, untreated or treated with medications. In addition to clinical exclusion from treatment, few behavioral intervention research studies of insomnia have focused on older adults.

Nursing has not addressed the problem of sleep disturbance in older adults from an intervention standpoint. The nursing literature concerning sleep problems in older adults includes "how to" articles (e.g. Davignon \& Bruno, 1982; Hayter, 1985; Hoch \& Reynolds, 1986; Lerner, 1982), conceptual articles (e.g. Collings, 1983), and descriptive and survey studies (e.g. Clapin-French, 1986; Pacini \& Fitzpatrick, 1982; Hayter, 1983; Hoch, Reynolds, \& Houck, 1988). Based on the prevalence of the problem, nurses are likely to encounter many older adults with sleep disturbances. When asked to list their major concerns, older individuals place sleep at or near the top of their list (Miles \& Dement, 1980).

Recent testimony by nurse researchers before the National Commission on Sleep Disorders Research has highlighted the need for investigations by nurses in this area. Shaver (1991), in her testimony, called for multidisciplinary involvement in the science of sleep and the application of that science through nonpharmacological treatments. Shaver believes that nurses are in a position to impact the health behaviors of sleep. Felton (1991) pointed out in her testimony that areas of human health associated with sleep-wake schedules are a concern of nursing.

There is a paucity of nursing research in the area of sleep (Shaver \& Giblin, 1989) so it is not surprising that nursing has failed to address the treatment of insomnia in a scientific manner. Shaver \& Giblin's review of nursing research related to sleep indicates that the existing studies lack a theoretical perspective
and have rarely addressed an evaluation of therapies for sleep problems. There has been a call within nursing for the development of interventions that strengthen the sleep-wake cycle of older adults (Hoch, Reynolds, \& Houck, 1988).

Shaver and Giblin (1989) suggest that the manifestation of sleep in a circadian pattern requires it to be studied from the perspective of personenvironment fit. Nurses are in a position to examine sleep as it relates to person and environment due to nursing's association with nursing conceptual models. Since sleep-wake cycles reflect human patterns in interaction with the environment, concern with sleep issues is compatible with the nursing conceptual models of Rogers $(1970,1986)$ and Newman (1986) which emphasize the importance of patterning in human and environmental fields.

The strengthening of the sleep-wake cycle of older adults is a major focus of the research study. A treatment package of sleep restriction therapy, stimulus control instructions, and an optional daytime nap was used in a controlled investigation to treat and evaluate sleep maintenance insomnia in older adults. The research is embedded in a theoretical framework that considers a nursing conceptual model concerned with patterning in human-environment fields. The research has clinical significance in its potential for use in the clinical setting to improve the sleep-wake patterns of older adults with insomnia. Safe, effective, and nonpharmaceutical treatments for insomnia in the elderly are needed. After
appropriate testing, such treatments could be implemented independently by nurse clinicians.

## Purpose

The purpose of the proposed research project was to evaluate the effectiveness of a behavioral intervention for sleep maintenance insomnia in older adults. The specific aims of the research were to assist older adults with sleep maintenance insomnia:

1. to consolidate sleep and establish a consistent sleep-wake pattern.
2. to strengthen the bed and bedroom as a cue for sleep by reducing sleep interfering activities.
3. to report a decrease in the negative impact of insomnia on their lives.
4. maintain therapeutic gains from posttreatment to the three month follow-up assessment phase.

## Summary

The sleep-wake patterns of older persons change as they age. Sleep maintenance insomnia has been documented as a major subjective and objective health problem of the elderly. The development of insomnia may be influenced by various factors. General health, lifestyle factors, and psychological elements are significant predictors of sleep quality in elders (Morgan, Healey, \& Healey, 1989). As sleep quality decreases, many elderly persons will find themselves the victims of the perpetuating factors of psychophysiological arousal and learned
maladaptive habits. Persistent insomnia may become an established pattern for at least $25 \%$ of elders.

Current modes of treatment for insomnia in older persons are either ineffective or supported by an underdeveloped empirical base. Hypnotics may be useful in the short-term treatment of insomnia but their long-term effectiveness has not been established. Lack of efficacy of hypnotics and dangerous side-effects for elders has prompted the National Institutes of Health (1991) to recommend that health care professionals avoid prescribing hypnotics for older persons with persistent insomnia. Instead, more controlled investigations which target the perpetuating factors of persistent insomnia in late-life are needed.

Nursing has failed to address the evaluation and treatment of insomnia in older adults in a scientific manner. Insomnia is a problem that has significant clinical relevance for nursing. The empirical findings from the development and testing of behavioral interventions for insomnia in older adults have the potential for clinical utilization. Researchers in the area of sleep have called upon nurses to begin to develop and test interventions to improve sleep. Concepts that are of interest to nursing, such as person-environment fit and patterning, can be integrated into a theoretical framework underlying an intervention to enhance the sleep of older persons with persistent sleep maintenance insomnia.

## CHAPTER TWO

## CONCEPTUALIZATION AND REVIEW OF THE LITERATURE

This chapter presents the nursing and behavioral conceptualizations of the proposed behavioral intervention and a review of the literature on the behavioral treatment of older adults with insomnia. Rogers' Science of Unitary Human Beings is used to provide a nursing perspective for the proposed intervention. Learning theory explains the development of the behavioral problem of insomnia as well as the change expected to occur. Each component of the proposed intervention is described and the treatment outcome literature appropriate to the component is reviewed. The literature is summarized and critiqued. Measurement and intervention issues related to the treatment outcome studies are discussed and evaluated in light of the research study.

Figure 2.1 diagrams a conceptualization of the proposed study. Learning theory is the construct that provides the framework for the behavioral intervention. The behavioral intervention is based upon two components of learning theory: operant conditioning and maladaptive learning. The behavioral intervention is composed of stimulus control instructions, sleep restriction therapy, sleep education and an optional daytime nap. Sleep-wake patterning is the construct that frames the disruption which occurs with persistent sleep maintenance insomnia. Persistent sleep maintenance insomnia and any changes that may occur as a result of treatment are measured by a daily sleep diary. Specifically,

Figure 2.1 Conceptualization of a Behavioral Treatment Outcome Study of Sleep Maintenance Insomnia in Older Adults

| Learning Theory | Sleep-Wake Patterning |
| :---: | :---: |
|  |  |
| Behavioral | Persistent |
| Intervention | Sleep |
|  | Maintenance |
|  | Insomnia |
| SCl | Sleep Behaviors |
| SRT | Sleep-Wake Impariment |
| Sleep Education | Dysfunctional Cognitions |
| Optional Daytime Nap | Presleep Anxiety |
|  | Mood |

SCI = Stimulus Control Instructions
SRT = Sleep Restriction Therapy
the outcome variables that reflect sleep maintenance insomnia are wake after sleep onset (WASO), total sleep time (TST), time in bed (TIB), and sleep efficiency (SE).

Interference of sleep maintenance insomnia on sleep-wake impairment, dysfunctional cognitions regarding sleep, presleep anxiety, and mood were also measured. Sleep maintenance insomnia, and the sleep behavior outcome variables that reflect the problem as it relates to older adults, were defined and reviewed in Chapter One.

## Nursing Conceptualization

As the number of research studies conducted by nurses increases, it is important to try to identify nursing research's link to nursing science. Some authors (e.g., Phillips, 1988) question whether research that is classified as "nursing research" is actually nursing research. The frame of reference for nursing research often does not flow from nursing. A carefully constructed argument for a study's relevance to nursing may not be enough to make it nursing research. Nursing models provide a framework in which to conceptualize a research study problem and intervention while providing a nursing perspective for the study.

## Pattern and Organization

The sleep-wake patterns of older adults with insomnia are a critical aspect of the proposed research project. Two nursing paradigms emphasize patterning in human and environmental fields. Newman (1986) describes health as a manifestation of an underlying pattern of energy exchange between person and
environment. Rogers (1986) views patterns as the distinguishing characteristic of humans as energy fields and the source of their uniqueness and diversity.

The research intervention did not attempt to explicate or test a theory evolving from a nursing conceptual model. The study was not generated from a conceptual system. Instead, the nursing conceptualization of the intervention attempts to identify some consistencies of the study with a current conceptual system. The identification of consistencies gives the intervention a nursing perspective.

Although Newman's (1986) model views patterning as an important concept, the focus of the model is on health. Rogers (1986) identifies patterning as a key concept or critical element in the principles underlying her model. Therefore, Rogers' Science of Unitary Human Beings provides the closest conceptual match with the proposed study.

Rogers (1986) assumes that humans are identified by pattern and organization which reflect their wholeness. Patterns emerge from the interaction of the human and environmental energy fields as observable events in the real world. Although energy fields are identified by patterns, patterns cannot be directly perceived (Cowling, 1990a). Nurses must rely on correlates or indices of patterning that give clues to what is occurring in energy fields. The correlates of patterning proceed in the direction of higher frequency, shorter rhythms, and faster motion (Malinski, 1986) while human field patterning becomes more complex,
diverse, and of a higher frequency as people age (Rogers 1986). An example of a correlate of patterning is the sleep-wake experience (Malinski). There appears to be a change in the patterning and organization of sleep and wake as people grow older.

In a discussion of chronological age within Rogers' Science of Unitary Human Beings, Cowling (1990b) notes that older adults may have age-specific pattern trends. Patterns vary from those of younger age groups and new patterns emerge. Rogers (1986) states that as persons age, the diversity of their field pattern is manifested by less sleep and more varied sleep-wake frequencies. The variation in sleep-wake frequencies is a reflection of the increasing complexity of aging. The factor that is missing in this view of age-specific pattern trends is organization.

Increasing complexity is not necessarily a positive experience unless there is accompanying pattern and organization (Reed, 1983). Age-specific sleep-wake pattern trends are present in the elderly but there is a lack of organization to the patterns. As complexity increases, greater organization is needed for persons to adapt to developmental changes (Reed, 1991). The intervention sought to organize current sleep-wake patterns and integrate new sleep-wake patterns by consolidating sleep and establishing a consistent sleep-wake schedule. The organization and integration of sleep patterns should enhance the efficiency of the sleep-wake patterning of the older adult.

## The Process of Health Patterning and a Pattern-Based Intervention

Intervention methodology suggested by advocates of Rogerian science can be used to understand a treatment that focuses on enhancing the sleep-wake patterns of older adults with insomnia. There has been a call within nursing for the facilitation of pattern recognition (Phillips, 1988). Nurse scientists and clinicians have begun to examine the process of health patterning. Barrett (1990b) describes the process of health patterning as "assisting clients with their knowing participation in change" (p. 105).

Cowling (1990a) outlines three criteria for selecting a pattern-based intervention. First, there should be some probability that the intervention will promote change in an individual's health patterning. The behavioral conceptualization (see later section) of the intervention provides a rationale for the use of the intervention with the specific sleep-wake problems of the older adult. The review of the literature presents empirical evidence of the intervention components' efficacy with a sleep disturbed older population.

The second criterion requires the intervention to include the client as a knowing participant in change. Subjects in the study were involved in a group format, classroom based intervention that used a carefully planned protocol emphasizing active participation. Subjects were responsible for monitoring their sleep-wake patterns.

To meet the third criterion, the intervention must be consistent with pattern appraisal. Pattern appraisal depends on the report of the subject. The intervention used the subject's self-report to gather information on sleep-wake patterning and incorporated the information into the delivery of the intervention.

Cowling (1990b) suggests viewing sleep alterations, such as insomnia, from a pattern perspective. Within a pattern based approach, Cowling recommends a nursing intervention that would focus on assisting the older person to accept changes in sleep and create new activities that promote sleep. The intervention includes an educational component that modifies sleep appraisal and expectations. The stimulus control instructions and sleep restriction therapy emphasize learning new ways to restructure sleepless time at night. These activities are used to reorganize previous sleep-wake patterns and integrate new sleep-wake patterns into the lives of older adults and to maintain them.

There are two major phases to the process of health patterning within a Rogerian framework (Barrett, 1990b). The first phase, pattern manifestation appraisal, involves the identification of manifestations of human and environmental fields related to health, such as sleep-wake patterns. Pattern manifestation appraisal within the study occurred during the screening interview and the two week pretreatment sleep behavior monitoring. The pretreatment sleep monitoring revealed individual patterns of sleep-wake behavior.

In the second phase of health patterning, deliberative mutual patterning, the nurse and client pattern the environmental field to foster unity related to health events. Deliberative mutual patterning occurred during the treatment phase of the study. Rogers' emphasis on individuality was incorporated into the research. Each subject's pattern of sleep-wake behavior was used to individualize the intervention. Subjects were actively involved in creating change in their individual sleep-wake patterns. Statistical analysis of the main outcome variable, wake after sleep onset, was performed at the individual level to identify patterns of change.

## Conclusion

Sleep maintenance insomnia can be considered as an age-specific pattern trend. In the elderly, this pattern is seen as a reflection of their complexity and diversity (Rogers, 1986). However, the sleep-wake pattern appears to lack organization as indicated in the complaints of older persons regarding their sleep. Rogers' conceptual model accentuates the need for both pattern and organization in human fields as evidence of their wholeness. Therefore, an intervention which organizes and integrates sleep-wake patterns can be viewed within Rogers' model as a logical and practical way to enhance unitary human development or aging in persons with subjective complaints of sleep-wake pattern disruptions.

Barrett (1988) refers to the phases of the health patterning process as the Rogerian practice methodology. The practice methodology provides a way to view the intervention within a specific nursing conceptual model. The perspective
provided by health patterning can help to distinguish the treatment as a nursing science-based intervention.

## Behavioral Conceptualization

As an introduction to the intervention, a discussion of the theoretical basis of the treatment is presented. Learning theory helps to explain the underlying causal mechanism of behavioral problem development, specifically insomnia. Behavior change can also be accounted for by learning theory. Learning Theory

The components of the intervention are behavioral techniques. Behavior therapy is built on a body of experimental studies with a learning theory basis (Kanfer \& Phillips, 1970). Learning theory uses principles derived from experimental studies and established learning models to treat problem behavior. A learning approach is concerned with the person-environment relationship, how behavior develops and changes as a result of the personenvironment interaction, and the ability to measure behavior and detect change (Karoly, 1980).

Three types of learning models are important in the development and alteration of behavior: classical conditioning, operant conditioning, and observational learning (Kazdin, 1980b). The behavioral intervention used in this treatment study is best explained using an operant conditioning paradigm. The operant approach assumes that many complex human activities are learned
(Karoly, 1980). An operant is a learned behavior that occurs in response to an environmental event or stimulus and can be controlled by altering the consequences that follow it. Operants are therefore strengthened or weakened by the events (consequences) that follow them (Kazdin, 1978).

Sleep behavior is viewed as responsive to the same conditioning processes as waking behavior (Spielman, Caruso, \& Glovinsky, 1987). Most operants or behaviors, such as sleep, that occur with a high frequency do so under certain conditions. For example, for good sleepers, there are numerous rituals surrounding bedtime that are performed in and around the bedroom (e.g., the clock reading 11:00 PM, brushing teeth, turning off the lights, assuming a certain position in bed, etc.). The rituals, bedroom, and bed become discriminative stimuli, events which a elicit a behavior (drowsiness) that is reinforced (sleep occurs). Good sleepers learn to perform in the context of certain classes of stimuli. This process is called discrimination. As discussed in Chapter One, persons with insomnia may have developed difficulty sleeping for a number of reasons. Although the precipitating condition may have resolved, bedtime rituals, activities in bed, and excessive time in bed can contribute to the maintenance of a sleep problem in the role of discriminative stimuli.

Learned maladaptive habits and sleep incompatible behaviors prevent the person with insomnia from falling asleep or falling back to sleep. After
experiencing t'is problem night after night, the bed and bedroom are no longer discriminative stimuli for sleep. Instead, the poor sleeper becomes aroused by the cues of the bed and bedroom. A process of conditioned arousal develops.

There are several therapeutic uses of operant conditioning (Karoly, 1980). Operant conditioning can be used to establish behavior, such as a consistent sleep-wake pattern. The learning model can facilitate the acceleration and strengthening of behavior as well as eliminate or weaken behavior. Learned maladaptive sleep habits are replaced by new sleep behaviors, thereby weakening the association between the bed and bedroom and sleep incompatible behaviors while strengthening the bed and bedroom as cues for sleep. Consequently, conditioned arousal is decreased.

Description of the Intervention and Review of the Behavioral Treatment Outcome Literature on Insomnia in Older Adults

Few behavioral intervention research studies of insomnia have focused on older adults. Behavioral outcome research has primarily targeted sleep onset insomnia in young and middle aged adults. Reviews of controlled investigations using behavioral interventions have demonstrated reasonable success in the treatment of insomnia in young and middle aged persons (e.g. Bootzin \& Nicassio, 1978; Borkovec, 1982; Lacks, 1987, Lichstein \& Fischer, 1985; Turner, 1986).

Until 1983, there were no published studies of behavioral treatments designed specifically for older persons. Older adults were systematically excluded from insomnia treatment outcome studies because of the changes in sleep patterns that occur as persons age (Puder, Lacks, Bertelson, \& Storandt, 1983). It was thought that older persons would not benefit from behavioral treatments. A commentary and review of the field of behavioral gerontology reports the effective treatment of problems such as insomnia, depression, pain, incontinence, alcohol abuse, dementia, and social inactivity (Carstensen, 1988). Carstensen states that a common thread in the behavioral gerontology literature is that the interventions used effectively with young persons work for older individuals as well. Older adults should not be excluded from insomnia treatment research based on age. To date, there are 12 treatment outcome studies of insomnia in the elderly.

This section describes each component of the behavioral intervention. A rationale is provided for the selection of the treatment component. The relevance of each component for targeting the perpetuating factors of persistent insomnia in older persons is presented. An examination of each of the intervention components elucidates the mechanism of change and the expected treatment effects. The anticipated efficacy of treatment is supported by a review of the treatment outcome literature for the particular component's use in an older population. A discussion of treatment packages is also
presented. An argument for the testing of multicomponent approaches, particularly the treatment package in this study, is offered. The multicomponent outcome literature on insomnia in the elderly follows the discussion of treatment packages.

## Sleep Restriction Therapy (SRT)

Description of the intervention component. SRT is a behavioral treatment for insomnia developed by Spielman (Spielman, Saskin, \& Thorpy, 1987). The theoretical underpinnings of SRT emphasize the factors that perpetuate insomnia rather than those that precipitate insomnia or predispose persons to develop sleep problems. The treatment is based on the observation that persons with insomnia, especially older adults, spend too much time in bed attempting to sleep (Dement, Miles, \& Carskadon, 1982; Spielman, Saskin, \& Thorpy, 1987). An assumption of SRT is that "extra bedtime often leads to increased wakefulness, resulting in fragmented sleep and variability in the timing of sleep and wakefulness." (Spielman, Caruso, \& Glovinsky, 1987, p.546). SRT prescribes an individualized sleep-wake schedule that limits the subjects' amount of time in bed to the estimated mean nightly time asleep. The aims of SRT are the consolidation of sleep and the limitation of sleep to a specific time by restricting the amount of time spent in bed.

Several features of SRT make it a promising behavioral treatment for use in the research. The majority of treatment outcome studies have utilized
community dwelling adults. The effect of SRT on a number of sleep outcome variables related to sleep onset latency and sleep maintenance has been examined in an older population. Variables have included sleep onset latency, total sleep time, wake after sleep onset, number of awakenings, sleep efficiency, and time in bed.

A side effect of SRT has been daytime sleepiness during the initial weeks of treatment. A recent change in the method of calculating SRT has reduced the feelings of sleepiness reported by subjects and clients, although many older persons still desire a daytime nap (Spielman, personal communication, February, 1991). An untitled instrument has been developed by Spielman and his associates to assess daytime functioning for use in conjunction with SRT. Data from the instrument can be used with the new SRT method to adjust the SRT prescription (Rubinstein et al., 1990). The instrument, entitled Symptom Questionnaire (SQ) for the purpose of the study, is included in Appendix $A$ and the algorithm is in Appendix B.

The evaluation of durability of treatment is not yet available for SRT studies of the elderly. An investigation with middle-aged adults found that variables related to sleep maintenance insomnia remained significantly improved nine months after treatment (Spielman, Saskin, \& Thorpy, 1987). A study that combined SRT with stimulus control instructions and an optional
daytime nap reported improvements were maintained at two and six months after treatment (Hoelscher \& Edinger, 1988).

Review of the literature. Sleep restriction therapy has been used effectively with both sleep onset and sleep maintenance insomniacs (Glovinsky \& Spielman, 1991). Sleep restriction therapy has been tested against stimulus control therapy and has been included in several different treatment packages. Anderson et al. (1988) compared sleep restriction therapy and stimulus control therapy for an unspecified type of insomnia in twenty community dwelling older adults. Results were consistent for the sleep onset latency variable but mixed results were obtained on the wake after sleep onset, total sleep time, and sleep efficiency variables according to the type of measurement, sleep diary or polysomnography. Sleep onset latency was not significantly reduced for the sleep restriction and stimulus control groups on either the subjective or objective measures. Time awake after sleep onset showed significant reductions on the sleep diaries for both treatment groups. There was no significant change using the polysomnography recording for the two treatments on time awake after sleep onset. Sleep efficiency was significantly increased for the stimulus control group using diaries and the polysomnogram. There were significant improvements in sleep efficiency for the sleep restriction group on the sleep diaries only. Total sleep time was significantly increased for subjective measurement of the stimulus control group only.

Rubinstein et al. (1990) tested a modified version of sleep restriction therapy with middle aged and older community dwelling persons with an unspecified type of insomnia (mean age $=57.9$ years). Daily sleep diaries and polysomnography were used to measure several sleep variables. There were no significant changes on the subjective and objective measures for sleep onset latency. Time awake after sleep onset showed significant improvement on the sleep diaries but not on the polysomnogram. Total sleep time, wake after sleep onset, and sleep efficiency changed significantly on the subjective measure only. Time in bed had a barely significant change on the subjective measure only.

Relaxation therapy was compared to sleep restriction therapy for sleep onset and sleep maintenance insomnia in community dwelling older adults (mean age $=69.7$ years, $n=22$ ) in a study by Friedman, Bliwise, Yeasavage, and Salom (1991). The subjects received four weekly individual hour-long treatment sessions and one wrap-up session at the end of treatment. Subjects received an additional session at the start of the two week follow-up, three months later. Using subjective measurement, sleep onset and time awake after sleep onset were significantly reduced for both groups during active treatment. There was significant subjective reduction for the two groups on sleep onset latency at the three month follow-up. Time in bed and time in bed after waking were decreased during active treatment for the sleep restriction group. The
sleep restriction group spent less time in bed and had higher sleep efficiency scores than the relaxation group at the three month follow-up. The amount of percentage decrease in time awake after sleep onset for the sleep restriction group from baseline to the three month follow-up period was approximately twice that of the relaxation group. The sleep restriction group also demonstrated a 22 minute significant reduction in variability within an individual subject's time in bed toward the end of treatment relative to baseline. For both treatments, total sleep time did not significantly increase during the active treatment phase but it did increase at follow-up. The amount of percentage increase in total sleep time for the sleep restriction group from baseline to the three month follow-up period was approximately twice that of the relaxation group.

An important aspect of treatment delivery for the Friedman et al. (1991) study was the flexibility of the therapist and modification of treatment that occurred. This was especially true for the sleep restriction group. Based upon Spielman, Saskin, \& Thorpy's (1987) report of an approximately $20 \%$ attrition rate in their sleep restriction study of younger persons with insomnia, the decision to modify the treatment as necessary was made. The researchers felt that the more recalcitrant nature of older adults might affect the drop-out rate. Flexibility in the prescription of sleep restriction to consider what the older adult finds tolerable and acceptable could avoid high attrition. From a total of 38
recruits, four dropped out, four became physically ill, and eight did not complete follow-up, leaving 22 subjects who participated through all phases.

## Stimulus Control Instructions (SCI)

Description of the intervention component. SCl (Appendix C ) is a behavioral treatment developed by Bootzin (1972). Bootzin has conceptualized insomnia within an operant or learning paradigm. The bed and bedroom are no longer discriminative stimuli for sleep due to their association with activities incompatible with sleep such as watching television, eating, reviewing the day's events, planning, problem solving, worrying, or lying awake. Another incompatible behavior involves the anxiety and frustration that arises from trying to fall asleep or fall back to sleep. The activities and behaviors become associated with the bedroom as cues for arousal rather than sleep.

Persons are taught through SCI to reassociate the bed and bedroom with rapidly falling asleep or back to sleep. The aims of SCl are to acquire a consistent sleep pattern, strengthen the bed and bedroom as cues for sleep, and weaken them as cues for activities that interfere with sleep (Bootzin, EngleFriedman, \& Hazelwood, 1983).

An assumption of SCl is that insomnia that may have been caused by a physical illness or stress can be maintained by poor sleep habits. The theoretical underpinnings of SCl are similar to those of SRT in that the focus is on perpetuating factors rather than precipitating or predispositional factors in
the deveiopment of persistent insomnia. The instructions focus on activities of daily living and environmental factors that influence sleep.

Review of the literature. SCI has been used with both sleep onset and sleep maintenance insomniacs, including older adults (Bootzin \& EngleFriedman, 1987). The subjects have been community-dwelling adults. Sleep outcome variables studied have included sleep onset latency, wake after sleep onset, number of awakenings, sleep efficiency, time in bed, and total sleep time. SCl has been evaluated for durability of effects at periods from six weeks to two years after treatment. Results from a two-year follow-up indicated that the older adult subjects assessed had maintained or improved on the sleep maintenance variable of total sleep time (Bootzin et al., 1992).

Modified SCl were used in this study. The modified instructions are based on those used by Hoelscher and Edinger (1988) in a behavioral treatment study of older adults with insomnia. SCI has been modified due to some overlap of instructions with the treatment guidelines of the other components of the intervention. The modification involves the elimination of the instruction not to nap. The rationale for eliminating the nap in a sample of older adults is discussed in the section on an optional limited daytime nap.

Stimulus control instructions have been widely evaluated with young and middle-aged insomniacs and appear to be the most effective nonpharmacological treatment of insomnia available today (e.g. Bootzin \&

Nicassio, 1978; Borkovec, 1982; Espie, Lindsay, Brooks, Hood, \& Turvey, 1989). Although the most frequently tested behavioral treatment for older adults as well, stimulus control instructions have been evaluated in a limited number of treatment outcome studies using elderly persons. Concerned with the lack of insomnia treatment studies designed specifically for older persons, Puder, Lacks, Bertelson, and Storandt (1983) evaluated the effectiveness of stimulus control therapy in a community dwelling older population. Sixteen older adults with sleep onset latency insomnia aged 60 to 75 years participated in the study. Small group sessions $(n=3$ to 6 ) were used to conduct the four week treatment. The researchers found that stimulus control therapy significantly decreased sleep onset latency insomnia as measured by daily sleep diaries. Clinically significant change was reported by a reduction in sleep onset latency of $50 \%$ or more (range $=0-84 \%$ ) for 10 of the 16 subjects. Treatment gain was maintained at a six week follow-up.

The treatment of sleep maintenance insomnia using countercontrol treatment, a variant of stimulus control instructions, was tested by Davies, Lacks, Storandt, and Bertelson (1986). Countercontrol treatment, developed by Zwart and Lisman (1979), eliminates the stimulus control instruction to get out of bed and go into another room if unable to sleep. Instead subjects were told to stay in bed and engage in a nonarousing activity such as reading a dull book. The authors reasoned that the effectiveness of stimulus control
instructions may lie in their ability to disrupt cognitive activity and restless tossing rather than reestablishing the bed as a discriminative stimulus for sleep. Therefore the elimination of the instruction to get out of bed if unable to sleep might be more effective for sleep maintenance insomnia, which is more difficult to treat, as well as more feasible for less ambulatory older adults. Each subject was required to spend 30 minutes per day engaged in noncognitive activities while in bed in order to rule out an explanation of the bed as a discriminative stimulus for sleep. In addition, the temporal instructions of stimulus control therapy were eliminated according to the original study by Zwart and Lisman.

Sixteen of the 34 community-dwelling subjects were aged 61 and older. Subjects met in small groups ( $n=3-7$ ) once per week for four weeks. The older subjects gained as much improvement as the middle-aged subjects in decreasing the amount of time spent awake after sleep onset and the number of awakenings according to daily sleep diaries even though they started and ended treatment with more sleep disturbance. At a one year follow-up, treatment gains were maintained, however, there was no mention of the ages of the 16 subjects measured at this time point.

The countercontrol procedure was effective but the magnitude of the results was not as great as that reported by researchers using stimulus control with sleep onset and sleep maintenance insomnia (Lacks, Bertelson, Gans, \& Kunkel, 1983). According to the authors, the elimination of the temporal
instructions of stimulus control may have accounted for the difference. The temporal control component establishes a consistent sleep schedule and this process would have been blocked. The temporal instructions are probably of significant importance to older adults who undergo circadian rhythm and lifestyle changes that adversely impact their sleep schedules. Interestingly, the researchers conducted the study based on complaints of subjects from previous studies who disliked getting out of bed when they could not sleep. They found that the subjects in the present study complained just as much about turning on the lights and engaging in an activity in bed in the middle of the night.

The first controlled evaluation of behavioral interventions for treatment of sleep onset latency and sleep maintenance insomnia in community dwelling older adults ( $n=53$ ) aged 47 to 76 years was conducted by Engle-Friedman et al. (1992). The treatments consisted of support and sleep hygiene instructions alone or with either progressive relaxation or stimulus control instructions. The subjects received two weeks of baseline, one individual treatment per week for four weeks, two weeks follow-up immediately after treatment, and follow-up at two years posttreatment.

All three treatments showed significant improvement with decreased awakenings, almost $50 \%$ less naps taken, increased feelings of being refreshed in the morning, increased self-efficacy with respect to sleep, decreased concern
about being able to fall asleep, and decreased scores on the Beck Depression Inventory. In addition to subjective reports, over half of the participants were measured polysomnographically four times during the study. Polysomnography indicated a reduction of almost $50 \%$ of time spent in stage wake by the stimulus control and progressive relaxation groups. The support and information did not have a reduction in stage wake according to the polysomnogram. Stimulus control instructions had the greatest impact on sleep onset latency percentage of improvement from baseline to the end of treatment. Sleep efficiency means were improved for the stimulus control group (77.3\%) and the progressive relaxation group (78.6\%). The improvement in sleep efficiency is based on a previous finding that the sleep efficiency of older adults aged 60 to 85 years averages $67 \%$ (Coleman et al., 1981). At the two year follow-up, 42 of the subjects had maintained or improved on the measures of total sleep and sleep onset latency; however, stimulus control instructions were the most effective. The subjects who received stimulus control instructions had continued using them more than the subjects who received other treatments.

Morin and Azrin (1987) tested stimulus control and imagery training in the treatment of sleep maintenance insomnia in 21 community dwelling older adults (mean age $=57$ ). The subjects met in groups of three to five persons for four weekly one hour therapy sessions. Using daily sleep diary reports, the subjects who received stimulus control therapy were found to have significantly
reduced their time awake after sleep onset compared to the imagery training and waiting list control groups. The imagery training and waiting list control, groups did not differ significantly from each other. The stimulus control group showed lower levels of depression after treatment than the imagery group. Anxiety scores were not significantly changed. A three month follow-up of 20 of the 21 subjects revealed the stimulus control group had shorter awakenings than the imagery training group. The difference was not significant at a 12 month follow-up. Within-group changes from baseline to the three month follow-up showed significant reductions in awakening duration for both groups but only the stimulus control group had a significant reduction in frequency of awakenings. The significant others of the subjects in both treatment groups reported significant decreases in pre- to post-treatment sleeping problem severity, degree of interference with daily functioning, and noticeability of sleep problems. The researchers did not report the number of subjects who had significant others complete the measure. The measure had only face validity and was not completed by the control group.

Morin and Azrin (1988) delivered the same treatments from their previous study to 27 community dwelling older adults (mean age $=67$ years) with sleep maintenance insomnia. The subjects received six group therapy sessions conducted twice per week for the first two weeks and once per week thereafter. The researchers added an electromechanical recording device to the measures.

The electromechanical device is a hand held switch connected to a portable clock. The subject holds the switch and activates the clock upon retiring. When the person falls asleep, the pressure is released and the switch lever automatically stops the clock. Morin (personal communication, February, 1991) believes this device is worthwhile only in the measurement of sleep-onset latency insomnia because subjects fail to follow the directions upon awakening during the night.

The stimulus control group reduced awakening duration and increased total sleep time significantly more than the imagery and waiting list control groups. The subjects rated the severity, interference, and noticeability of their sleeping problems. The stimulus control group had significantly lower scores on the three indices from pre- to posttreatment. The imagery group had lower severity scores and the waiting list group had no changes. Improvements were collaborated by significant others for the stimulus control group only. There were no changes on the depression and anxiety measures. Three and twelve month follow-ups revealed significantly decreased awakening duration for both treatment groups compared to baseline measurements. Pooled data from the three treatment groups showed high correlations between the sleep diary and the electromechanical device for awakening duration and sleep onset latency perhaps because the subjects were responsible for monitoring both types of data.

## Sleep Education

Description of the intervention component. The majority of insomnia treatment outcome studies include educational intervention as part of treatment. An educational component of treatment usually consists of providing basic knowledge about sleep processes and functions, developmental changes in sleep, sleep hygiene information, and supportive information (Bootzin \& EngleFriedman, 1987; Lacks, 1987). Supportive information is directed at modifying sleep appraisal and expectations so persons understand that there are large individual differences in sleep requirements and it is not a catastrophe to go without sleep. The educative aspect of treatment allows the insomnia problem to be placed in a coping context (Bootzin \& Engle-Friedman). The educational component of the intervention used in this study consisted of several topics. The topics include the purpose and functions of sleep, sleep architecture and developmental changes, circadian rhythms, individual sleep needs, sleep deprivation, and a comprehensive review of sleep hygiene. The intervention component did not include a cognitive focus as in Bootzin and EngleFriedman's (1988) study, discussed in the following section. The majority of the sleep education information was delivered in the first treatment session, but sleep education was emphasized throughout treatment.

Review of the literature. It has been generally believed that sleep education is probably not enough to produce behavior changes in sleep
patterns (Morin \& Kwentus, 1988). However, one study has examined the efficacy of a sleep education intervention (Bootzin \& Engle-Friedman, 1987). Older adults with sleep onset and/or sleep maintenance insomnia who received only sleep information and support treatment experienced significant improvement in their sleep when compared to a no treatment group. The addition of stimulus control instructions to the support and information treatment improved the sleep efficiency of the subjects. The support and information treatment continued to be effective two years later.

Sleep hygiene, a common component of sleep education, was compared to two treatments, stimulus control instructions and meditation using persons with sleep maintenance insomnia (mean age $=52.14$ years) (Schoiket, Bertelson, \& Lacks, 1988). Significant improvement was found in all groups for wake after sleep onset, number of awakenings, and duration of awakenings. Subjects in the sleep hygiene group were less satisfied with their treatment and less likely to believe they had improved. It appears that sleep hygiene is an important part of therapeutic intervention, but may not be perceived as a "real" treatment. The difference in outcomes between the Bootzin and EngleFriedman (1987) and the Schoiket et al. (1988) studies probably lies in the varying components of the sleep education intervention. Bootzin and EngleFriedman's information and support intervention actually had a cognitive restructuring element that involved the modification of appraisal and
expectations regarding sleep. Schoiket et al.'s intervention focused on sleep hygiene. Sleep hygiene consisted of sleep habits and practices that promote good sleep such as the avoidance of alcohol, naps, and exercise at certain times of the day as well as instructions on adjusting the personal environment so it is conducive to sleep. Information on developmental changes was also included.

## Optional Limited Daytime Nap

Description and review of the literature. A limited optional nap of no greater than one hour per day, taken at approximately the same time each day, was allowed in the intervention. Napping at the same time each day was used to help establish a consistent sleep-wake pattern (research study purpose \#1). As discussed previously, the major sleep disturbance of older adults is frequent nighttime awakenings resulting in an inconsistent sleep-wake pattern.

Carskadon, Brown, and Dement (1982) demonstrated a relationship between sleep fragmentation and daytime sleep tendency in older persons. The researchers recommended restricting nighttime sleep and prescribing a midday nap to improve the sleep-wake pattern of the older adult. Aber and Webb (1986) found that nighttime sleep is not significantly changed by a limited daytime nap. The researchers recommended nap opportunities of 60 minutes or less and nap time of approximately 50 minutes or less. Thus, the stimulus control instruction "no napping" was eliminated for the intervention used in this
study. It was anticipated that as participants began to demonstrate a consistent, consolidated sleep pattern, the need for a daytime nap may decrease. Alternatively, developmental changes in the circadian rhythm of older adults might influence them to continue napping in spite of consolidating sleep and establishing a consistent sleep wake-pattern.

## Relaxation Therapy

Relaxation therapy was not utilized in the present study but the literature on insomnia treatment outcome studies includes one study of older adults using this type of treatment exclusively (Lichstein \& Johnson, 1993). Fifty-seven older women, aged 60 to 80 , were formed into three groups of medicated insomniacs (hypnotics), nonmedicated insomniacs (taking anxiolytics or antihypertensives but not hypnotics), and noninsomniacs (noncomplaining sleepers taking anxiolytics or antihypertensives). A relaxation technique which tailored the treatment to individual preferences was used. Subjects received three individual treatment sessions. Only the nonmedicated insomniacs experienced substantial sleep improvement. A reduction in the use of hypnotics occurred for the medicated insomniacs.

## Treatment Packages

Description of treatment packages. The behavioral intervention is designed to improve the sleep maintenance difficulties of older adult insomniacs. The intervention can be described as a treatment package
strategy since it contains multiple components: sleep restriction therapy, stimulus control instructions, sleep education, and an optional daytime nap. Treatment package strategies evaluate the effects of a given treatment as it is normally conducted by advocates of the technique (Kazdin, 1980a). The treatment package approach is concerned with the administration and evaluation of the treatment in its entirety rather than the contribution of the components to behavior change.

Treatment packages can be complex and varied making it difficult to identify its specific features. One strategy to avoid this potential weakness is to identify and describe the features of each of the package components as was done in the preceding sections. An examination of the theoretical underpinnings of each component was included to help identify specific features of the proposed treatment package.

This specific treatment package was chosen because it targets the primary sleep complaints, maladaptive sleep behaviors, and conditioned arousal of older persons. Frequent awakenings, lengthy periods of awakening after initial sleep onset, sleep incompatible behaviors, and conditioned arousal are addressed by stimulus control instructions and sleep education. Excessive time in bed is treated by sleep restriction therapy. The optional daytime nap provides an opportunity to nap at a time during the day when it is less likely to interfere with nighttime sleep. Since insomnia is a complex problem,
researchers believe a single-component method of treatment may only address one aspect of the sleep problem (Lacks \& Morin, 1992). Consequently, multicomponent approaches are viewed as deserving replication and revision (Lacks \& Morin).

Review of the literature. Hoelscher and Edinger (1988) tested a treatment package that included modified stimulus control instructions, sleep restriction, and sleep education. The researchers also allowed an optional daytime nap of no longer than one hour per day. This is the treatment package used in this study, however, Hoelscher and Edinger did not use a controlled design. A multiple baseline design was used for four community dwelling older insomniacs (age range $=59$ to 72 ) with sleep maintenance difficulties. Measures included daily sleep diaries and a sleep assessment device. The sleep assessment device turns on the tape recorder for ten seconds and makes a soft sound every ten minutes throughout the night. The subject records wakefulness, which is counted as wake time, or if the segment is silent, the time is measured as sleep time. The researchers reported clinically significant reductions in time awake after sleep onset for three of the four subjects. Time in bed was decreased by approximately one hour per night. Total sleep time did not change. The average standard deviations decreased for most of the sleep variables indicating the subjects' sleep patterns became more stable. Substantial correlations were found between time in bed and
wake after sleep onset ( $\mathrm{r}=.70$ to .91 ) substantiating Spielman's (Spielman, Saskin, \& Thorpy, 1987) hypothesis that time in bed perpetuates sleep maintenance insomnia. Improvement was maintained at 2 and 6 month followups. The subject with little improvement was later found to have a sleep disorder not amenable to behavioral intervention. Edinger et al. (1990) compared the treatment package tested by Hoelscher and Edinger (1988) against relaxation therapy using a multiple baseline design in a sample of community dwelling older persons ( $n=7$, mean age $=61.9$ ) with sleep maintenance insomnia. Sleep diaries and the sleep assessment device were used. The behavioral package resulted in greater improvement in time awake after sleep onset, number of awakenings, sleep efficiency, and sleep quality than the relaxation treatment. The standard deviations showed a large reduction in the night to night variability in sleep of the behavioral treatment package subjects. At a three month follow-up, the treatment gain had been maintained.

Morin, Kowatch, Berry, and Walton (1993) compared a behavioral package consisting of stimulus control, sleep restriction, cognitive restructuring, and sleep hygiene to a waiting list control group. Twenty-four community dwelling older subjects (mean age $=67.1$ years) with insomnia were measured using sleep diaries and polysomnography on several sleep outcome variables. The type of insomnia treated was unspecified, but the outcome variables were
related to sleep maintenance insomnia. Collateral validation ratings were obtained from significant others. The behavioral package significantly reduced the amount of time spent awake after sleep onset on both the sleep diary and the polysomnography record as compared to the waiting list control group. There was no change in total sleep time except for the waiting list control which increased its sleep time on the polysomnogram. The treatment group significantly improved its sleep efficiency on the subjective and objective measures. Significant others' ratings supported the findings with improvement ratings on severity, interference, and noticeability of sleep problems.

Summary, Critique, and Issues Related to the Treatment Outcome Studies of Insomnia in Older Adults

A summary of the studies reviewed in the previous section is presented to allow the formulation of an opinion on the state of the science of the treatment of insomnia in older adults. This section also presents a discussion and critique of the measurement and intervention aspects of the studies previously reviewed. Both sections are meant to raise issues that must be considered in the methodology of the proposed study.

## Summary and Critique of Treatment Outcome Studies of Older Adults

The components of the intervention are appropriate for use in the treatment of sleep maintenance insomnia in the elderly. The theoretical underpinnings and aims of the major components, SRT and SCl, focus on the
perpetuating factors in persistent insomnia in older persons: learned maladaptive sleep habits, sleep incompatible behaviors, and conditioned arousal. Eleven treatment outcome studies of insomnia in older adults provided support for the selection of the components of the intervention. The Lichstein and Johnson (1993) study is not included in the summary as it tests only relaxation therapy and includes subjects taking hypnotics. Table 2.1 presents a summary of the 11 studies.

The total subjects ( $n=235$ ) for the 11 studies were community dwelling older adults with an average age of 63.03 years. Community dwelling older adults have been the focus of the studies to date. This population appears to be a reasonable starting point for treatment outcome studies since the majority of older persons live in the community.

Sixty-five percent of the subjects were female. The observation that more older women participated in the studies reviewed is supported by recent meta-analysis findings (Rediehs, Reis, \& Creason, 1990). Overall, women tend to report more subjective sleep difficulties than men. Polysomnographic reports revealed more sleep disturbances for men. The authors point to tradition and cultural factors as explanations of women's tendency to report more sleep problems. Women's role as caretakers of young and elderly persons make them more comfortable with health care professionals and more aware of

Table 2.1. Summary of Treatment Outcome Studies of Older Adults with Insomnia

| Authors | N | Mean Age | Sleep Complaint Treated |
| :--- | :--- | :--- | :--- |
| Anderson et al. (1988) | 20 | 63.8 | Sleep Onset Latency <br> Sleep Maintenance |
| Davies et al. (1986) | 34 | 58.5 | Sleep Maintenance |
| Edinger et al. (1990) | 7 | 61.9 | Sleep Maintenance |
| Engle-Friedman et al. (1992) | 53 | 59.6 | Sleep Onset Latency <br> Sleep Maintenance |
| Friedman et al. (1991) | 22 | 69.2 | Sleep Maintenance |
| Hoelscher \& Edinger (1988) | 4 | 63.8 | Sleep Maintenance |
| Morin \& Azrin (1987) | 21 | 57 | Sleep Maintenance |
| Morin \& Azrin (1988) | 27 | 67.4 | Sleep Maintenance |
| Morin et al. (1993) | 24 | 67.1 | Sleep Maintenance |
| Puder et al. (1983) | 16 | 67.06 | Sleep Onset Latency |

Table 2.1. Summary of Treatment Outcome Studies of Older Adults with Insomnia (continued)

| Authors | Treatment(s) | Baseline (in min.) |
| :---: | :---: | :---: |
| Anderson et al. (1988) | SRT, SCI | 147.11 (SCI) ${ }^{(S R T)}$ |
| Davies et al. (1986) | Countercontrol | 79.91 |
| Engle-Friedman et al. (1992) | SCI, Relaxation <br> Sleep Hygiene, Support | --- |
| Edinger et al. (1990) | Relaxation, Treatment Package | $103.7$ <br> (package) |
| Friedman et al. (1991) | SRT, Relaxation | $\begin{gathered} 52.6 \\ \text { (SRT) } \end{gathered}$ |
| Hoelscher \& Edinger (1988) | Treatment Package | 103.6 |
| Morin \& Azrin (1987) | SCI, Imagery Training | ---- |
| Morin \& Azrin (1988) | SCI, Imagery Training | $\begin{aligned} & 76.74 \\ & \text { (SCI) } \end{aligned}$ |
| Morin et al. (1993) | Treatment Package | 151.24 |
| Puder et al. (1983) | SCl | ---- |
| Rubinstein et al. (1990) | SRT | 136.2 |

Table 2.1. Summary of Treatment Outcome Studies of Older Adults with Insomnia (continued)

| Authors | Mean \% Subjective Improvement WASO <br> Baseline to Treatment |  |
| :--- | :--- | :--- |
| Anderson et al. (1988) | $55(\mathrm{SCI})$ | $74($ SRT ) |

physical symptoms. Cultural imperatives influence males to think of themselves as strong and stoic which may prevent them from reporting problems.

The studies reviewed were group-designs with the exception of two studies (Edinger et al., 1990; Hoelscher \& Edinger, 1988) which used a multiple baseline design. Of the 235 subjects, all received active treatments consisting of single or multicomponent interventions. Fifty-two subjects were placed on a waiting list prior to treatment and 19 participants used sleep and psychotropic medication during treatment in two studies.

Single component treatments included sleep restriction therapy (three studies), stimulus control instructions (six studies), relaxation (three studies), sleep hygiene and support (one study), and cognitive procedures (two studies). The two multiple baseline design studies used a treatment package that included sleep restriction therapy, stimulus control instructions, and sleep education. A controlied group-design study utilized a multicomponent approach consisting of sleep restriction therapy, stimulus control instructions, cognitive restructuring, and sleep hygiene.

Four of 22 subjects in the Friedman et al. (1991) study used sleeping medications or an antidepressant. No significant difference was found between the medication users and the other subjects on any of the outcome variables. Fifty-six percent of the 27 subjects in Morin and Azrin's (1988) study used
sleeping medications throughout treatment. The drug free subjects responded better to treatment than the subjects who used medication.

Of the 11 studies reviewed, one focused on sleep onset problems, seven addressed sleep maintenance problems, three targeted a combination of the two problems, and one was aimed at sleep onset latency, sleep maintenance, and early morning awakening. Treatment was delivered in individual sessions (six studies) or in a small group format (five studies). Treatment length ran from four to eight weeks depending on the type of intervention. Treatment for SCl is recommended to be four weeks (Lacks, 1987). Spielman (personal communication, June, 1992) suggests a treatment length of six to eight weeks for SRT. The study conducted by Friedman et al. used SRT for four weeks with significant changes reported on the WASO outcome variable. Other sleep researchers (e.g., Morin, personal communication, June, 1992) recommend that behavioral treatment for older adults should be lengthened to eight weeks regardless of the intervention used. Morin states that the data he is accumulating points to more benefits for older adults from lengthier albeit shortterm treatments.

Insomnia has been a longstanding problem for the participants in the studies reviewed. The participants had suffered from insomnia for an average of 13.8 years. In addition, the mean baseline WASO of 117 minutes, the length of time spent awake after sleep onset, reflects the significance of the problem.

More importantly, how effective have the treatments been for the sleep difficulties of the 235 older adults who participated? The overall mean improvement in the 11 studies from baseline to posttreatment on the subjective target symptoms of SOL and WASO was $53 \%$. Multicomponent interventions produced only slightly more improvement than single component treatments (55\% versus 52\%). Individual treatment delivery demonstrated a $56 \%$ improvement rate while the group format improvement was $46 \%$. Data provided by seven of the 12 studies indicates a 50\% improvement rate at shortterm follow-up (six studies) and a 42\% improvement rate at long-term follow-up (three studies).

An improvement rate of $53 \%$ is far from the ideal goal of behavior therapy. However, short-term behavioral approaches are promising interventions that can decrease the sleep complaints of the elderly. Indeed, the outcomes of the studies legitimize the previously ignored complaints of older persons with sleep difficulties. Furthermore, the studies demonstrate, in contrast to earlier opinions, that sleep problems in an older population are treatable.

What remains is for sleep researchers to address the multifaceted nature of insomnia in the elderly using multicomponent approaches. Specifically, components that focus on the perpetuating factors of persistent insomnia in the elderly are needed. The group format continues to be favored by insomnia
researchers despite the higher improvement rate of the individual format seen in the 11 studies reviewed. The group format offers support and accountability, factors that appear to be powerful therapeutic elements (Lacks \& Powlishta, 1989). Since only three of the 11 treatment outcome studies of older adults have measured long-term treatment gains, researchers must include long term follow-up to assess the durability of treatment. To date, three studies have tested multicomponent approaches with older persons and only one of the three studies used a controlled design. Therefore, more rigorous research methodology, as conducted in the present study, is needed. Issues Related To Treatment Outcome Studies Of Insomnia Measurement Issues

Self-report. Self-report through sleep diaries has been the predominant method of measurement of sleep outcome variables. However, in several of the studies that used both objective and subjective measurement, a strong perception of change element emerged. The majority of significant change occurred through the subjective measurement of sleep variables in the Anderson et al. (1988) study. Rubinstein et al.'s study (1990) demonstrated significant change in the five sleep outcome variables on the subjective measurement only. In Bootzin et al.'s (1987) study, objective measurement revealed an improvement of $50 \%$ in stage wake. This improvement is equivalent to the subjective improvement calculated for the 11 insomnia
treatment of the elderly outcome studies reviewed previously (53\%). Morin et al. (1990) found more support through objective measurement than the other studies that used this method. The significant changes occurred in two of the three outcome variables, total wake time and sleep efficiency, for subjects measured by sleep diary and polysomnography.

Since it is the subjective experience of sleep difficulty that prompts individuals to find treatment, subjective improvement is an important factor (Bootzin \& Engle-Friedman, 1981). One might hypothesize that there is no relationship between the subjective experience of sleep difficulty and the objective changes that occur on the polysomnogram. However, previous research in this area does not support this idea, especially with the elderly. The subjective report of older adults, particularly women, correlates closely with objective measures (Hoch et al., 1987). Differences in the timing of the objective measurement in relation to treatment may be responsible for the differences observed.

Nonetheless, the findings lend support to the use of self-reports in the proposed study. The literature reviewed indicates that significant changes have been identified through the subjective measurement of similar outcome variables proposed in the research study.

Timing of measurement. The time points for measurement were fairly consistent in the studies reviewed. All studies used a baseline period to assess
sleep-wake patterns. Sleep-wake patterns were monitored throughout treatment using sleep diaries. The point of follow-up of the subjects varied among the studies. Subjects were measured at intervals from six weeks to two years after intervention to assess the maintenance of the treatment effect. The ideal follow-up interval is years after treatment; however, the problem of attrition arises when waiting long periods of time (Kazdin, 1980a).

In the studies reviewed, there was little or no attrition at follow-up periods up to three months posttreatment. However, at one to two years postreatment, sleep diary follow-ups were completed by less than half of the original subjects who participated. The loss of subjects raises questions as to whether the follow-up data represents the level of sleep behavior one might see if the original sample had been available. The interpretation of the long-term followup data becomes difficult. Another issue related to the timing of measurement is the point at which the immediate effect of treatment is assessed. The studies reviewed differed as to the point at which they measured posttreatment effects. The classic pretest-posttest control group design (Campbell \& Stanley, 1963) consists of both the treatment and control groups receiving evaluation immediately following the treatment. However, in the majority of studies reviewed, the researchers used the sleep diary scores obtained during the last week or two of treatment measurement as the posttreatment scores.

A major issue in behavior therapy is the ability to demonstrate that enough change has occurred to improve the target behavior (Kazdin, 1980b). It may be advantageous to delay the last assessments until the treatment is completed thereby allowing enough time for change to occur. The true pretestposttest control group design allows the investigator to assess the amount of change that occurred as a function of the intervention. The assessment of the amount of change is especially important in clinical research (Kazdin, 1980a). Therefore, posttreatment scores should be assessed in the first week or two immediately following treatment completion.

The assessment of mood. An interesting finding in several of the studies reviewed was the decrease in depression scores posttreatment. Although depression is not as significant a problem for older adults with insomnia as it is in a younger population of persons with difficulty sleeping (Roehrs, Zorick, Sicklesteel, Wittig, \& Roth, 1983), it is necessary to screen subjects for clinical depression. Separate therapeutic attention is necessary for depression and insomnia since one cannot assume that improvement in one problem will bring about improvement in the other (Bootzin \& Nicassio, 1978). Improvement in mood is an added bonus in the behavioral treatment of insomnia in an age group that is more likely to report depressed mood. However, persons with signs of clinical depression cannot be included in an insomnia treatment
outcome study. Clinically depressed older adults must be referred for treatment of their affective disorder.

Variability of insomnia outcome measures. One of the purposes of the proposed study is to establish a consistent sleep-wake pattern for the subjects. Findings from several of the studies reviewed demonstrate that the behavioral interventions reduce the variability in certain treatment outcome sleep variables. The decrease in variability indicates that stable sleep-wake patterns have developed as a result of the interventions. Consistent sleep-wake patterning is one of the proposed study's research purposes.

Social validation. The use of social validation measures by Morin (1987, 1988) in his studies is an important aspect of behavior therapy in evaluating whether the effects of treatment are of applied or clinical significance (Kazdin, 1977). In the treatment outcome studies reviewed, the social validation measures lacked psychometric estimates and were not applied to both treatment and control groups. In spite of the measurement weaknesses, social validation assessment addresses a critical aspect of behavior therapy. The evaluation of whether the significant persons in the subject's life consider the subject's behavior to have changed is important in the area of insomnia since significant others may reinforce sleep complaints (Bootzin \& Engle-Friedman, 1987).

Despite the importance of social validation, the proposed dissertation study did not incorporate such measurement methods for several reasons. First, the measures have not been tested adequately. Secondly, since this is an initial study, time and financial restraints prohibit social validation measurement. The research focus for this study remained on the subjects themselves.

## Intervention Issues

Individual versus group format. The treatment outcome studies effectively used both individual and group approaches to treatment delivery. It is difficult to evaluate if one method is more effective since there has not been a study conducted to compare delivery methods. The group format has been used successfully in the behavioral treatment of other problems of older adulthood such as depression (Carstensen, 1988). Therefore, the group approach was a valid format for delivering a behavioral treatment for insomnia to older adults in the dissertation study.

Length of treatment. Treatment length varied in the treatment outcome studies reviewed. The shortest treatment time was four weeks and the longest was eight weeks. Treatment length is dependent upon the specific intervention(s) utilized. Stimulus control instructions and sleep restriction therapy need different lengths of treatment according to the developers and advocates of the treatments. Sleep restriction therapy can be accomplished in six weeks (Spielman, personal communication, June, 1992) while a minimum of
four weeks is needed for stimulus control instructions (Lacks, 1987). The present study incorporated treatment length specifications into the implementation of the intervention.

Ensuring treatment compliance in older adults. The flexibility in delivery of sleep restriction therapy by Friedman, Bliwise, Yeasavage, and Salom (1991) is an important aspect of treating insomnia in older adults. The treatment is not easy to follow as it requires some abrupt changes in hours for retiring and arising. Older adults may have set certain times to go to bed and get up in the morning, regardless of whether they are actually sleeping during that time in bed. Many older adults believe that time spent in bed is beneficial and decreasing time in bed may be harmful to their well-being (Friedman, Bliwise, Yeasavage, \& Salom, 1991). Active participation by subjects as well as some give and take between the therapist and subjects may help to improve compliance.

In addition to treatment flexibility, provision for how older persons will spend the time awake that results from following stimulus control and sleep restriction therapy must be addressed. Hoelscher and Edinger (1988) found that older subjects with insomnia using sleep restriction complained of boredom and had difficulty staying awake until the scheduled bedtime. In order to assure treatment compliance and integrity, treatment outcome studies must include concrete plans for each individual to follow while awake during the
night. There must be differentiation between arousing activities, used to stay awake until the sleep prescription bedtime, and more sedentary activities, followed when one gets out of bed during the night according to stimulus control activities, when the goal is to get sleepy and go back to bed. With the exception of the Freidman et al. (1991) article, the studies reviewed did not specify how, if at all, such differentiation of activities was accomplished.

## Summary

This chapter has presented the theory underlying the proposed intervention, a description of the intervention components, the empirical evidence to support their use in an older population, and a conceptualization of a nursing perspective for the intervention. Learning theory, the foundation of behavior therapy, contributes a framework for understanding the proposed intervention. Within the learning theory framework, the operant conditioning model helps to specify the mechanism underlying the development of a behavior as well as approaches to changing the behavior. The focus of learning theory is on persons and their environment, two major concerns of nursing. In addition, learning theory emphasizes the evaluation of behavioral change.

A description of the components of the intervention examined the nature of the treatment which includes the conceptual basis, assumptions of the interventions, and processes involved in treatment. The intervention
descriptions built the rationale for the selection of the particular components for the problem of persistent sleep maintenance insomnia in the elderly. Empirical findings from studies that have used behavioral interventions for insomnia in older adults offer evidence of efficacy of treatment in this small but developing field. Stimulus control instructions remain the most widely tested and effective intervention. Sleep restriction therapy appears to have potential as an intervention for an older population. Treatment packages utilizing the major components of the proposed intervention demonstrate success in impacting the sleep variables that are particularly troublesome for older adults with persistent sleep maintenance insomnia. In spite of the accumulating evidence, the review of the literature indicates that the existing treatment packages need further refinement and testing in an older population.

The relationship between an intervention study and nursing science can be developed through a conceptualization of the problem and intervention within a nursing model. Rogers' Science of Unitary Human Beings provides a framework for identifying consistencies and inconsistencies between a behavioral intervention and a nursing conceptual model. The patterning emphasis of Rogerian science provides a rich background for a discussion of sleep-wake pattern alterations in older adults. Recent writings focusing on a practice methodology within Rogerian science offer another approach to establishing an intervention's consistency with the Science of Unitary Human

Beings. The facilitation of pattern recognition, selection of a pattern-based intervention, and implementaticn of deliberative patterning occur within the process of health patterning.

## CHAPTER THREE

## METHODOLOGY

This chapter presents the methodology for the behavioral intervention for sleep maintenance insomnia in older adults. The research question posed in the study was: How effective is a behavioral intervention for sleep maintenance insomnia in enhancing the sleep-wake patterns of older adults with insomnia? The study answered the question using an experimental design with repeated measures to compare the effects of the behavioral intervention with a waiting list control (WLC) group.

## Treatment Strength and Integrity

Adequate strength and integrity of treatment are issues that underlie the delivery of an effective intervention (Scott \& Sechrest, 1989; Sechrest, West, Phillips, Redner, \& Yeaton, 1979; Yeaton \& Sechrest, 1981). The strength of a treatment refers to the likelihood that the treatment will have its intended effect (Yeaton \& Sechrest). In order to assure treatment strength, careful attention to the parameters of the intervention are necessary. Suggested parameters of treatment strength are: purity, specificity, dose, duration, focus of treatment, the intervener, intervention protocol, and differential assignment (Scott \& Sechrest, 1989; Sechrest et al., 1979). Chapter Two presented several parameters of treatment strength. The description of the intervention components included aspects of the parameters of purity, specificity, dose, duration, and focus of
treatment. The empirical findings discussed and evaluated in Chapter Two and the intervention theory proposed by the developer of the intervention and its advocates can assist in making decisions regarding the parameters of treatment strength. The methodology of the intervention study further explicates the parameters of treatment strength addressed in Chapter Two and describes the remaining parameters of intervener, intervention protocol, and differential assignment.

Treatment integrity refers to whether the treatment was delivered as planned (Yeaton \& Sechrest, 1981). Strength of treatment can be planned and assessed at any time, but the integrity of treatment can be assessed only after the completion of treatment (Sechrest \& Redner, 1979). However, the likelihood of treatment integrity should be possible to assess prior to treatment delivery through an examination of the nature of the treatment and the plans to assure its delivery according to protocol (Sechrest et al., 1979). The nature of the treatment was explored in Chapter Two. Treatment delivery is described in the methodology. The treatment protocol is carefully detailed to provide a standardized plan. Interventions grounded in a theory of treatment that specifies the techniques and procedures to be applied in order to bring about desired outcomes are more likely to produce useful findings (Finney \& Moos, 1989).

## Subjects and Subject Selection

An aspect of treatment strength includes a plan for assessing the suitability of subjects for the intervention study (Sechrest, West, Phillips, Redner, \& Yeaton, 1979). The following discussion of subjects describes the plan for recruiting and assessing the appropriateness of potential subjects for the study. A rationale for the selection of subjects is presented.

## Subject Selection

Older adults were recruited from the community via newspaper advertisements and flyers placed in retirement communities. The printed media form of advertising is a recruitment method commonly used by researchers studying the behavioral treatment of older adults with insomnia. Individuals with sleep maintenance difficulties were recruited since this is the most frequent sleep complaint of older adults.

Approval for the study was obtained from the Human Subjects Review Committee of The University of Arizona prior to recruitment (Appendix D). The study was given exempt status.

The subject selection criteria were:

1. Community dwelling, noninstitutionalized adults aged 60 and over.
2. Wake after sleep onset (WASO) 60 minutes or more per night for a minimum of three nights per week as corroborated through sleep diaries for 14 days. Persons with sleep onset latency were permitted to enter
the study if they also experienced WASO of the magnitude described in the selection criteria.
3. Had experienced sleep maintenance insomnia, as defined above, for at least six months.
4. Could not be regularly taking hypnotic medication more than two to three nights per week and were willing to discontinue the medication under their prescribing physician's supervision. The supervised withdrawal had to be accomplished within 4 weeks prior to starting the baseline assessment period.
5. Could not currently be involved in psychotherapy or receiving treatment for major depression or psychopathology. Potential subjects were excluded if they scored 25 or greater on the Geriatric Depression Scale. Anyone who scored between 15 and 25 was individually evaluated for signs and symptoms of depression and suicidal ideation based upon the investigator's skills as a psychiatric-mental health nurse.
6. Did not have symptoms of sleep apnea, nocturnal myoclonus, or restless legs syndrome through self-report. When available and with the permission of the potential subject, signs of sleep apnea and nocturnal myoclonus were also ascertained through conversations with bed partners.
7. Did not have a medical condition directly related to their insomnia. Medications taken routinely by potential subjects were evaluated on an individual basis during screening. The subjects were told they must record on the daily sleep diary any medications other than those reviewed during screening.
8. Did not have an alcohol problem as evaluated with the CAGE scale. Scores of 2 or higher necessitated further exploration of drinking patterns.
9. Were able to read and write English.

Criteria 2 through 8 were verified by the use of the Sleep History Interview, Geriatric Depression Scale, and the CAGE scale which are discussed in the description of the instruments. The lower age limit of 60 years was chosen based upon the ages of subjects in the insomnia outcome studies reviewed in Chapter Two. An upper age limit was not imposed since the subject's daily functioning competence rather than age dictates their ability to benefit from the behavioral treatment. Aspects of daily functioning were assessed in the screening interview.

Wake after sleep onset (WASO). Since sleep maintenance is the primary problem of older adults, WASO is the outcome variable that best represents this problem. Through a baseline assessment, potential subjects were required to demonstrate the sleep difficulty for 60 minutes or more on at least three nights
per week in order to target persons with severe problems. A 14 day baseline monitoring period to corroborate the older adult's complaint of insomnia was necessary to ascertain the severity of the person's sleep difficulty. Since persons with insomnia have a great deal of variability in their sleep-wake patterns, 14 days assured a time period long enough to provide reliable baseline data. The baseline data also allowed assessment of the amount of change experienced from pre- to posttreatment.

Hypnotics. The issue of whether to accept subjects into an insomnia treatment study who are taking hypnotic medication has not been resolved. Although little is known about the usefulness of behavioral treatments for persons with insomnia who take hypnotic drugs, one study has compared pretreatment drug withdrawal to posttreatment drug withdrawal in a ten subject case study (Espie, Lindsay, \& Brooks, 1988). The results indicate that pretreatment withdrawal treatment resulted in an improved sleep pattern. Persons in both groups were able to benefit from behavioral treatment, however, they appeared to have more problems with hypnotic relapse during the following year. In addition, clinical experience indicates that persons benefit more from treatment if they have withdrawn from hypnotics. Restricting persons who were using hypnotics more than two or three times per week will helped to simplify the execution of the research study. Persons taking more hypnotics than specified would have had more difficulty. However, elderly
adults without health problems do not accurately reflect an older population. Morin and his associates (Morin \& Azrin, 1988) have included older adults with medical disorders unless the insomnia was considered secondary to a health problem. They believe this may weaken the true treatment effect, but the results appear to have more generalizability.

## Screening Procedure

When persons call to inquire about the study, the investigator provided a brief explanation of the research project and reviewed the specific inclusion criteria with those who were interested. A preliminary screening was conducted by telephone with the potential subject. At this point an attempt was made to satisfy as many of the study's subject selection criteria as possible. Permission was obtained to talk to a bedpartner if possible regarding signs of other sleep disorders. After speaking to the bedpartner, and if all other preliminary telephone screening criteria were met, a screening appointment with the investigator was made. A packet of instruments was sent to the potential subject by mail. Potential participants were made aware that the interview was a formal screening procedure to evaluate their appropriateness for inclusion in the study.

The screening interview was conducted in an office at the College of Nursing. The purpose of the study and a brief description were reviewed. The potential subject then read the disclaimer (Appendix E). The investigator used
the Sleep History Interview, Geriatric Depression Scale, the CAGE scale, her clinical experience in the evaluation and treatment of persons with insomnia, and her skills as a psychiatric-mental health nurse clinician, to make judgments regarding the person's ability to participate. Based on the screening interview data, potential subjects were advised of their status.

The investigator emphasized the potential subject's choice to withdraw from treatment at any time during the study without incurring ill feelings. Additional emphasis was placed on the fact that inclusion in the study at that point only entailed eligibility to assess a 14 day baseline period of sleep behavior. If the baseline sleep assessment did not reveal a sleep problem of the magnitude described in study inclusion criterion number two, the potential subject was not allowed to continue in the study. Potential subjects were informed that failure to comply with the monitoring of daily sleep patterns might result in being dropped from the study. At the end of the 14 day baseline period, the results of the baseline sleep monitoring and the status of the potential subject in the study were explained per telephone to the potential subject. The telephone format was used to avoid an additional trip to the College of Nursing for the older adult. Information on the class times were given per telephone and mailed to the subjects. Persons who did not meet the study criteria or who appeared to suffer from a sleep disorder not amenable to behavioral intervention were offered a referral to the University of Arizona,

College of Medicine, Sleep Disorders Center. Individuals who were found to suffer from depression were offered referrals to the local community mental health center.

## Instruments

Measurement in the intervention project assessed several domains. The assessment domains and the instruments used to measure the specific domain are displayed in Table 3.1. All of the instruments used in the study are included in Appendix A. Permission to use scales that are not in the public domain is included in Appendix B.

The instruments are self-report measures. Bootzin and Engle-Friedman (1981) note that "the experiential component of insomnia is likely to be central to the disorder" (p.112). The subjective report is crucial to obtaining judgments regarding the severity of the sleep problem and the effects of treatment. In regard to the clinical relevance of the proposed study, nurses in clinical practice

Table 3.1. Assessment Domains and Instruments

| Assessment Domain | Instrument |
| :---: | :---: |
| Sleep Behaviors | Daily Sleep Diary |
| Sleep-Wake Impairment | Patient's Rating Symptom Questionnaire Patient's Outcome Ratings Daily Sleep Diary |
| Dysfunctional Cognitions | Personal Beliefs and Attitudes about Sleep |
| Presleep Anxiety | Sleep Anticipatory Anxiety Questionnaire |
| Mood | Geriatric Depression Scale State Trait Anxiety Inventory |
| Treatment Evaluation | Therapy Evaluation Questionnaire Patient's Outcome Ratings |
| Treatment Compliance | Daily Sleep Diary Patient's Outcome Ratings |

would most likely rely on the patient's self-report of insomnia to make assessment and treatment judgements.

## Sleep History Interview (SHI)

The SHI was completed by the investigator in an interview format to assist in the evaluation of the appropriateness of interested potential subjects for inclusion in the study. The SHI was developed by Morin and his associates (Morin \& Azrin, 1988) and includes nine screening areas.

## CAGE

The CAGE scale is a 4-item, self-report screening instrument designed to identify alcoholics (Ewing \& Rouse, 1970). CAGE is an acronym for cut down, annoy, guilty, and "eye opener." Validation studies with clinical samples indicate that the CAGE identifies most alcoholics (Beresford, Low, Adduci, \& Goggans, 1982; Ewing, 1984; Mayfield, McLeod, \& Hall, 1974). Factor analysis demonstrates that the CAGE is a unidimensional scale (Smart, Adlaf, \& Knoke, 1991). A score of 2 or greater is the suggested cut-off indicative of a drinking problem.

## Geriatric Depression Scale (GDS)

The GDS was developed by Yesavage and his associates (Brink et al., 1982; Yesavage et al., 1983) as a screening instrument to measure depression in older adults. The scale will also be used to examine any change in depression scores after treatment. The instrument is a self-administered 30
yes/no item scale. A scoring key is used to ascertain level of depression. The scale developers recommend that the older adult subjects should be requested to complete a questionnaire referring to changes in mood and that the instrument should be titled "Mood Assessment Scale".

The GDS has been recommended over the Beck Depression Inventory (Beck \& Beck, 1972) for use in an older population for several reasons (Spreen \& Strauss, 1991). Accurate identification of depression was made using both instruments in a study of geriatric medical outpatients (Norris, Gallagher, Wilson, \& Winograd, 1987) and a study of depression in alcoholics (Tamkin, Carson, Nixon, \& Hyer, 1987). The studies found that older adults had more difficulty responding to the BDI's multiple-choice format. In addition, some of the somatic content items were not appropriate for the older adults. Neither the GDS nor the BDI has been validated in older adults with cognitive or sensory impairment. The GDS omits items dealing with guilt, sexuality, and suicide, which the developers of the scale believe to be inappropriate for older persons. Twelve items that dealt with psychosomatic complaints were dropped based on poor item-total correlations.

The developers of the GDS have submitted the scale to psychometric evaluation (Yesavage et al., 1983). The item-total correlations range from .32 to .83 with a mean of .56 , alpha coefficient of .94 , and split-half reliability of .94 . A one week test-retest reliability was .85 . A five factor solution emerged in a test
of 326 community dwelling older adults with an age range from 66 to 92 years (Sheikh et al., 1991). The factor structure accounted for $42.9 \%$ of the variance and included sad mood, lack of energy, positive mood, agitation, and social withdrawal. Construct, concurrent, and criterion validity have been established for the GDS (Yesavage et al., 1983). Using normative data for the GDS, cutoff points are recommended as 0-9 for normal, 10-19 for mild depressives, and 2030 for severe depressives (Brink et al., 1982; Yesavage et al., 1983).

## State-Trait Anxiety Inventory (STAI)

The STAI, developed by Spielberger (1966), has been used extensively in research and clinical practice to assess anxiety. The STAI consists of a state scale and a trait scale. Each scale is summated and has 20 items using a Likert format. Responses range from not at all to very much so for the state scale and almost never to almost always for the trait scale. When reverse coding is done on appropriate items, a high score indicates more anxiety. Investigators currently conducting research programs of insomnia treatment outcomes in older persons use or recommend the use of the STAl to measure anxiety pre and posttreatment (Friedman, personal communication, June, 1992; Morin \& Azrin, 1987, 1988).

Normative data on the STAI provided the following psychometric estimates for the scales (Spielberger, 1983). The mean scores for working adult males aged 50 to 69 on the state anxiety scale are 34.51 (SD 10.34) and
33.86 (SD 8.86) on the trait anxiety scale. Mean scores for females in the same age group are 32.20 (SD 8.67) on the state anxiety scale and 31.79 (SD 7.78) on the trait anxiety scale. The alpha coefficients for adults aged 50 to 69 are .92 for males and .90 for females. Test-retest correlations indicate adequate stability of the STAI in that the correlations are relatively high for the trait anxiety scale and low for the state anxiety scale. The scales also evidence concurrent, convergent, divergent, and construct validity.

## Demographic Information (DI)

The self-administered DI gathers information on six demographic areas. The six areas include age, marital status, ethnicity, level of education, and employment status.

## Daily Sleep Diary (DSD)

The DSD is a self-administered log of daily sleep behaviors. Three questions evaluate sleep-wake impairment: sleep quality, refreshness on arising, and sleep compared to usual. Daily sleep diaries are likely to be a less biased measure than global reports of sleep improvement (Bootzin \& Nicassio, 1978). Most insomnia research teams develop their own diaries for their investigations (Bootzin \& Engle-Friedman, 1981). Sleep diaries tap similar information concerning sleep behaviors. The diary that will be utilized in the proposed study wasbjects during their waiting period (baseline to posttreatment 1). There was significant ( $\mathrm{ps}<.01$ ) improvement from posttreaiment 1 to
posttreatment 2 on the WASO, TST, and SE variables. Line and bar graphs demonstrating changes in WASO, SE, and TST for the delayed treatment group are displayed in Figures 4.2 to 4.5 and Figure 4.7.

Substantial test-retest reliability has been reported for the use of sleep diaries with poor sleepers ( $r=.69$ to .93 ) (Coates et al., 1982). The relationship between sleep diaries and polysomnography (physiological measurement of sleep) has been found to be in the .60 's indicating that the same construct is being measured (Bootzin \& Engle-Friedman, 1981). The item responses were called in to a voice mail service each morning rather than accumulating the diaries at home between classes. This method was chosen to decrease the possibility of retrospective estimates.

## Patient's Ratings (PR) and Patient Outcome Ratings (POR)

The PR and POR questionnaires are Likert-type scales developed by Morin (Morin \& Azrin, 1988). The PR, a five item scale, assesses sleep impairment during the baseline period. When the second item is reverse scored, a high score on the five items indicates more sleep impairment. The posttreatment version (POR) has three additional items that rate the degree of change in the sleep pattern, compliance with treatment, and supportiveness of the significant other during treatment. An additional nine items evaluate the behavioral intervention. Five of the nine items are open ended questions.

## Therapy Evaluation Questionnaire (TEQ)

The TEQ, a Likert format scale, is based on the Treatment Credibility scale developed by Borkovec and Nau (1972). The scale was modified by Morin (Morin \& Azrin, 1988) for use with older adults with insomnia. The three item scale, administered immediately after the first treatment session, measures expectancies for success, treatment plausibility, and confidence in recommending treatment to a friend with insomnia. Subjects had an opportunity to listen to a detailed explanation of the treatment. An additional three items are added for posttreatment evaluation to rate the therapist and willingness to undergo the treatment again if the problem reoccurred.

## Symptom Questionnaire (SQ)

The 4 item Likert-type SQ scale, developed by Spielman (Rubinstein, et al., 1990), assesses the adequacy of daytime alertness and in turn offers some insight into the effect of the treatment on the daily functioning of the older adult. The scale was developed specifically for use with sleep restriction therapy. The item responses range from never to always.

## Sleep Anticipatory Anxiety Questionnaire (SAAQ)

The SAAQ is a 10 item scale with a Likert-type format consisting of four response alternatives. The SAAQ is a summated scale with each response scored 1 through 4, strongly disagree to strongly agree. The scale measures presleep anxiety in order to evaluate the level of arousal when trying to fall
asleep. Higher scores indicate more presleep anxiety. The SAAQ was designed for use with sleep onset latency insomniacs. In this study, the stem which precedes the items was changed from "When I try to fall asleep at night..." to "When I try to fall back to sleep at night..." in order to address sleep maintenance insomnia.

Psychometric properties of the SAAQ were examined using student ( $n=1212$ ) and insomniac ( $n=77$ ) samples (Bootzin, Shoham, \& Kuo, 1994). The insomniac sample consisted of young adults (mean age $=29.49$, sd $=$ 7.16). Internal consistency (Cronbach's alpha) is .84 for the student sample and .83 for the insomniac sample. A principal components factor analysis revealed an identical two factor solution for both samples. The first factor measures overall degree of presleep anxiety. Factor two contrasts the five cognitive items with the five somatic items. The two factor solution accounts for $41.4 \%$ and $16.9 \%$ of the variance in the student sample and $40.8 \%$ and $19.8 \%$ of the variance in the insomniac sample. Mean total scores are 21.64 (sd $=$ $4.91)$ for the student sample and $23.68(s d=4.69)$ for the insomniac sample. The difference score (cognitive minus somatic score) describes the extent to which subjects experience primarily cognitive as compared to somatic arousal. Difference scores are $3.30(s d=2.85)$ for the student sample and $5.49(s d=$ 3.10) for the insomniac sample.

## Personal Beliefs and Attitudes about Sleep (PBAS)

The PBAS is a 31 item scale with a 100 mm . visual analog format, anchored with strongly disagree and strongly agree, developed by Morin and his associates (Morin, Stone, Trinkle, Mercer, \& Remsberg, 1992). The scales measures beliefs, attitudes, expectations, and attributions about sleep and insomnia. Morin et al. (1992) established five conceptually derived themes to describe the nature of the cognitions regarding sleep: misattributions of the consequences of insomnia, diminished perception of control and predictability of sleep, unrealistic sleep expectations, misconceptions about the causes of insomnia, and faulty beliefs about sleep promoting practices. The items were developed from clinical practice experience and theoretical conceptualizations of chronic insomnia. A higher score indicates a more dysfunctional belief. Since the development of the PBAS (Morin et al., 1992) and the completion of the intervention delivery component of the study, Morin has changed the scale to 28 items and calls it Dysfunctional Beliefs and Attitudes about Sleep (DBAS) (Morin, Stone, Trinkle, Mercer, \& Remsberg, 1993).

The 28-item scale was used in the statistical analysis of the present study to correspond to the psychometric evaluations conducted by Morin et al. (1993). Morin et al.'s evaluation of the scale included 74 insomniacs and 71 self-defined good sleepers who completed the DBAS. Internal consistency (Cronbach's alpha) was .81 for the poor sleepers and .80 for the good
sleepers. Factor analysis was not performed. The groups were compared on each of the five themes. Cognitions regarding misattributions of the consequences of insomnia, fear of loss of control (hopelessness), and the unpredictability of insomnia (helplessness) best differentiated the two groups.

## Outcome Measures and Psychometric Estimates

Several of the instruments (DSD, POR, SQ, and TEQ) used as outcome measures lack psychometric evaluation. Several points regarding outcome measures in nursing intervention studies have been raised by Stewart and Archbold $(1992,1993)$. Sensitivity to change should be the primary criterion in the selection of an outcome measure. High internal consistency is appropriate for the measurement of individual differences, but is not sufficient for the evaluation of treatment outcome measures. In spite of established reliability and validity, the instrument may not be optimally sensitive to the treatment condition.

Stewart and Archbold make several recommendations for establishing the sensitivity of an outcome measure. One recommendation, most salient for this study, considers whether the instruments have been used in intervention studies. The DSD, POR, and TEQ have been used in Morin's research program to evaluate the effect of cognitive and behavioral interventions similar to the intervention proposed in this study, using the same population (Morin \& Azrin, 1987, 1988; Morin, Kowatch, Berry, \& Walton, 1993). The outcome
measures demonstrated the ability to detect change. Another recommendation to verify sensitivity is to connect the change in the outcome variable to the intervention. The conceptual link between the intervention and the sleep behavior outcome variables has been established in Chapter Two in the description of the intervention and review of the behavioral treatment outcome literature on insomnia. The outcome variable should also have the potential to change. The ability of the sleep behavior variables to change after short term treatment has also been established through a review of the literature. The establishment of content validity can contribute to sensitivity. Although not formally established, the specific items in the POR and TEQ capture at face value, both singly and collectively, the effects of the intervention. The DSD, POR, and DSD have a potential range of scores and response formats that allow room for change to occur and be detected. Consideration of the aforementioned issues can increase an instrument's sensitivity to change which may be more crucial than high reliability and established validity.

Since psychometric properties are not currently available for the PR and SQ, two psychometric evaluations were performed. First, the PR and SQ was assessed for test-retest reliability during the two week baseline period. A significant correlation, $r=.79$ ( $p<.01$ ), was found for the PR. The correlation for the SQ was nonsignificant. Second, correlations between the WASO variable and the posttreatment measures of the SQ and POR scales were
examineci. If the SQ and POR reflect outcomes of sleep treatment, they should be strongly related to the DSD. A significant correlation ( $\mathrm{r}=.42, \mathrm{p} \leq .05$ ) was found only between the POR and WASO. The SQ reflects adequacy of daytime alertness and may not be as directly related to outcomes of sleep and sleep treatment as the items of the POR.

## Design of the Study

The study employed an experimental design with repeated measures to compare the effects of a behavioral intervention with a waiting list control (WLC) group. The recruitment process during a pilot study (Epstein, 1991) of the intervention indicated that persons with insomnia are very anxious to begin treatment as soon as they find that it is available. Therefore, a design in which subjects could be assigned to treatment or a traditional control group may result in subjects choosing not to participate at all. Thus, the decision was made to have a WLC group design which is depicted in Figure 3.1. For the pruposes of this study, the treatment group is referred to as the "immediate treatment group" and the WLC group is designated as the "delayed treatment group". The data collection protocol section provides a more detailed discussion of the measurement time points presented in the design plan.

The classes were small with not more than seven older adults in a class. When the older adults completed the screening process and were eligible for participation, they were randomly assigned to either the immediate treatment
group or the delayed treatment group. A fourteen day baseline measurement at time 1 occurred for both groups as part of the screening process. Random assignment took place and treatment began. When treatment ended, the two groups were measured using the posttreatment instruments at time 2. The 14 day posttreatment measurement at time 2 is the posttreatment evaluation for the immediate treatment group and the pretreatment baseline period for the delayed treatment group. The delayed treatment group received treatment following the 14 -day baseline. The delayed treatment group was measured posttreatment at time 3. Both groups were measured three months after treatment to obtain follow-up data.

Figure 3.1. Waiting List Control Group Design

| ITG | O 1 | $\times$ | O 2 |  | 06 | 08 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | O3 |  | 04 | $\times$ | O5 | 07 |
|  | T1 |  | T2 |  | T3 | T4 |

$T=$ time $\quad O=$ observation $\quad I T G=$ Immediate Treatment Group
$X=$ treatment $\quad$ DTG $=$ Delayed Treatment Group

* = data will not be reported in this research study

Follow-up measurement three months after treatment occurred at time 4 for both groups. A two year follow-up is planned (time 5).

Subjects who were found eligible for treatment during the time following the formation of the first immediate treatment and delayed treatment groups became the next treatment and control groups. Thus, the first dyad discussed above was considered the first wave of treatment and the two groups formed after the first dyad was the second dyad or second wave of treatment, etc..

Randomization of subjects controls for history, motivation, instrumentation, statistical regression, and selection bias. The immediate treatment and delayed treatment groups took the pre- and posttreatment assessments over the same time interval. The measurement and comparison of the two groups at times 1 and 2 kept the assessment time intervals constant thereby controlling for threats to internal validity of maturation and history. An advantage of a waiting list control group design is that treatment can be evaluated at different time points. Treatment is replicated thereby allowing between-group comparisons ( O 2 to O 4 ) and within-group comparisons ( O 3 to O 4 and O 4 to O 5 ).

## Data Collection Protocol

The time frame for measurement is presented in Figure 3.2. Measurement occurred at five points during the study. The first phase of data collection took place during the screening interview (T1). The SHI, CAGE, GDS,

Figure 3.2. Assessment and Treatment Schedule.

|  | T1 | T2 | T3 | T4 | T5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Screening | Baseline | Treatment | Posttreatment | Follow-up |
| Week |  | 12 | 345678 | 910 | 2021 |
| SHI | a |  |  |  |  |
| ETOH | a |  |  |  |  |
| GDS | b |  |  | $b$ |  |
| STAI | $b$ |  |  | $b$ |  |
| DSD |  | c c | eeceee | c c | e e |
| PR |  | d d |  | g 9 |  |
| POR |  |  |  | f |  |
| TEQ |  |  | f | f |  |
| SQ |  | dd | ff | $d d$ |  |
| PBAS | b |  |  | $b$ |  |
| SAAQ | b |  |  | b |  |
| $a=$ one time screening assessment (immediate treatment and delayed treatment groups) <br> $b=$ screening and posttreatment assessment |  |  |  |  |  |
| $c=$ daily assessment throughout the week (immediate treatment and delayed treatment groups) |  |  |  |  |  |
| $\mathrm{d}=$ weekly assessment (immediate treatment and delayed treatment groups) |  |  |  |  |  |
| $e=$ daily assessment throughout the week (immediate treatment group) |  |  |  |  |  |
| $\mathrm{f}=$ weekly assessment (immediate treatment group) |  |  |  |  |  |
| $\mathrm{g}=$ weekly assessment (delayed treatment group) |  |  |  |  |  |

STAI, PBAS, and SAAQ were used at T1 to assess sleep behavior history, alcohol use, depression, and anxiety, dysfunctional cognitions, and presleep anxiety. The data was used to form a decision as to whether the potential subject was eligible to proceed with the 14-day baseline measurement.

The two-week baseline period comprised the second phase of data collection (T2). The DSD, PR, and SQ were given at T2 in order to obtain baseline data of usual sleep patterns and the impact of insomnia on the participants' lives. A two-week baseline measurement of sleep behavior using the DSD is necessary in treatment research on insomnia. Persons with insomnia have high night to night variability in their sleep patterns (Coates et al., 1982). Wake time after sleep onset of adults with insomnia has been found to be considerably less stable than that of a control group (Kales et al., 1984). The two-week measurement was meant to assure sufficient sampling over time to identify individual patterns of sleep behavior (Lacks, 1987). The two-week baseline of sleep behaviors allowed the investigator to ascertain whether the potential subject had a sleep problem of the magnitude required by the inclusion criteria.

Participants were provided with PR and SQ instruments to complete during the baseline phase. The scales were returned by mail. During the screening interview, participants were taught how to complete the DSD and how to leave responses to the DSD, PR, and SQ on the voice mail service
during the two week baseline period. Responses to the DSD were called in daily to the voice mail service during the two-week baseline period and throughout the treatment phase of the research project. Subjects responding to the DSD by voice mail service identified themselves by their identification number. The voice mailbox was accessible by an access number known only to the investigator. After the data was transcribed each day, the messages were erased. Participants who failed to call in their sleep diary responses were contacted by the investigator to remind the subject or determine if any problems existed.

Individuals whose sleep-wake patterns during the 14-day baseline monitoring met the inclusion criteria were randomly assigned to either the immediate treatment or delayed treatment groups. The treatment portion of the project was the third data collection phase (T3). For the immediate treatment group, the DSD was collected daily during T3 to gather data to monitor sleep behavior pattern improvement and to use in weekly class discussions. The SQ was administered during the fourth and fifth weeks of treatment (T3). The sleep restriction algorithm is used with the SQ to ensure the subject has an adequate amount of time in bed available, about seven hours by the end of treatment. The SQ instruments were called in to the voice mail service. Participants completed the TEQ during the first and last treatment sessions.

The instruments administered at T4, the two weeks following treatment, were used to gather posttreatment data necessary for testing the efficacy of the intervention. In addition, the delayed treatment group subjects completed the baseline instruments at T4 because this time point was also the delayed treatment group's baseline period. The DSD and SQ were completed by the immediate treatment and delayed treatment groups. The DSD was called in daily and the SQ scales were called in weekly to the voice mail service. The POR scale was completed during T4 and returned by mail. The PR, rather than the POR, was given to the delayed treatment group only at T4 for two reasons. First, the delayed treatment subjects did not have feedback on the questions regarding the treatment, and secondly, the PR was completed by the delayed treatment group as a baseline instrument.

The two-week follow-up interval, scheduled three months after completion of treatment, was the final stage of data collection (T5). Follow-up data was collected to evaluate the durability of the treatment effect. The participants werc asked to call in their responses to the DSD and SQ to the voice mail service during the follow-up interval.

The use of repeated measures raises the issue of instrument reactivity with treatment. Measurement of the immediate treatment and delayed treatment subjects simultaneously controls for changes in the instrument application and changes in the criteria on scoring behavior over time.

Therefore, if any instrumentation effect occurred, it should be equalized among the two groups since they were measured at the same time periods and with the same frequency. The exception is the DSD measurement. The delayed treatment group did not complete the DSD during most of T3. The behavior therapy literature indicates that keeping a record of behavior can change the behavior being monitored (Kazdin, 1974). The design of the study required a no treatment control group, therefore, the decision was made to eliminate the majority of T3 DSD and SQ completion by delayed treatment subjects.

## Intervention Protocol

A pilot study was conducted to assess the strength and integrity of the behavioral intervention (Epstein, 1991). The assessment and evaluation of treatment strength and integrity allowed the investigator to make appropriate improvements in the intervention and thereby increase the probability of delivering an effective treatment in the proposed study. Based on the pilot study, changes were made in the treatment manual and in the delivery format of the intervention.

In the present study, the subjects randomly assigned to the behavioral intervention were scheduled to attend weekly treatment classes in small groups. The group format has been used in many studies of adult insomniacs including older adults. Based on a seven-study research program of behavioral interventions for insomnia, Lacks and Powlishta (1989) reported that the group
format ofiers both support and accountability, factors that appear to be powerful therapeutic elements. In addition, the group format has been used successfully in the behavioral treatment of other health problems of older adulthood such as depression (Carstensen, 1988).

In order to accommodate the prescribed length of treatment for both stimulus control instructions and sleep restriction therapy, a six-week treatment program was instituted. Four weekly classes and two weekly telephone interventions were scheduled. Sleep restriction therapy dictates a treatment length of six weeks to obtain marked subjective improvement (Rubinstein et al., 1990). Stimulus control instructions have been implemented in an older population, as well as younger adults, over a four-week period with significant treatment effects (Bootzin \& Engle-Friedman, 1987). Lacks (1987), commenting on her insomnia treatment outcome research program, believes that the standard four weeks of treatment using stimulus control instructions could be improved by an additional session when treating older adults. A treatment outcome study conducted by Morin and his associates (Morin et al., 1993) used a treatment package that includes stimulus control, sleep restriction therapy, cognitive restructuring and sleep education for older adults with insomnia. Morin implements the treatment over an eight week period and believes that lengthier insomnia treatments produce the greatest effect in an older population (Morin, personal communication, May, 1992).

The classes were conducted by the investigator. The use of only one experimenter (therapist) can introduce a potential source of bias in research. A treatment package was implemented which contained several components that were interspersed throughout the intervention. Therefore, the likelihood of therapist bias in favor of one treatment, or component in this case, was eliminated. In addition, attention to elements of treatment strength and integrity assisted the investigator/experimenter to avoid sources of bias.

The level of training, experience, competence, and motivation are important characteristics of the experimenter and directly affect treatment strength and integrity (Sechrest \& Scott, 1989). Suggestions by evaluation researchers to assure delivery of treatment as intended were followed (Sechrest, West, Phillips, Redner, \& Yeaton, 1979). The investigator/experimenter had a strong background in the assessment and treatment of persons with insomnia in clinical and research settings and implemented the intervention in a pilot study (Epstein, 1991). To further address treatment strength and integrity, each class intervention was taped. A doctoral student with masters preparation in psychiatric-mental health nursing randomly selected one of the audiotapes of the first class sessions to document that the treatment was being delivered as intended according to the protocol. Other than rating the tape, the reviewer was not involved in the treatment project. A checklist (Appendix F) was used to document that the
treatmeri protocol, as described in the treatment manual (Appendix $G$ ) for the first session, was adhered to. The first session tapes were used because the first session included the detailed instructions for each component of the intervention.

Each class followed a standard format using a treatment manual (Appendix G). A formal, specific treatment protocol is likely to result in stronger interventions and assure a purer treatment (Sechrest \& Scott, 1989). The intervention protocol used aspects of the treatment manual developed by Lacks and her associates and included in her 1987 book. The manual focuses on the delivery of stimulus control instructions, the primary intervention in Lacks' seven study research program targeting the treatment of adult insomniacs including older adults (Lacks \& Powlishta, 1989). Lack's (1987) manual was used to develop a treatment manual that was used in the pilot study (Epstein, 1991). The manual was modified based on audiotape transcription evaluations of the pilot study.

The first treatment session began by "breaking the ice" through introductions, a short description of the treatment of insomnia, and brief recounts of their insomnia history by each of the participants. Each of the components of the intervention was described and written handouts of intervention instructions were distributed (Appendix C and Appendix H). Sleep restriction therapy was referred to as sleep efficiency treatment in the manual
and classes. Bar graphs of the baseline sleep variables for each subject were used as teaching tools. The intervention was explained and discussed in detail using discussion issues described in the manual. Homework was assigned in terms of following the intervention instructions, prescribing the subjects' sleep restriction therapy, and completing the measurement tools, including a review of how to call in responses to the DSD. Individual sleep restriction therapy instructions were calculated based on sleep behavior variables gathered from the DSDs following Spielman's (Rubenstein et al., 1990) algorithm (Appendix B). Calculations were made by the investigator prior to each class. Each person's therapy prescription was reviewed in class.

The first session lasted approximately three hours. The remaining class sessions (sessions two through four) lasted approximately 60 minutes. Sessions two through four focused on reviewing the DSDs, discussing progress to date, discussing problems encountered in adhering to the treatment requirements, troubleshooting problems using Lacks' format for problem solving, and devising strategies to enhance treatment compliance. Intervention instructions were reviewed in the sessions as necessary. Sleep restriction instructions were distributed and discussed. An important aspect of sessions three and four involved shaping the subjects' awareness of the change in their sleep-wake patterns. Many times subjects will demonstrate improvements in their sleep yet they do not seem to be aware of or perceive the changes. Often
this is because they are not feeling better, i.e., their daytime functioning may not have improved. The subjects also need to observe the changes through reviews of the DSDs and the bar graphs prepared each week based on the individual data, and discuss them, thereby making the process of change more salient.

Treatment weeks five and six were completed through the use of a telephone intervention. Based on the pilot study (Epstein, 1991), two telephone interventions replaced two classes. The two telephone interventions were, perhaps 15 to 20 minutes. At this point, treatment adherence problems should have been solved and strategies to enhance compliance were established. It was anticipated that the use of a telephone intervention in the last two weeks would decrease the complaints regarding travel to the treatment sessions voiced by older individuals during the screening and treatment phases of the pilot study.

During the telephone intervention, the treatment proceeded in the following manner. Sleep restriction therapy prescriptions during the final two weeks of treatment were calculated based on the responses to the ISQ. The prescriptions were given to the subject per telephone. Time was spent modifying the prescription as necessary. The therapist also briefly reviewed any difficulties the subject may have experienced in following the therapeutic intervention. It was anticipated that by week five, the main issue would be the
prescription and modification of sleep restriction therapy, however, the shaping of awareness of changes in sleep behavior continued.

## Statistical Analysis

## Sample Size and Power Analysis

Calculation of an adequate sample size was conducted in the following manner. A summary of effect sizes for the behavioral treatment of insomnia was not found in the literature. Effect sizes were calculated based on available tables of means and standard deviations from the literature on the stimulus control and/or sleep restriction treatment of adults with insomnia. The calculations revealed effect sizes ranging from .51 to .64 . In order to detect significant changes in dependent variables between experimental and control groups, the effect size for the proposed study will be set at .50 . Cohen (1988) suggests a minimum statistical power of .80 in order to compare baseline versus posttreatment differences in the dependent variables for intervention and control groups. To compare two groups using analysis of variance and covariance with a .05 level of significance, an effect size of .50 , and a desired power level of $.80,17$ subjects are needed for each group (Cohen). Therefore, 34 subjects, or more if possible, were sought for entry into the study.

## Data Analysis

Data were scored, entered in the computer, and rechecked for accurate entry. Preliminary confirmatory data analysis plans included the evaluation of
demographic data and sleep behaviors for significant pretreatment group (immediate treatment versus delayed treatment) differences using chi-square tests and one way analysis of variance (ANOVA).

Posttreatment analysis of sleep behaviors included several repeated measures analysis of variance (ANOVA). Analysis of comparative effectiveness was based on mean values of the outcome variables for each subject for the time periods specified. Repeated measures analysis of variance (ANOVA) with a $2 \times 2$ (group by condition) design was used to identify significant differences between groups. The immediate treatment and delayed treatment groups constitute the between groups measure while the repeated measures within subject factor (time) is the condition (see figure 3.3). A within group repeated measures ANOVA was employed to examine change over three time periods (baseline, posttreatment, and follow-up) on sleep behaviors for the delayed treatment group (see figure 3.4). A $2 \times 3$ (group $X$ condition) repeated measures ANOVA was used to determine maintenance of treatment effect from posttreatment to follow-up (see figure 3.5).

The variables measuring sleep-wake impairment, mood, dysfunctional cognitions, and presleep anxiety were examined using a $2 \times 2$ (group by time) repeated measures ANOVA. This repeated measures ANOVA differed from the tests described above due to the difference in the time points involved. The sleep-wake impairment and mood instruments were administered at baseline
and following treatment (posttreatment 1) for the immediate treatment group. For the delayed treatment group, the scales were given at baseline and following delayed treatment (posttreatment 2). Figure 3.6 presents the diagram of the time points and the cells used in the repeated measures ANOVA.

Post-hoc analyses were performed to identify significant differences between groups and within conditions for repeated measures ANOVA tests. Tukey between group contrasts and pairwise contrasts were used. Only comparisons deemed central to the purpose of the study were performed in order to control Type I error rates. Significance levels were adjusted for the evaluation of comparisons according to the Bonferroni test. In order to correct for Type I error rates associated with repeated measures ANOVA when violations of homogeneity of variance occurred, $F$ values were evaluated using the Geiser-Greenhouse correction procedure (Geiser \& Greenhouse, 1958).

A consistent sieep-wake pattern was a goal of the research project (study aim 1). Since insomniacs are known to have high night to night variability in their sleep, change in variability was examined statistically. Spielman, Saskin, and Thorpy (1987) used standard deviations in t-tests to explore pretreatment to posttreatment decreases in variability. Standard deviations are probably not normally distributed so they may not be appropriate for use in a t-test. An F-test was used to compare the variances pretreatment and posttreatment. In addition, nonparametric tests, the sign test and Wilcoxon
signed ranks test, were performed on the standard deviations. A visual representation of the variability of the groups at various time points was constructed using box plots.

An individual regression analysis (IRA) was conducted in which the main sleep behavior outcome variable, wake after sleep onset (WASO) was regressed on time and the slope (the direction and rate of change for each individual) was estimated for each subject. A time variable was created for each subject representing 12 data collection points: two pretreatment weeks, six treatment weeks, two posttreatment weeks, and two weeks at a three month follow-up. A cubic transformation of the time variable was used to give the best representation of the pattern of nonlinear change in WASO.

An assessment of the internal consistency (Cronbach's alpha) of the instruments used in the study was conducted pretreatment and posttreatment. The Daily Sleep Diary was not evaluated for reliability as it contains various response formats and different types of questions.

Treatment and therapist evaluation variables were examined using t-tests to address treatment strength and integrity issues. A plan to determine treatment compliance included using the seven treatment compliance questions from the Daily Sleep Diary. Difficulties which arose in using these questions to analyze compliance are discussed in Chapter Four. A compliance question from the Patient Outcome Rating scale was used to conduct a $5 \times 2$
(compliance level X WASO at pretreatment and posttreatment) repeated measures ANOVA.

Figure 3.3. Time Points Used in Cells of Repeated Measures (Group X Time) ANOVA for Between and Within Group Comparison of Baseline to Posttreatment Intervention Effect


Figure 3.4. Time Points Used in Cells of Repeated Measures ANOVA for Within Group Comparison of Delayed Intervention Effect

|  | Baseline | Tx | Ptx 1 | Tx | Ptx 2 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| DTG | * |  | * | X | * |
| Tx = treatment |  |  |  |  |  |
| Ptx $1=$ first posttreatment period |  |  |  |  |  |
| Ptx $2=$ second posttreatment period |  |  |  |  |  |
| DTG = delayed treatment group |  |  |  |  |  |
| * $=$ time point used in ANOVA |  |  |  |  |  |
| $X=$ treatment administered |  |  |  |  |  |

Figure 3.5. Time Points Used in Cells of Repeated Measures ANOVA for Between and Within Group Comparison of Posttreatment to Follow-Up Effect

| Time | Baseline Tx | Ptx 1 | Tx | Ptx 2 | F/U |
| :---: | :---: | :---: | :---: | :---: | :---: |
| ITG | * X | * |  |  | * |
| DTG |  | * | X |  | * |
| Tx $=$ treatment |  |  |  |  |  |
| Ptx $1=$ first posttreatment period |  |  |  |  |  |
| Ptx $2=$ second posttreatment period |  |  |  |  |  |
| $\mathrm{F} / \mathrm{U}=$ three month follow-up |  |  |  |  |  |
| ITG = immediate treatment group |  |  |  |  |  |
| DTG = delayed treatment group |  |  |  |  |  |
| $X=\operatorname{tr}$ | ent administe |  |  |  |  |

Figure 3.6. Time Points Used in Cells of Repeated Measures ANOVA for Between and Within Group Comparison of Pretreatment to Posttreatment Effect for Sleep-Wake Impairment, Dysfunctional Cognitions, Presleep Anxiety, and Mood Variables
Time Baseline Tx Ptx 1 Tx Ptx 2

| ITG | $*$ | $x$ | $*$ |  |
| :--- | :--- | :--- | :--- | :--- |
| DTG | $*$ |  |  |  |

Tx = treatment
Ptx 1 = first posttreatment period
Ptx $2=$ second posttreatment period
ITG = immediate treatment group
DTG = delayed treatment group

* $=$ time point used in ANOVA
$X=$ treatment administered


## Missing Data Rules

For the Daily Sleep Diary, several rules were established to deal with missing data. An occasional night of missing data was replaced with the subject's variable mean for the week during which the data was missing. If the subject stated that he or she did not sleep at all during the night, specific rules were established for certain sleep behavior variables. A missing value for sleep onset latency was replaced with a value of 240 minutes of latency. The wake after sleep onset (WASO), time in bed (TIB), and nighttime awakening (NTA) value were replaced with, the subject's mean value for that variable for the week. Total sleep time (TST) received a value of zero.

Missing data rules were established for all instruments other than the Daily Sleep Diary. Rather than substituting a subject's mean scale or subscale score, the statistical programs were written so that the case would not be thrown out if it had $10 \%$ to $20 \%$ of the data missing, depending on the number of items in the scale.

## Clinical Significance Analysis

It is incumbent upon nurse researchers who conduct treatment intervention studies to address not only the statistical significance of their findings but also the clinical meaningfulness of the effects of treatment. The effect of a treatment is clinically significant when the subject's change is statistically reliable and the subject returns to normative levels of behavior on
the dependent variable after treatment (Jacobson, Follette, \& Revenstorf, 1984). In order to evaluate this change, an individual response to treatment must be examined. The research study analyzed and reported the proportion of subjects receiving treatment who improved to the point that they would be ineligible for participation in the study under the inclusion (sleep behavior) criteria.

The Patient Outcome Rating scale and the Therapy Evaluation Questionnaire include questions which target the clinical significance of the study results. These questions were analyzed separately (frequencies) and also in a repeated measures ANOVA with WASO at pretreatment and posttreatment. Finally, the amount of change (percent) in sleep behavior was examined.

## Hypotheses

Older adults are at risk for health related problems and injury as a result of pharmacological treatment of sleep maintenance insomnia. This study sought to contribute to the small but growing number of behavioral treatment outcome studies in the area of late life insomnia. The purpose of the study was to test the efficacy of a behavioral treatment package in reducing self-reported sleep maintenance insomnia complaints of older adults. The specific aims identified in Chapter One serve as an outline for the hypotheses that guided the research.

## Specific Aim 1:

Assist older adults with sleep maintenance insomnia to consolidate sleep and establish a consistent sleep-wake pattern.

Hypothesis 1: Older adults who receive behavioral treatment will experience an improvement in sleep behaviors as evidenced by:

1a. a significant decrease in wake after sleep onset.
1b. a significant decrease in wake after sleep onset variability.
1c. no change in nighttime awakenings.
1d. a significant increase in total sleep time.
1e. a significant increase in sleep efficiency.
1f. a significant decrease in time in bed.
1g. a significant decrease in sleep onset latency.
1h. no change in the amount of nap time.

## Specific Aim 2:

Strengthen the bed and bedroom as a cue for sleep by reducing sleep interfering activities.

This aim was reflected in improvement of performance on sleep behavior variables. Therefore, the hypotheses listed under Aim 1 are central to Aim 2 as well.

## Specific Aim 3:

Decrease the negative impact of insomnia on the lives of elders with insomnia.

Hypothesis 3: Subjects who receive behavioral treatment will report a significant decrease in sleep-wake impairment.

## Specific Aim 4:

Therapeutic gains will be maintained from posttreatment to the 3 month follow-up assessment phase.

Hypothesis 4: Subjects who receive behavioral treatment will have no significant difference in sleep behaviors from posttreatment to the 3 month follow-up phase.

## Summary

Community dwelling adults aged 60 years and older were sought for participation in a behavioral treatment program for sleep maintenance insomnia. A variety of sleep behavior, physical, and mental health criteria were used to select subjects. After a screening interview, potential subjects entered the 14 day baseline phase of the study. Based on the sleep behavior emitted during the 14 days, potential subjects were admitted to or excluded from the study. Several instruments measuring sleep behaviors, sleep-wake impairment, presleep anxiety, mood, dysfunctional cognitions regarding sleep, and treatment evaluation were used during all phases of the study.

Upon admission to the study, subjects were randomly assigned to an immediate treatment group or delayed treatment group. The treatment phase consisted of four weeks of classroom intervention and two weeks of telephone intervention. When the immediate treatment group completed treatment and posttreatment assessments, the delayed treatment group began treatment. Several data analysis procedures were planned and utilized to evaluate the data. A strategy to determine the clinical significance of the study was formulated and conducted.

## CHAPTER FOUR

## RESULTS

The purpose of the study was to evaluate the effectiveness of a behavioral intervention for sleep maintenance insomnia in older adults. This chapter presents the results of the statistical analysis conducted to measure the intervention's efficacy.

## Screening Process

Advertisements and flyers resulted in 264 telephone inquiries. Each of the 264 calls was responded to by the investigator. The phone screening process eliminated 205 of the callers. Many reasons existed for ineligibility to participate further in the screening. The most common reasons were insomnia not severe enough to meet study criteria, time conflicts, suspicion of sleep apnea, and hypnotic use. One of the callers who used a hypnotic wanted to pursue withdrawal under the supervision of his physician. This was allowed since he only took one-quarter of a Halcion 0.125 mg tablet every night for one and one-half years. Another individual used a Proventyl inhaler prn at bedtime. He felt it did not help him and arranged with his physician to discontinue it. Both individuals went on to complete the screening process.

Several people did not show up for their appointments and 60 individuals were finally interviewed. Upon further exploration during the office interview, five individuals were dropped from the screening process due to apparent sleep
disorders or insomnia that was not severe enough to meet the criteria. Fifty-five people were eligible to proceed with the completion of two weeks of DSDs. However, two people took the diaries but decided not to call them in and one felt he would not be able to follow the stimulus control instructions. Fifty-two older adults actually proceeded with the diary completion.

Six people dropped out during the two week DSD completion citing time conflicts or dislike of the DSD process as the reason. Forty-six older adults completed the two week DSDs but four decided not to enter treatment primarily due to time conflicts. Thirteen persons who completed DSDs did not meet the insomnia criteria for eligibility. Referrals to the Insomnia Clinic were offered to ineligible individuals. Twenty-seven people entered treatment.

## Description of Sample

Three of the 27 subjects who began treatment dropped out. Two subjects were dropped from analysis because they entered treatment late, did not have random assignment, and did not have a pretreatment measurement followed by a waiting period to correspond to the treatment group. Therefore, the sample described in this chapter was comprised of twenty-two subjects. Table 4.1 displays the demographic and clinical characteristics of the subjects. The subjects ranged in age from 60 to 92 (mean 71.18 years, SD 8.96) completed treatment. Twelve females and ten males participated. Sixteen subjects were married, 3 were divorced and 3 were widowed. The entire
sample was Caucasian. The mean number of years of education for the sample was 13.91 (SD 2.69). Fifteen subjects were retired, 1 was employed partime and 6 classified themselves as never employed.

The subjects had been suffering from insomnia for 18 months to 25 years (mean 9.23, SD 7.59). The primary insomnia criterion for entry into the study was difficulty maintaining sleep. All subjects were also asked if they also experienced sleep onset latency (SOL) insomnia. Seven subjects stated SOL insomnia was a problem for them while 15 denied any SOL difficulty.

Sixty-eight percent of the subjects had used prescribed sleeping medication in the past and $23 \%$ had used over the counter sleeping aids. Seventy-seven percent currently suffered from one or more stable physical illnesses. Cardiovascular disease and arthritis were the most common illnesses. The subjects used an average of $1.7(S D=1.3)$ prescribed medications. The most commonly prescribed medications were cardiovascular drugs ( $n=6$ ), hormonal supplements $(n=5)$, and thyroid supplements $(n=4)$.

Preliminary analyses (ANOVAs and chi-square tests) of demographic variables revealed no significant pretreatment group differences. There were also no significant differences between groups in terms of presence of SOL, sleep maintenance insomnia duration, prior use of prescribed and over the counter sleep medications, and number of current physical illnesses and medications.
Table 4.1 Subject Demographic and Clinical Characteristics ..... 137

| Variable | Frequency | $M$ | $S D$ |
| :--- | :--- | :--- | :--- |
| Age (Years) |  | 71.18 | 8.96 |

Gender
Female ..... 12
Male ..... 10
Marital Status
Married ..... 16
Widowed ..... 3
Divorced ..... 3
Ethnic Origin
Caucasian ..... 22
Education (Years) ..... 13.9 ..... 2.69
Employment Status
Parttime ..... 1
Retired ..... 15
None ..... 6
Duration of Insomnia Problem (Years) ..... 9.23 ..... 7.59
Sleep Onset Latency
Yes ..... 7
No ..... 15
Medical Conditions (Number of Diagnoses) ..... 1.59 ..... 1.10
Number of Medications ..... 1.68 ..... 1.29
Past Use of Sleeping Medication
Yes ..... 15
No ..... 7
Past Use of Over the Counter Sleeping Medication
Yes ..... 5
No ..... 17

## Sleep Behaviors

Immediate treatment. Preliminary analyses (ANOVAs) conducted to determine differences between the immediate treatment and delayed treatment groups on the sleep measures at baseline were nonsignificant (ps>.1) except for differences between groups for time in bed which was significant ( $p=.05$ ).

Group means and standard deviations across pretreatment and posttreatment phases are presented in Table 4.2. In Table 4.2, "posttreatment (1)" is the immediate treatment group's posttreatment assessment phase. Baseline and posttreatment sleep data were examined using $2 \times 2$ (Group $X$ Time) repeated measures ANOVAs. A diagram of the time points used in the analyses is presented in Figure 4.1. Significant Group $X$ Time interactions were found for wake after sleep onset (WASO), $F(1,20)=15.01, p<.01$; sleep efficiency (SE), $F(1,20)=23.07, p<.01$; and time in bed (TIB), $F(1,20)=4.73$, $p<.05$. The change on total sleep time (TST) ( $p=.07$ ) was in the expected direction for a Group x Time interaction but did not reach statistical significance. Significant time effects were obtained for WASO, $F(1,20)=17.14, p<.01 ; S E$, $F(1,20)=23.15, p<.01 ;$ TIB, $F(1,20)=12.90, p<.01$; and sleep onset latency (SOL), $F(1,20)=5.50, p<.05$. Significant group effects occurred for $S E$, $F(1,20)=9.07, p<.01$, and total sleep time $(T S T), F(1,20)=9.88, p<.01$.

Tukey post hoc comparisons were utilized to examine between- and within-groups differences. The immediate treatment group had a significant
reduction in WASO, SE, and TIB ( $\mathrm{ps} \leq .01$ ) from pretreatment to posttreatment.
Between group comparisons showed that the immediate treatment group subjects were significantly more improved on measures of WASO, SE and TST (ps $\leq .01$ ). Line and bar graph representations of the effect of treatment on WASO, TST, TIB, and SE are displayed in Figures 4.2 to 4.6.

Table 4.2. Sleep Behaviors: Pretreatment to Posttreatment Intervention Effect

| Variable | $\underline{\square}$ | Pretreatment |  | Posttreatment (1) |  | Posttreatment (2) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Mean | Standard Deviation | Mean | Standard Deviation | Mean | Standard Deviation |
| Wake After Sleep Onset (minutes) |  |  |  |  |  |  |  |
| ITG | 13 | 104.48 | 42.02 | $41.90^{\text {ab }}$ | 21.73 | ------ | ----- |
| DTG | 9 | 84.50 | 28.68 | 82.42 | 38.42 | $29.00^{\text {c }}$ | 19.47 |
| Total Sleep Time (minutes) |  |  |  |  |  |  |  |
| ITG | 13 | 337.25 | 81.84 | $371.87^{\text {b }}$ | 52.02 | ------ | ------ |
| DTG | 9 | 283.40 | 63.13 | 273.14 | 35.58 | $357.02^{\text {c }}$ | 55.81 |
| Time in Bed (minutes) |  |  |  |  |  |  |  |
| ITG | 13 | 516.04 | 48.76 | $454.64^{\text {a }}$ | 49.22 | -- | -- |
| DTG | 9 | 467.34 | 64.19 | 452.26 | 29.87 | 443.58 | 36.84 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}$ Significant change from Pretreatment to Posttreatment 1 ( $p \leq .01$ )
${ }^{\mathrm{b}}$ Significant difference between groups ( $\mathrm{p} \leq .01$ )
${ }^{\text {c }}$ Significant change from posttreatment (1) to posttreatment (2) for the DTG Group ( $p<.01$ )

Table 4.2. Sleep Behaviors: Pretreatment to Posttreatment Intervention Effect (continued)

| Variable |  | Pretreatment |  | Posttreatment (1) |  | Posttreatment (2) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard Deviation | Mean | Standard Deviation | Mean | Standard Deviation |
| Sleep Efficiency (Percentages) |  |  |  |  |  |  |  |
| ITG | 13 | 65.17 | 12.46 | $82.00^{\text {ab }}$ | 8.00 | ----- | ----- |
| DTG | 9 | 61.24 | 10.65 | 61.25 | 9.26 | $81.12^{\text {c }}$ | 9.10 |

## Sleep Onset Latency (minutes)

| ITG | 13 | 19.78 | 16.22 | 13.56 | 11.60 | ---- | $\cdots---$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | 9 | 28.94 | 20.13 | 25.47 | 16.49 | 17.88 | 16.42 |

Nighttime Awakenings (number)

| ITG | 13 | 2.07 | .79 | 1.57 | .68 | $-\ldots---$ | ----- |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | 9 | 2.00 | .68 | 1.91 | .40 | 1.52 | .66 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}$ Significant change from Pretreatment to Posttreatment 1 ( $p \leq .01$ )
${ }^{\mathrm{b}}$ Significant difference between groups ( $\mathrm{p} \leq .01$ )
${ }^{c}$ Significant change from posttreatment (1) to posttreatment (2) for the DTG Group ( $\mathrm{p}<.01$ )

Table 4.2. Sleep Behaviors: Pretreatment to Posttreatment Intervention Effect (continued)

| Variable | n | Pretreatment |  | Posttreatment (1) |  | Posttreatment (2) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Mean | Standard Deviation | Mean | Standard Deviation | Mean | Standard Deviation |
| Naps (minutes) |  |  |  |  |  |  |  |
| ITG | 13 | 12.38 | 16.00 | 15.17 | 12.68 | ----- | ----- |
| DTG | 9 | 14.04 | 8.04 | 21.37 | 16.59 | 11.89 | 13.61 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}$ Significant change from Pretreatment to Posttreatment 1 ( $p \leq .01$ )
${ }^{\mathrm{b}}$ Significant difference between groups ( $\mathrm{p} \leq .01$ )
${ }^{\text {c }}$ Significant change from posttreatment (1) to posttreatment (2) for the DTG Group ( $p<.01$ )

Figure 4.1. Time Points Used in Cells of Repeated Measures (Group X Time) ANOVA for Between and Within Group Comparison of Baseline to Posttreatment Intervention Effect

|  | Baseline | Treatment | Posttreatment |
| :---: | :---: | :---: | :---: |
| ITG | * | $x$ | * |
| DTG | * |  | * |
| ITG = Immediate Treatment Group <br> DTG = Delayed Treatment Group <br> * $=$ time point used in ANOVA <br> $X=$ treatment |  |  |  |

Delayed treatment. Nine subjects received treatment after the waiting period. Group means and standard deviations are presented in Table 4.2. In Table 4.2, "posttreatment (2)" refers to the delayed treatment group's posttreatment assessment phase. Within-group repeated measures ANOVAs with Tukey pairwise contrasts were conducted for the delayed treatment group to compare data obtained at baseline, after the waiting period (posttreatment 1) and after delayed treatment (posttreatment 2) (see Figure 4.8). There were significant main effects for time for WASO, $F(2,16)=16.58, p<.01$; TST, $F(2,16)=8.42, p<.01$; and $S E, F(2,16)=24.23, p<.01$. The contrasts revealed
no significant changes on any sleep variable for the delayed treatment subjects during their waiting period (baseline to posttreatment 1). There was significant (ps<.01) improvement from posttreatment 1 to posttreatment 2 on the WASO, TST, and SE variables. Line and bar graphs demonstrating changes in WASO, SE, and TST for the delayed treatment group are displayed in Figures 4.2 to 4.5 and Figure 4.7.

Figure 4.2 Changes Over Course of Study For Immediate and Delayed Treatment Groups

Wake After Sleep Onset


Total Sleep Time


Figure 4.2 Changes Over Course of Study For Immediate and Delayed Treatment Groups (Continued)

Time in Bed


Sleep Efficiency



Figure 4.4 Effect of Treatment on Sleep Efficiency


Immediate Treatment Group, n=13


Figure 4.5 Effect of Treatment on Total Sleep Time


Immediate Treatment Group, $\mathrm{n}=13$


Figure 4.6 Effect of Treatment on Time in Bed



Figure 4.7. Time Points Used in Cells of Repeated Measures ANOVA for Within Group Comparison of Delayed Intervention Effect


Three month follow-up. Eleven immediate treatment group subjects and 6 delayed treatment group subjects completed the 3 month follow-up sleep diaries. Group means and standard deviations for follow-up are displayed in Table 4.3. Based on the Tukey between and within group analyses, significant pre to posttreatment effects were examined for maintenance of therapeutic improvement. Within-group repeated measures ANOVAs were conducted to analyze changes in sleep variables from posttreatment to the 3 month follow-up period. Figure 4.9 displays the time points used in the analyses. Tukey contrasts demonstrated no change from posttreatment to follow-up for WASO, SE, TST and TIB, suggesting maintenance of treatment gain during the 3
months after intervention. A significant group effect occurred for TIB, $F(1,15)=9.22, p<.01$. Contrasts indicated that the immediate treatment subjects spent significantly more TIB at pretreatment and at the three month follow-up than the delayed treatment subjects. A significant interaction effect for SOL, $F(2,30)=3.35, p<.05$, was not supported by Tukey post hoc contrasts. There was a significant decrease ( $p<.01$ ) in SOL from pretreatment to the three month follow-up for the delayed treatment subjects.

Wake after sleep onset variability. Insomniacs are known to have high night-to-night variability in their sleep (Spielman, Saskin, and Thorpy, 1987). Ideally, one would want to see a decrease in WASO scores after intervention and a decrease in variability implying that the intervention worked in a similar way for all individuals. This would also indicate that subjects had attained a consistent sleep-wake pattern. If the WASO scores decreased after treatment and the variability remained high or increased, the intervention might have been effective but not equally so for everyone.

Variability in the amount of time spent awake after sleep onset was examined for each group comparing pretreatment and posttreatment periods. The difference in variability from pretreatment to posttreatment was determined using three statistical tests. The immediate treatment group evidenced a significant decrease in pretreatment to posttreatment variability on the three tests: $F$ test $(F(12,12)=37.39, p \leq .05)$, sign test $(p<.01)$, and Wilcoxon signed-
ranks test $(z=-2.55, p<.01)$. The delayed treatment group's WASO variability did not change significantly during their waiting period but the group did experience a significant reduction from posttreatment 1 to posttreatment 2 on the $F$ test $(F(8,8)=3.59, p \leq .05)$ and Wilcoxon matched-pairs signed-ranks test $(z=-2.07, p<.05)$.

Table 4.3. Sleep Behaviors: Maintenance of Improvement from Posttreatment to 3 Month Follow-Up

| Variable |  | Posttreatment |  | Follow-Up (3 months) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard <br> Deviation | Mean | Standard <br> Deviation |
| Wake After Sleep Onset (minutes) |  |  |  |  |  |
| ITG | 11 | 37.16 | 14.43 | 42.16 | 26.65 |
| DTG | 6 | 18.52 | 12.00 | 26.92 | 21.61 |
| Sleep Efficiency (percentage) |  |  |  |  |  |
| ITG | 11 | 82.73 | 7.89 | 80.95 | 12.22 |
| DTG | 6 | 85.72 | 5.62 | 86.50 | 7.35 |
| Total Sleep time (minutes) |  |  |  |  |  |
| ITG | 11 | 369.55 | 56.51 | 381.60 | 66.63 |
| DTG | 6 | 372.98 | 59.00 | 341.85 | 66.73 |
| $\begin{aligned} & \text { ITG = Immediate Treatment Group } \\ & \text { DTG = Delayed Treatment Group } \end{aligned}$ |  |  |  |  |  |

Table 4.3. Sleep Behaviors: Maintenance of Improvement from Postreatment to 3 Month Follow-Up (continued)

| Variable |  | Posttreatment |  | Follow-Up (3 months) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard Deviation | Mean | Standard Deviation |
| Time in Bed (minutes) |  |  |  |  |  |
| ITG | 11 | 447.37 | 43.96 | 472.31 | 43.69 |
| DTG | 6 | 438.39 | 44.61 | $392.20^{\text {a }}$ | 51.33 |

Sleep Onset Latency (minutes)

| ITG | 11 | 11.51 | 11.47 | 13.89 | 11.78 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | 6 | 19.55 | 20.33 | 9.95 | 4.99 |

Nighttime Awakenings (number)

| ITG | 11 | 1.49 | .70 | 1.34 | .32 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | 6 | 1.54 | .82 | 1.57 | .38 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
$\mathrm{a}=$ Significant Between Group Difference ( $\mathrm{p}<.01$ )

Table 4.3. Sleep Behaviors: Maintenance of Improvement from Posttreatment to 3 Month Follow-Up (continued)

| Variable | Posttreatment |  | Follow-Up (3 months) |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $n$ | Mean | Standard <br> Deviation | Mean | Standard <br> Deviation |
| Naps (minutes) | 11 | 16.92 | 12.84 | 12.50 | 15.02 |
| ITG | 6 | 10.75 | 14.69 | 14.84 | 13.57 |
| DTG |  |  |  |  |  |

ITG = Immediate Treatment Group
DTG $=$ Delayed Treatment Group

Figure 4.8. Time Points Used in Cells of Repeated Measures ANOVA for Between and Within Group Comparison of Posttreatment to Follow-Up Effect
Time Baseline Tx Ptx 1 Tx Ptx 2 F/U

| ITG |  |  |
| :--- | :--- | :--- | :--- | :--- |
| DTG | * | * |

Tx $=$ treatment
Ptx $1=$ first posttreatment period
Ptx 2 = second posttreatment period
F/U = three month follow-up
ITG = Immediate Treatment Group
DTG = Delayed Treatment Group

* $=$ time point used in ANOVA
$X=$ intervention given

The variability or spread of the WASO variable was also examined using box plots (see Figure 4.9). The box plots of the immediate treatment and delayed treatment groups are displayed at each time point. Only one box plot is presented at the second posttreatment period since this represents the time point immediately after the delayed treatment group's intervention. The immediate treatment group's median is slightly higher at pretreatment and there is a much larger spread of WASO scores than in the delayed treatment group. At posttreatment 1, the immediate treatment group's median and spread have
decreased after intervention. The variability of the delayed treatment group increased and the median stayed about the same. The delayed treatment group's boxplot now more closely resembled the immediate treatment group's pretreatment box plot. After treatment, the spread and median decreased. The delayed treatment group's variability looked more similar to that of the immediate treatment group after receiving the intervention. Finally, at follow-up, both groups appeared to maintain decreased WASO and low variability

Individual Regression Analysis (IRA) on Wake After Sleep
Onset (WASO). An IRA was conducted in which WASO was regressed on time and the slope (the direction and rate of change for each individual) was estimated for each subject. A time variable was created for each subject representing 12 data collection points: two pretreatment weeks, six treatment weeks, two posttreatment weeks, and two weeks at a three month follow-up. A cubic transformation of the time variable was used to give the best representation of the pattern of change in WASO.

The b-values (siopes) and their significance are presented in Table 4.4. Negative slopes or b-values were expected in this analysis since a decrease in WASO was anticipated as a result of the intervention. Eighteen of the 22 subjects demonstrated a negative slope or intraindividual pattern of change indicative of a decrease in WASO over the 12-week period.

Table 4.4. Individual Regression Analysis: b Weights and Significance

| SID | GROUP | b WEIGHT |
| :---: | :--- | :--- |
|  |  |  |
| 8 | Immediate Treatment Group | -0.45 |
| 11 | Delayed Treatment Group | -0.17 |
| 13 | Immediate Treatment Group | -0.30 |
| 15 | Immediate Treatment Group | -0.13 |
| 17 | Immediate Treatment Group | -0.91 |
| 22 | Immediate Treatment Group | -0.65 |
| 23 | Immediate Treatment Group | 0.22 |
| 24 | Immediate Treatment Group | -0.60 |
| 27 | Immediate Treatment Group | -0.38 |
| 28 | Immediate Treatment Group | -0.08 |
| 34 | Delayed Treatment Group | -0.06 |
| 40 | Immediate Treatment Group | -0.30 |

Table 4.4. Individual Regression Analysis: $b$ Weights and Significance (continued)

| SID | GROUP | b WEIGHT |
| :--- | :--- | :--- |
|  |  |  |
|  |  |  |
| 42 | Delayed Treatment Group | 0.05 |
| 46 | Delayed Treatment Group | -0.09 |
| 47 | Delayed Treatment Group | -0.73 |
| 48 | Delayed Treatment Group | -0.32 |
| 52 | Immediate Treatment Group | -0.15 |
| 54 | Delayed Treatment Group | 0.31 |
| 55 | Immediate Treatment Group | 0.37 |
| 58 | Immediate Treatment Group | -0.37 |
| 59 | Delayed Treatment Group | -0.07 |
| 62 | Delayed Treatment Group | -0.15 |

An ANOVA using the intercept as the dependent variable to test for any difference between the groups at pretreatment was nonsignificant. To determine whether the pattern of change during treatment was similar for the immediate treatment group and for the delayed treatment group, an ANOVA using the slope as the dependent variable was conducted. A nonsignificant finding indicated that both groups changed in the same direction.

Sleep-Wake Impairment, Dysfunctional Cognitions, Presleep Anxiety, and Mood

## Measures

The sleep-wake impairment, dysfunctional cognitions, presleep anxiety, and mood instruments were administered at the pretreatment and first posttreatment periods for the immediate treatment group. For the delayed treatment group, the scales were given at pretreatment and the second posttreatment period. Therefore in this section, posttreatment is referred to as "posttreatment 1 " for the immediate treatment group and "posttreatment 2" for the delayed treatment group.

Baseline and posttreatment data for the three Daily Sleep Diary sleepwake impairment items were examined using the same repeated measures ANOVA statistical tests (see Figures 4.1, 4.8, and 4.9) that were utilized to analyze the sleep behavior variables. A $2 \times 2$ (Group $\times$ Time) repeated measures ANOVA statistical test (see Figure 4.11) was used to analyze all other sleep-wake impairment data, dysfunctional cognitions, presleep anxiety, and

Figure 4.9.
Comparison of Variability of Wake After Sleep Onset Across Time

mood data. Within the measurement design used to analyze sleep-wake impairment, dysfunctional cognitions, presleep anxiety, and mood, if the treatment was effective, one would expect only a significant main effect for time.

The reliability (Cronbach's alpha) of the instruments was determined pretreatment and posttreatment. The total sample was used to estimate the reliabilities.

Figure 4.10. Time Points Used in Cells of Repeated Measures ANOVA for Between and Within Group Comparison of Pretreatment to Posttreatment Effect for Sleep-Wake Impairment, Dysfunctional Cognitions, Presleep Anxiety, and Mood Variables
Time Baseline Tx Ptx $1 \quad$ Tx Ptx 2
ITG * X *

DTG
*
$X$
*

Tx = treatment
Ptx $1=$ first posttreatment period
Ptx 2 = second posttreatment period
ITG = Immediate Treatment Group
DTG = Delayed Treatment Group

* $=$ time point used in ANOVA
$X=$ intervention given

Sleep-wake impairment: Daily sleep diary (DSD) items. Group means and standard deviations used in the between and within group analyses are shown in Table 4.5. A $2 \times 2$ (Group $\times$ Time) repeated measures ANOVA demonstrated a significant interaction effect $(F(1,20)=6.64, p<.01)$ ) for how the subject felt in the morning, a significant time effect $(F(1,20)=4.09, p \leq .05)$ for the quality of sleep, and a time effect in the expected direction which did not reach significance for rating sleep compared to usual ( $p=.06$ ). Tukey post hoc contrasts indicated a significant between group difference ( $p<.01$ ) at baseline for how the subject felt in the morning. There were no differences at posttreatment. The contrasts did not demonstrate differences between pretreatment and posttreatment phases for quality of sleep.

A within-group repeated measures ANOVA was conducted for the delayed treatment group. Significant time effects were found for how the subject felt in the morning $(F(2,16)=6.44, p<.01)$ and quality of sleep $(F(2,16)=4.46, p<.05)$. Tukey pairwise contrasts revealed significant differences between posttreatment 1 and posttreatment 2 for how the subject felt in the morning ( $p<.01$ ). The same contrast for quality of sleep was in the expected direction but did not reach significance ( $p<.04$ ).

Group means and standard deviations used to examine the three month follow-up are presented in Table 4.6. Based on the Tukey within group contrasts, significant pre to posttreatment effects were examined for duration of

Table 4.5. Daily Sleep Diary (DSD) Sleep-Wake Impairment Items Pretreatment to Posttreatment: Means and Standards Deviations

| Variable | Pretreatment |  | Posttreatment (1) | Posttreatment (2) |
| :--- | :---: | :---: | ---: | :--- |
|  | $\underline{n}$ | Mean | Standard <br> Deviation | Mean Standard |
|  |  |  | MeanStandard <br> Deviation | Deviation |

## How I Felt When I Got Up This Morning

| ITG | 13 | $2.23^{\mathrm{a}}$ | .48 | 2.56 | .68 | $\ldots-\ldots$ | $\ldots-\ldots$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | 9 | 2.56 | .34 | 2.49 | .36 | $3.00^{\mathrm{b}}$ | .37 |
| Quality of Sleep Last Night |  |  |  |  |  |  |  |


| ITG | 13 | 2.40 | .53 | 2.77 | .48 | ----- | ------ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| DTG | 9 | 2.58 | .35 | 2.67 | .31 | 3.05 | .39 |

## Sleep Last Night Compared to Usual

| ITG | 13 | 1.88 | . 24 | 2.13 | . 37 | ----- | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| DTG | 9 | 1.94 | . 24 | 2.03 | . 30 | 2.19 | . 30 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}=$ Significant Difference Between Groups ( $p<.01$ )
${ }^{\mathrm{b}}=$ Significant Change from Posttreatment (1) to Posttreatment (2)

Table 4.6. Daily Sleep Diary (DSD) Sleep-Wake Impairment Items Posttreatment to Follow-Up: Means and Standards Deviations

| Variable |  | Posttreatment (1) (Immediate Treatment Group) Posttreatment (2) (Delayed Treatment Group) |  | Follow-Up (3 Months) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\underline{\square}$ | Mean | Standard Deviation | Mean | Standard Deviation |
| How I Felt When I Got Up This Morning |  |  |  |  |  |
| ITG | 11 | 2.69 | . 65 | 2.79 | . 47 |
| DTG | 6 | 3.12 | . 28 | 3.00 | . 14 |
| Quality of Sleep Last Night |  |  |  |  |  |
| ITG | 11 | 2.86 | . 47 | 3.00 | . 42 |
| DTG | 6 | 3.17 | . 30 | 3.07 | . 28 |
| Sleep Last Night Compared to Usual |  |  |  |  |  |
| ITG | 11 | 2.21 | . 33 | 2.11 | . 31 |
| DTG | 6 | 2.29 | . 29 | 2.27 | . 24 |
| ITG = Immediate Treatment Group <br> DTG = Delayed Treatment Group |  |  |  |  |  |

treatment effect. A within group repeated measures ANOVA was conducted to explore changes from posttreatment to the 3-month follow-up for the delayed treatment group on how the subjects felt in the morning. Tukey contrasts revealed no change indicating maintenance of improvement in how the subjects felt in the morning.

Sleep-wake impairment: Patient rating (PR) and patient outcome rating scales (POR). The PR and POR scales share seven items that represent sleepwake impairment. The POR scale has an additional seven Likert type outcome items and five open-ended questions. A reliability estimate (Cronbach's alpha) was determined for the scales (see Table 4.7) using the sleep-wake impairment items. The standardized alphas during the pretreatment period were low. At the end of the last posttreatment week, the alpha level had risen considerably.

Group means and standard deviations for the total seven sleep impairment items at pre and posttreatment are presented in Table 4.8. A $2 \times 2$ (Group X Time) repeated measures ANOVA was conducted using the PR at pretreatment and the POR at posttreatment. A significant main effect for time was obtained, $F(1,19)=27.35, p<.01$.

A repeated measures ANOVA (Group $X$ Time) of each sleep impairment item was conducted. Group means and standard deviations for each item are displayed in Table 4.9. A significant time effect ( $p<.01$ ) was found for the immediate treatment group on difficulty falling asleep. The delayed treatment
group did not experience any significant decrease in difficulty falling asleep after treatment. Significant main effects for time were obtained for difficulty staying asleep, $F(1,16)=5.87, p<.05$; problem waking up too early, $F(1,15)=4.44$, $p=.05$; satisfaction with sleep pattern, $F(1,17)=19.71, p<.01$; interference of sleep problem, $F(1,16)=15.77, p<.01$; noticeability of problem, $F(1,17)=6.32$, $p<.05$; and worry/distress, $F(1,17)=27.56, p<.01$. Descriptive statistics for the POR scale's remaining seven items are presented in Table 4.10.

The responses to the five open-ended questions were examined in the clinical significance section of Chapter Five.

Table 4.7. Patient Rating (PR) Scale (Pretreatment) and Patient Outcome Rating (POR) Scale (Posttreatment): Means, Standard Deviations and Reliabilities (Coefficient Alpha) Pretreatment and Postreatment ( $\mathrm{n}=17$ )

|  | Mean | SD | $\alpha$ |
| :--- | :---: | :---: | :---: |
| Patient Rating |  |  |  |
| Pretreatment Week 1 | 22.90 | 4.25 | .67 |
| Pretreatment Week 2 | 22.95 | 3.58 | .63 |
| Patient Outcome Rating |  |  |  |
| Posttreatment Week 2 | 16.67 | 5.42 | .84 |

Table 4.8. Patient Rating Scale (PR) (Pretreatment) and Patient Outcome Rating Scale (POR) (Posttreatment) Mean Total Sleep-Wake Impairment: Means and Standard Deviations

| Variable | Pretreatment |  |  | Posttreatment (1) (Immediate Treatment Group) Posttreatment (2) (Delayed Treatment Group) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard Deviation | Mean | Standard Deviation |
| ITG | 13 | 23.69 | 3.73 | 15.31 | $5.38{ }^{\text {a }}$ |
| DTG | 8 | 21.63 | 4.34 | 17.13 | $5.44^{\text {a }}$ |

ITG = Immeidate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}=$ Significant Time Effect pretreatment to posttreatment (1) and (2)

| Table 4.9. | Patient Rating Scale (PR) and Patient Outcome Rating Scale (POR) Individual Sleep-Wake Impairment Items: Means and Standard Deviations |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Variable | Pretreatment |  |  | Posttreatment (1) (Immediate Treatment Group) Postreatment (2) (Delayed Treatment Group) |  |
|  |  |  |  |  |  |
|  | $\underline{\square}$ | Mean | Standard | Mean | Standard |
|  |  |  | Deviation |  | Deviation |
| Difficulty Falling Asleep |  |  |  |  |  |
| ITG | 12 | 2.17 | . 94 | $1.50{ }^{\text {a }}$ | . 80 |
| DTG | 7 | 1.71 | . 76 | 1.86 | . 90 |
| Difficulty Staying Asleep |  |  |  |  |  |
| ITG | 12 | 3.58 | . 52 | $2.58{ }^{\text {b }}$ | 1.00 |
| DTG | 6 | 3.67 | . 52 | $3.50{ }^{\text {b }}$ | 1.18 |
| Problem Waking Up Too Early |  |  |  |  |  |
| ITG | 11 | 3.09 | . 83 | $2.18{ }^{\text {b }}$ | . 98 |
| DTG | 6 | 3.50 | . 55 | $3.17^{\text {b }}$ | 1.84 |
| Satisfaction/Dissatisfaction with Current Sleep Pattern |  |  |  |  |  |
| ITG | 12 | 4.33 | 1.23 | $2.50{ }^{\text {a }}$ | . 91 |
| DTG | 7 | 4.14 | . 69 | $2.86{ }^{\text {a }}$ | 1.22 |
| ITG = Immediate Treatment Group |  |  |  |  |  |
| DTG = Delayed Treatment Group |  |  |  |  |  |
| ${ }^{\text {a }}=$ Significant Time Effect pretreatment to posttreatment (1) and (2) (p<.01) |  |  |  |  |  |
| ${ }^{\mathrm{b}}=$ Significant Time Effect pretreatment to posttreatment (1) and (2) $(\mathrm{p} \leq .05)$ |  |  |  |  |  |

Table 4.9. Patient Rating Scale (PR) and Patient Outcome Rating Scale (POR) Individual Sleep-Wake Impairment Items: Means and Standard Deviations (continued)


Table 4.10. Patient Outcome Rating (POR) Scale: Descriptive Statistics

|  | FREQUENCY | PERCENT |
| :--- | :---: | :---: |
|  |  |  |
| Degree of Change Since First Enrolled in Treatment |  |  |
|  |  |  |
| slightly improved | 5 | 22.7 |
| improved | 4 | 18.2 |
| much improved | 11 | 50 |
| very much improved | 1 | 4.5 |
|  | 1 | 4.5 Missing |
| Compliance with Treatment Recommendations |  |  |
|  |  |  |
| not at all compliant | 1 | 4.5 |
| a little | 1 | 4.5 |
| somewhat | 3 | 13.6 |
| much | 10 | 45.5 |
| very much compliant | 6 | 27.3 |
|  | 1 | 4.5 Missing |
| Support of Spouse or Significant Other |  |  |
| not at all supportive |  |  |
| a little | 1 | 4.5 |
| somewhat | 3 | 13.6 |
| much | 1 | 4.5 |
| very much supportive | 4 | 18.2 |
|  | 8 | 36.4 |
|  | 5 | 22.7 Missing |

Table 4.10. Patient Outcome Rating (POR) Scale: Descriptive Statistics (continued)


Table 4.10. Patient Outcome Rating (POR) Scale: Descriptive Statistics (continued)

Feel You Still have a Problem with Insomnia

| yes, severe problems | 1 | 4.5 |
| :--- | :---: | :---: |
| $\ldots---$ | 5 | 22.7 |
| $\ldots---$ | 5 | 22.7 |
| no problem at all | 9 | 40.9 |
|  | 1 | 4.5 |
|  | 1 | 4.5 Missing |

Sleep-wake impairment: Symptom questionnaire (SQ). The alpha coefficients for the SQ are displayed in Table 4.11. Low reliabilities were found at all time points except for the final week of the three month follow-up period. The means and standard deviations for the scale are presented in Table 4.12. A $2 \times 2$ (Group $X$ Time) repeated measures ANOVA revealed no significant effects. A $2 \times 3$ (Group $X$ Time) repeated measures ANOVA to examine changes from postreatment to follow-up was also nonsignificant for main and interaction effects.

Table 4.11 Symptom Questionnaire (SQ): Means, Standard Deviations and Reliabilities (Coefficient Alpha)

| Variable | n |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  |  | Mean |  |  |
| Baseline <br> Week 1 | 22 | 13.77 | 2.07 | .53 |
| Baseline <br> Week 2 | 21 | 12.71 | 1.90 | .35 |
| Postreatment <br> Week 1 | 19 | 12.21 | 2.49 | .47 |
| Posttreatment <br> Week 2 | 20 | 11.75 | 2.69 | .64 |
| 3 Month <br> Follow-up <br> Week 1 | 17 | 12.53 | 2.35 | .50 |
| 3 Month <br> Follow-up <br> Week 2 | 15 | 11.27 | 3.26 | .85 |

Table 4.12. Symptom Questionnaire (SQ): Means and Standard Deviations

| Variable |  | Pretreatment |  | Posttreatment (1) (Immediate Treatment Group) Posttreatment (2) (Delayed Treatment Group) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard Deviation | Mean | Standard Deviation |
| ITG | 13 | 12.85 | 1.28 | 12.31 | 2.72 |
| DTG | 7 | 12.14 | 2.73 | 10.71 | 2.50 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
(PBAS). Reliability estimates (Cronbach's alpha) were obtained for the PBAS (Table 4.13). Moderate internal consistency was found at the pretreatment and posttreatment periods.

Morin established five conceptually derived themes to describe the cognitions regarding sleep (Morin, Stone, Trinkle, Mercer, \& Remsberg, 1993). Means and standard deviations for the PBAS and the five themes are presented in Table 4.14. A $2 \times 2$ (Group X Time) repeated measures ANOVA was conducted for the total PBAS and the five themes. Significant main effects for time were obtained for the total scale, $F(1,20)=14.41, p<.01$; control and predictability of sleep, $\mathrm{F}(1,20)=21.94, \mathrm{p}<.01$; and sleep promoting practices, $F(1,20)=4.77, p<.05$. Change on consequences of insomnia $(p<.06)$ was in the expected direction but did not reach significance for a main effect of time. There was a significant group effect $(F(1,20)=4.41, p \leq .05)$ for sleep requirement expectations but Tukey post hoc contrasts were nonsignificant.

Table 4.13. Personal Beliefs and Attitudes About Sleep (PBAS): Means, Standard Deviations and Reliabilities (Coefficient Alpha) ( $n=17$ )

Variable

|  | Mean | SD | $\alpha$ |
| :--- | :---: | :---: | :---: |
| Total Scale |  |  |  |
| Pretreatment | 1087.88 | 364.79 | .85 |
| Posttreatment | 877.06 | 292.18 | .82 |

Table 4.14. Personal Beliefs and Attitudes About Sleep (PBAS): Means and Standard Deviations

| Variable | Pretreatment |  |  | Posttreatment (1) (Immediate Treatment Group) <br> Posttreatment (2) (Delayed Treatment Group) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\underline{n}$ | Mean | Standard Deviation | Mean | Standard Deviation |  |
| Total Scale |  |  |  |  |  |  |
| ITG | 13 | 1077.39 | 404.72 |  | $878.77^{\text {a }}$ | 357.39 |
| DTG | 9 | 1116.11 | 292.59 |  | $831.00^{\text {a }}$ | 155.63 |
| Consequences |  |  |  |  |  |  |
| ITG | 13 | 277.69 | 137.20 |  | 244.00 | 145.33 |
| DTG | 9 | 321.44 | 72.53 |  | 263.00 | 98.54 |


| Control/Predictability |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| ITG | 13 | 398.31 | 154.86 | $284.39^{\mathrm{a}}$ | 119.05 |
| DTG | 9 | 420.89 | 125.65 | $249.67^{\mathrm{a}}$ | 75.24 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}=$ Significant Time Effect $(p<.01)$

Table 4.14. Personal Beliefs and Attitudes About Sleep (PBAS): Means and Standard Deviations (continued)

| Variable | Pretreatment |  |  | Posttreatment (1) (Immediate Treatment Group) Posttreatment (2) (Delayed Treatment Group) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard Deviation | Mean | Standard <br> Deviation |
| Sleep Requirement Expectations |  |  |  |  |  |
| ITG | 13 | 118.08 | 50.17 | 130.92 | 57.15 |
| DTG | 9 | 90.44 | 22.21 | 86.33 | 38.69 |
| Causal Attributions |  |  |  |  |  |
| ITG | 13 | 71.31 | 48.03 | 55.69 | 37.29 |
| DTG | 9 | 71.67 | 46.13 | 73.78 | 32.67 |

## Sleep Promoting Practices

| ITG | 13 | 212.00 | 142.35 | $163.77^{\mathrm{a}}$ | 115.97 |
| :--- | :---: | :---: | :---: | :---: | :---: |
| DTG | 9 | 211.67 | 151.12 | $158.22^{\mathrm{a}}$ | 88.58 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{a}=$ Significant Time Effect $(p<.01)$

Presleep anxiety: Sleep anticipatory anxiey questionnaire (SAAQ). Alpha coefficients were determined for the total SAAQ at pretreatment and posttreatment (Table 4.15). High internal consistency was found at both time periods.

Group means and standard deviations for the SAAQ are presented in
Table 4.16. There was a significant main effect for time $(F(1,18)=4.19, p \leq .05)$ regarding the overall degree of anxiety about falling back to sleep after awakening using a $2 \times 2$ (Group by Time) repeated measures ANOVA. Difference scores used in a $2 \times 2$ (Group $\times$ Time) repeated measures ANOVA to describe the extent to which subjects report cognitive as compared to somatic arousal when trying to fall back to sleep revealed no significant main or interaction effects. The difference scores' group means and standard deviations are displayed in Table 4.17. A $2 \times 2$ (Group $\times$ Time) repeated measures ANOVA conducted separately for the cognitive and somatic items demonstrated a significant time effect for the cognitive items. Means and standard deviations are presented in Table 4.18.

Table 4.15. Sleep Anticipatory/Anxiety Questionnaire (SAAQ): Means, Standard Deviations and Reliabilities (Coefficient Alpha) ( $n=16$ )

|  | Mean | SD | $\alpha$ |
| :--- | :---: | :---: | :---: |
| TOTAL SCALE |  |  |  |
| Pretreatment | 21.94 | 5.47 | .90 |
| Posttreatment | 19.38 | 5.86 | .89 |
|  |  |  |  |

Table 4.16. Sleep Anticipatory Anxiety Questionnaire (SAAQ): Means and Standard Deviations

| Variable | Pretreatment |  |  | Postrreatment (1) (Immediate Treatment Group) <br> Posttreatment (2) (Delayed Treatment Group) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\underline{\square}$ | Mean | Standard <br> Deviation | Mean | Standard <br> Deviation |
| ITG | 12 | 22.17 | 5.20 | $20.67^{\text {a }}$ | 5.85 |
| DTG | 8 | 22.13 | 6.24 | $18.63{ }^{\text {a }}$ | 4.63 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{\mathrm{a}}=$ significant time effect $\mathrm{p} \leq .05$

Table 4.17. Sleep Anticipatory Anxiety Difference Scores: Means and Standard Deviations

| Variable |  | Pretreatment Difference Score |  | Posttreatment (1)(Immediate Treatment Group) Posttreatment (2) (Delayed Treatment Group) Difference Score |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\underline{n}$ | Mean | Standard Deviation | Mean | Standard Deviation |
| ITG | 12 | 3.17 | 2.44 | 3.17 | 3.54 |
| DTG | 8 | 4.63 | 2.77 | 2.87 | 3.83 |
| ITG = Immediate Treatment Group <br> DTG = Delayed Treatment Group |  |  |  |  |  |

Table 4.18. Sleep Anticipatory Anxiety Questionnaire (SAA): Means and Standard Deviations for Somatic and Cognitive Themes

| Theme/Group | Pretreatment |  |  | Posttreatment (1) (Treatment Group) Postreatment (2) (WLC) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\underline{\square}$ | Mean | Standard Deviation | Mean | Standard <br> Deviation |
| Somatic Theme |  |  |  |  |  |
| Treatment | 12 | 9.50 | 3.29 | 8.75 | 4.13 |
| WLC | 8 | 8.75 | 2.90 | 7.88 | 2.53 |
| Cognitive Theme |  |  |  |  |  |
| Treatment | 12 | 12.67 | 2.39 | $11.92^{\text {a }}$ | 3.87 |
| WLC | 8 | 13.38 | 2.50 | $10.75{ }^{\text {a }}$ | 3.41 |

${ }^{a}=$ Significant Time Effect $(\mathrm{p} \leq .05)$

Mood: Geriatric depression scale (GDS). Alpha coefficients for the GDS were low at pretreatment and posttreatment (see Table 4.19). Group means and standard deviations are displayed in Table 4.20. The mean total scores were computed using the GDS scoring key and examined in a $2 \times 2$ (Group $X$ Time) repeated measures ANOVA. A significant time effect was obtained.

Table 4.19. Geriatric Depression Scale (GDS): Means, Standard Deviations and Reliabilities (Coefficient Alpha) ( $n=17$ )

|  | Mean | SD | $\alpha$ |
| :--- | :---: | :---: | :---: |
| Total Scale |  |  |  |
| Pretreatment | 45.76 | 12.19 | .53 |
| Postreatment | 43.29 | 7.60 | .49 |

Table 4.20. Geriatric Depression Scale (GDS): Means and Standard Deviations

| Variable | Pretreatment |  |  | Posttreatment (1) (Immediate Treatment Group) Posttreatment (2) (Delayed Treatment Group) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |
|  | $\underline{\square}$ | Mean | Standard Deviation | Mean | Standard Deviation |
| ITG | 13 | 8.39 | 5.17 | $6.46{ }^{\text {a }}$ | 4.41 |
| DTG | 9 | 9.78 | 5.76 | $4.89{ }^{\text {a }}$ | 4.26 |

ITG = Immediate Treatment Group
DTG = Delayed Treatment Group
${ }^{\mathfrak{a}}=$ Significant Time Effect $p<.01$

Mood: State trait anxiety inventory (STAI). High alpha coefficients were obtained for the state and trait scales at pretreatment and posttreatment periods (Table 4.21). Group means and standard deviations are presented in Table 4.22. A significant time effect was found for the state subscale ( $F(1,20$ ) $=14.94, p<.01)$ and the trait subscale $(F(1,19)=18.64, p<.01)$ using a $2 \times 2$ (Group X Time) repeated measures ANOVA.

Table 4.21. State-Trait Anxiety Scale (STAI): Means, Standard Deviations and Reliabilities (Coefficient Alpha)

| Variable | $\underline{n}$ |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  |  | Mean |  |  |
| State <br> Pretreatment | 19 | 33.42 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Trait <br> Pretreatment | 21 | 36.86 | 8.97 | .81 |
| State <br> Posttreatment | 19 | 28.11 | 5.33 | .88 |
| Trait <br> Postreatment | 17 | 32.94 | 7.88 | .83 |

Table 4.22. State-Trait Anxiety Inventory (STAI): Means and Standards Deviations

| Subscale Group | Pretreatment |  |  | Posttreatment |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | n | Mean | Standard Deviation | Mean | Standard Deviation |
| State |  |  |  |  |  |
| ITG | 13 | 31.08 | 7.12 | $28.15{ }^{\text {a }}$ | 6.20 |
| DTG | 9 | 35.11 | 7.00 | $24.78{ }^{\text {a }}$ | 8.29 |
| Trait |  |  |  |  |  |
| ITG | 13 | 35.54 | 10.06 | $31.54{ }^{\text {a }}$ | 9.28 |
| DTG | 8 | 38.25 | 6.23 | $31.63{ }^{\text {a }}$ | 7.50 |
| ITG $=$ Immediate Treatment Group DTG = Delayed Treatment Group ${ }^{a}=$ Significant Time Effect $(p<.01)$ |  |  |  |  |  |

## Physical Health Status and Sleep Outcomes

There was no difference between subjects with and without physical health problems on the sleep measures at baseline and posttreatment (ps>.1). Examination of a subset of health problems, painful conditions, revealed no difference between those with and without painful disorders on sleep outcomes at baseline and posttreatment (ps>.1).

## Treatment Evaluation

The Therapy Evaluation Questionnaires were not labelled by subject identification number to encourage unbiased reports. Rather than remove evaluations randomly to coincide with the number of subjects who dropped out, all of the evaluations were left in for analysis.

The three item Therapy Evaluation Questionnaire given after the first treatment class was compared to the equivalent three items from the six item Therapy Evaluation Questionnaire administered posttreatment. Descriptive statistics are displayed in Table 4.23. Using a t-test, there was no difference between the mean score of the three items at the first treatment class and posttreatment. No differences occurred from the first class to posttreatment using individual t-tests for each of the three items.

Table 4.23. Therapy Evaluation Questionnaire: Descriptive Statistics for Treatment Class One and Posttreatment


Table 4.23. Therapy Evaluation Questionnaire: Descriptive Statistics for Treatment Class One and Posttreatment (continued)

| TREATMENT CLASS ONE | POSTTREATMENT |
| :--- | :---: |
| FREQUENCY | PERCENT |


| If Having a Great Deal of Difficulty Remaining Asleep, |  |  |
| :--- | :--- | ---: |
| Willing to Undergo this Treatment Again |  |  |
| not at all | 1 | 4.2 |
| somewhat willing | 5 | 20.8 |
| willing | 5 | 20.8 |
| much willing | 5 | 20.8 |
| very much willing | 8 | 33.3 |

Competence of Therapist
not at all competent
somewhat competent
competent 1
4.2
very competent 9 37.5
extremely competent $\quad 14 \quad 58.3$

Warmth and Supportiveness of Therapist
not at all warm or supportive
somewhat warm and supportive
warm and supportive
3
12.5
very warm and supportive
29.2
extremely warm and supportive

## Clinical Significance

Two items from the Patient Outcome Rating (POR) scale were examined using a $2 \times 5$ (Time $X$ Level of Item Response) repeated measures ANOVA. The time condition was wake after sleep onset (WASO) at pre-and posttreatment. There were five levels of response for each of the two items used in the ANOVA. The two POR items that reflected clinical significance were the degree of change since first enrolled in treatment and whether the subjects still felt they had a problem with insomnia. Means and standard deviations are displayed in Tables 4.24 and 4.25. Significant time $(F(1,17)=57.39, p<.01)$ and interaction $(F(3,17)=3.34, p<.05)$ effects were found for degree of change. Post hoc contrasts indicated significant pre to posttreatment WASO improvement for three of the five ratings of degree of change. A significant time effect $(F(1,18)=8.04, p \leq .01)$ was revealed for the "feel you still have a problem with insomnia" rating. Further examination of clinical significance is addressed -in Chapter Five.

Table 4.24. Degree of Change Since First Enrolled in Treatment and Wake After Sleep Onset (WASO) Minutes): Means and Standard Deviations

| Degree of Change |  | WASO Pretreatment |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $\underline{n}$ | Mean | Standard <br> Deviation | WASO Postreatment |

${ }^{a}=$ Significant Change from Pretreatment to Posttreatment ( $p \leq .01$ )

Table 4.25. Felt You Still Have a Problem With Insomnia and Wake After Sleep Onset (WASO) (Minutes): Means and Standard Deviations

|  |  |  |
| :---: | :---: | :---: |
| Still Have a Problem | WASO Pretreatment | WASO Posttreatment |
| n | Mean | Standard <br> Deviation |


| Yes, severe <br> problem | 1 | 109.29 | .00 | $56.50^{\mathrm{a}}$ | .00 |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | 5 | 84.86 | 20.38 | $50.13^{\mathrm{a}}$ | 7.55 |
|  | 5 | 108.90 | 57.98 | $46.73^{\mathrm{a}}$ | 34.33 |
|  | 9 | 103.27 | 40.69 | $23.13^{\mathrm{a}}$ | 10.95 |
| No problem at all | 1 | 56.14 | .00 | $21.71^{\mathrm{a}}$ | .00 |

${ }^{a}=$ Significant Change from Pretreatment to Posttreatment ( $p \leq .01$ )

## Treatment Compliance

Seven questions were added to the Daily Sleep Diary to measure compliance. The first question asked if the subject was able to fall asleep within 15 minutes when he or she went to bed the previous night. If the question was answered as true, the following five questions would be skipped. For example, over the first two weeks of treatment, $81.5 \%$ of the subjects answered the question as true. This response is consistent with the description of the sample: only seven of the 22 subjects claimed difficulty falling asleep. Therefore, the majority of the subjects skipped the five follow-up sleep onset latency and compliance questions.

The final question asked the subject to record how many times the subject got out of bed for each awakening that was greater than 15 minutes. The question was directed at the subjects' compliance with treatment, specifically aimed at following stimulus control instructions.

The relationship between the number of awakenings greater than 15 minutes and the number of times the subject got out of bed was difficult to assess. The subjects recorded, on item five of the Daily Sleep Diary, the number of times he or she awakened during the night. Subjects were then asked to specify the duration of each awakening. Subjects tended to give the total amount of time they spent awake during the night rather than specifying
the duration of each awakening. Therefore, the number of awakenings greater than 15 minutes was unable to be assessed.

In order to address treatment compliance, two variables were used. The mean WASO pre- and posttreatment (posttreatment 1 for the immediate treatment group and posttreatment 2 for the delayed treatment group) was the first variable. The compliance question from the Patient Outcome Rating (POR) scale was used as the second variable. The question asks how compliant the subject has been in following the treatment recommendations during the program. Compliance and WASO were examined using a $2 \times 5$ (time $X$ compliance) repeated measures ANOVA. The WASO means and standard deviations according to compliance level are presented in Table 4.26. A significant time effect $F(16,1)=30.55, p<.01$, was obtained.

## Summary

Chapter Four presented the results of the statistical analysis. The summaries of the results indicate that the intervention was effective in improving the sleep-wake patterns of older adults. The between group analysis for sleep behaviors revealed an improvement in wake after sleep onset, sleep efficiency, and total sleep time for the immediate treatment group compared to the delayed treatment group (control group). The delayed treatment group demonstrated improvement on the same sleep behaviors after intervention using a within group analysis. The treatment effects were maintained for both

Table 4.26. Compliance with Following Treatment Recommendations During Program and Wake After Sleep Onset (WASO) (Minutes)

${ }^{a}=$ significant time effect $p<.01$
groups at the three month follow-up. Sleep-wake impairment, dysfunctional cognitions, and presleep anxiety were reduced for both groups after intervention. The mood measures indicated that the subjects were not depressed prior to treatment and no change occurred following intervention. State and trait anxiety levels decreased posttreatment. Favorable ratings for therapy evaluation were received. The majority of subjects felt they were compliant with treatment and had corresponding decreases in wake after sleep onset (WASO). The interpretation and discussion related to the specific hypotheses tested are found in Chapter Five.

## CHAPTER FIVE <br> DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

## Introduction

The purpose of the study was to evaluate the effectiveness of a behavioral intervention for sleep maintenance insomnia in older adults. The findings indicate that sleep maintenance insomnia in older adults can be effectively treated with behavioral intervention. Sleep was consolidated and in turn a more consistent sleep-wake pattern emerged. The strengthening of the bed and bedroom as cues for sleep was measured indirectly through the sleep behavior variables. Improved sleep parameters indicate that the subjects reduced sleep interfering activities. The older adults experienced a decrease in sleep-wake impairment which reflected a reduction in the negative impact of insomnia on their lives. The specific aims of the study are further addressed in the discussion of the interpretation of the study results.

## Interpretation of Findings

## Description of the Sample

The sample of older adults with sleep maintenance insomnia was
Caucasian and well educated. Socioeconomic status was not measured. The sample appeared to be primarily middle-class based on the investigator's numerous contacts with the subjects. The average age of the subjects in the 11 treatment outcome studies of older adults reviewed in Chapter Two was
63.03 years. The sample in the present study was about eight years older (mean 71.18 years). The mean age may have been influenced by the presence of 1 oldest old subject ( 92 years).

Insomnia had been a long standing problem (14 years) for the subjects in the 11 treatment outcome studies to date. The subjects in the present study average slightly less insomnia duration ( 9.23 years). The study targeted sleep maintenance insomnia and only about one-third of the sample had sleep onset latency difficulty.

The large percentage of subjects who had tried prescribed sleeping medication aids reflects the manner in which older adults with insomnia are treated by their health care providers. Prescription drugs are the most prevalent treatment. The fact that the subjects' sleep ccntinued to suffer and that they sought other treatment supports the ineffectiveness of the pharmacological approach.

The number of subjects currently suffering from one or more significant medical conditions was equivalent to the rate seen in other outcome studies of elders with insomnia (Edinger, Hoelscher, Marsh, Lipper, \& lonescu-Pioggia, 1992; Morin \& Azrin, 1988; Morin, Kowatch, Barry, \& Walton, 1993). The increased number of physical health problems associated with the aged does not distinguish good from poor sleepers (Morin \& Gramling, 1989). An attempt was made to exclude persons only if their insomnia appeared to be secondary
to a medical condition. Therefore, subjects with a wide array of health problems were accepted. This approach to may have weakened the true treatment effect, however the results should be more generalizable. The majority of older adults have health problems and take medications. In this study, subjects used an average of 1.7 prescribed medications. Morin and Gramling also found that medication usage does not differentiate elderly good from poor sleepers.

## Sleep Behavior Outcomes

## Decrease in Wake After Sleep Onset (Hypothesis 1a)

At baseline, the treatment group spent about 20 minutes more awake during the night compared to the WLC group although there was no significant difference between the two groups at this assessment phase. The intervention was effective in achieving a $60 \%$ reduction in wake after sleep onset (WASO) for the treatment group. The WLC group maintained the same amount of WASO during its waiting period and decreased WASO by $65 \%$ after delayed treatment. Although a nonsignificant finding, the WASO for the WLC group after delayed treatment was $30 \%$ less than the treatment group's WASO after immediate treatment. This may be due to the lower WASO at baseline for the WLC. These findings strengthen the results of previous outcome studies in this population. The 11 studies in this area of research had an overall mean improvement of about $53 \%$ from baseline to posttreatment on WASO and SOL.

Decrease in WASO is a consistent finding in studies which target sleep maintenance insomnia in elders (Anderson et al., 1988; Davies et al., 1986; Engle-Friedman et al., 1992; Friedman et al., 1991; Hoelscher \& Edinger, 1988; Morin \& Azrin, 1987, 1988; Morin et al., 1993; Rubinstein et al., 1990). The treatment outcome supports research hypothesis 1 a.

Additional support for the changes seen through repeated measures ANOVA is found in the individual regression analysis (IRA) of WASO. ANOVA examined change at the interindividual or group level. IRA allowed description of the intraindividual pattern of change in WASO over time. WASO decreased over time for individuals in both groups. The pattern of change for subjects over the pretreatment, treatment, posttreatment, and follow-up phases was in the same direction, i.e. a decrease in WASO.

## Significant Decrease in Wake After Sleep Onset Variability (Hypothesis 1b)

The high night to night variability in WASO was affected by intervention. Immediate and delayed treatment group subjects experienced a significant decrease in their WASO variability after intervention. The reduction in both WASO means and standard deviations implies that the response to intervention was similar for all subjects. Decreased variability after insomnia treatment in older adults has not been addressed in previous reports of findings. Spielman, Saskin, and Thorpy (1987) have reported decreased variability in WASO after sleep restriction therapy in younger subjects. The decrease in variability is
indicative of more stable, consistent sleep-wake patterns. Consistent sleepwake patterning was one of the study's specific research aims. Hypothesis 1b was supported.

## No Change in Nighttime Awakenings (Hypothesis 1c)

Research hypothesis 1c was supported by the data. Although subjects spent less time awake during the night, their frequency of nighttime awakenings did not change after treatment. It was expected that subjects might not decrease the number of times they awakened. Subjects were told pretreatment that the intervention was designed to impact the amount of time spent awake during the night. Therefore, they might find that they continue to awaken the same number of times but if treatment was effective they would not stay awake for long periods. This finding is consistent with self-report of nighttime awakenings in previous treatment studies with older adults (Edinger,Hoelscher, Marsh, Lipper, \& lonescu-Pioggia, 1992; Hoelscher \& Edinger, 1988). An analysis of polysomnographic reports of the sleep of older adults indicates they spend more time in lighter stages of sleep (Bliwise, 1993) where they will be more vulnerable to awakenings. So despite treatment, the older person may continue to awaken simply due to their sleep architecture.

Significant Increase in Total Sleep Time (Hypothesis 1d)
The total sleep time (TST) never exceeded six hours and 22 minutes at any point in the study. The treatment group made only a $9 \%$ gain in TST from
baseline to posttreatment but was obtaining $27 \%$ more sleep than the WLC group at posttreatment. The WLC group's sleep duration increased $23 \%$ after treatment. The WLC group's significant increase may be attributable to the lower baseline value. Hypothesis 1d was supported only for the WLC group. Increases in TST have been found in other studies of elders (Anderson et al., 1988; Morin \& Azrin, 1988; Rubinstein et al., 1990).

It appears that older adults' TST may not increase beyond a certain point despite treatment. Less interrupted sleep may be more significant than the amount of sleep obtained. If this is so, perhaps other sleep parameters better indicate improved sleep patterns. Morin and Gramling (1989) found that total sleep time was not a good indicator for distinguishing older poor sleepers from good sleepers. They suggest that sleep efficiency may be a better index. Significant Increase in Sleep Efficiency (Hypothesis 1e) and Significant Decrease in Time in Bed (Hypothesis 1f)

Sleep efficiency (SE) results indicated that subjects in both groups had indeed consolidated their sleep after treatment. A review of the polysomnographic features of the sleep of elders indicates that SE for older adults is approximately $70-80 \%$ (Bliwise, 1993). Subjects in both groups increased their SE to greater than 80\%. The WLC group's increase in TST and reduction in WASO is reflective of the SE improvement. A significant increase in SE for all subjects supports hypothesis 1e. SE improvements have been
reported in the treatment of older persons (Anderson et al., 1988; EngleFriedman et al., 1992; Friedman et al., 1991; Hoelscher \& Edinger, 1988; Morin \& Azrin, 1987, 1988; Morin et al., 1993; Rubinstein et al., 1990). It appears that behavioral treatment can successfully impact the SE of elders and raise it beyond the usual range for older adults. Although SE improved, time in bed (TIB) decreased (12\%) significantly for only the treatment group. There was little reduction in TIB for the WLC. Hypothesis $1 f$ was partially supported. Significant Decrease in Sleep Onset Latency (Hypothesis 1g)

Only one-third of the subjects stated they had a problem with sleep onset latency (SOL). Sleep diaries revealed only mild SOL problems for the two groups. The nonsignificant decrease in SOL refutes hypothesis 1 g . Based on the baseline values, it was not expected that there would be much change in SOL. Since the stimulus control instructions target both falling asleep and staying asleep, the nonsignificant decrease in SOL may have resulted from following the directions in regard to any SOL problem. In addition, the bed and bedroom became more associated with cues for sleep and may have contributed to the slight improvement. Other studies of behavioral treatment for older adults have found nonsignificant decreases in SOL by self-report (Anderson et al., 1988; Rubinstein et al., 1990). Indeed, the SOL values at posttreatment for this study were lower than the pretreatment SOL values reported in the aforementioned outcome studies signifying that this sample was
particular!y unaffected by SOL problems. SOL difficulties are often more problematic in young and middle adulthood than in older adulthood. No Change in the Amount of Nap Time (Hypothesis 1h)

Subjects spent very little time napping before treatment. There was no change for either group after treatment in the amount of time spent napping. Therefore, hypothesis 1 h was supported. Morin and Gramling (1989) found that daytime napping did not differ between good and poor older adult sleepers. However, other studies of older persons have reported increases napping with age (Miles \& Dement, 1980; Webb, 1975). The need to nap in older adulthood was not demonstrated in this sample.

No Significant Difference in Sleep Behaviors from Posttreatment to 3 Month

## Follow-up (Hypothesis 4)

There were no changes from posttreatment to the three month follow-up for both groups. This finding indicates that the therapeutic benefits discussed above were maintained and hypothesis 4 was supported. Follow-up at three months or more has demonstrated maintenance of therapeutic gains in a number of treatment outcome studies of elders (Engle-Friedman et al., 1992; Friedman et al., 1991; Hoelscher \& Edinger, 1988; Morin \& Azrin, 1987, 1988; Morin et al., 1993). Durability of treatment effect is an important issue in clinical research and one which has not been given proper attention. Nurses need to know that the interventions they use will continue to be effective once the client
has left the treatment setting. An additional follow-up assessment is planned for two years after treatment.

## Sleep-Wake Impairment Outcomes

## Daily Sleep Diary (DSD) Sleep-Wake

The only change in how the subjects felt when they got up in the morning was found in the WLC group after treatment. The improvement persisted to the follow-up phase. Those who did not improve may have felt tired upon awakening before treatment. These individuals may not have been able to recompensate as their nighttime sleep improved because of the scheduling constraints imposed by sleep restriction therapy. Many individuals may always feel sleepy upon awakening and it may take them some time to "wake up". Changes, or lack of, in the sleep behaviors of the subjects may have affected their responses. The subjects' sleep became more consolidated (decreased wake after sleep onset) but there was only partial increase in total sleep time.

After treatment, subjects did not change their estimates of the quality of sleep on the previous night. They consistently rated their previous night's sleep between restless and average. It may be that treatment group subjects felt the quality of their sleep had not changed because they still awakened during the night. Another contributor to the nonsignificant findings may be that the item responses basically describe soundness of sleep. A review of
polysomnographic measurement of the sleep of elders indicated that older persons spend less time in deep sleep and have more Stages 1 and 2 or light sleep (Bliwise, 1993). Using polysomnographic measurement, cognitivebehavioral intervention did not impact slow wave sleep (deep sleep) in elders with insomnia (Morin et al., 1993). Older adults may therefore interpret the quality of their sleep unfavorably even after treatment has decreased the amount of time awake during the night. The soundness of their sleep has not been affected by treatment.

The rating which compared the subjects' sleep on the previous night to their usual sleep did not change for either group. The subjects may have had some difficulty with the response word "usual". There were no instructions that defined what "usual" sleep meant. Subjects may have interpreted it differently. "Usual" may have meant their usual sleep prior to treatment. Another interpretation may have been based on increasing improvement in their sleep as treatment progressed. Subjects commented to the investigator that they were puzzled by the word "usual". Subjects who sought clarification were told to "do whatever you've been doing".

## Patient Rating (PR) and Patient Outcome Rating (POR) Scales

Sleep-wake impairment as measured by the PR and POR showed significant improvement from pre to posttreatment for both groups. The items comprising sleep-wake impairment were also examined for improvement.

Difficulty falling asleep improved for the treatment group only. They rated difficulty falling asleep as a mild problem while the WLC group estimated it between no problem and a mild problem. The number of minutes of sleep onset latency (SOL) pretreatment on the sleep diaries revealed only a slight problem for both groups. The treatment group had a lower SOL at pretreatment on the sleep diaries and ended treatment with a lower but nonsignificant SOL. As discussed in the sleep behaviors outcome section, difficulty falling asleep appears to be a problem of young and middle age persons (Bixler, Kales, Soldatos, et al., 1979; Mellinger et al., 1985) and was not especially problematic for this sample.

Difficulty staying asleep decreased significantly for both groups after intervention which supports the findings obtained from the sleep diaries. Subjects had less problems waking up too early.

The remaining items regarding sleep-wake impairment also reflect the clinical significance of the study. Subjects felt more satisfied and less distressed regarding their sleep patterns. They noticed less interference with daily functioning. Any remaining sleep disturbance was less noticeable in its impairment of the quality of sleep. Clearly, the sleep-wake patterns of the subjects became significantly less impaired after treatment. Morin et al. (1993) found similar improvement using the same instruments to measure older subjects who received a cognitive-behavioral treatment for insomnia.

## Symptom Questionnaire (SQ) Sleep-Wake Impairment Outcomes

The adequacy of daytime alertness did not change from pretreatment to posttreatment for either group. The algorithm developed by Spielman (Rubinstein, et al., 1990) (Appendix B) categorizes the subject's total scale score in order to prescribe sleep restriction therapy during the last two weeks of treatment. Based on the subject's answer to the four items, the prescribed time in bed was maintained or increased. The posttreatment scores of the subjects indicated they would have received an increase of 15 minutes in the amount of time in bed, if they were still in treatment. The increase would have held at the follow-up period as well since the subjects did not show any change from posttreatment to the follow-up assessment.

The subjects' responses indicate that they maintained a certain level of daytime sleepiness across the assessment phases. Older adults have been subjected to Multiple Sleep Latency Tests (MSLTs) which determine the amount of time to fall asleep at several nap opportunities throughout the day. Reports indicate that there was no difference in sleep tendency during the day between young and old adult subjects (Richardson et al., 1982) and may be less than young adults (Reynolds et al., 1991). Daytime sleep tendency may be elevated for older adults if persons with sleep related respiratory disturbances, usually sleep apnea, are not excluded from the sample (Miles \& Dement, 1982). Daytime sleepiness is a result of the seriously fragmented nighttime sleep due
to apneic episodes. A serious problem for this study might be that persons with sleep apnea were not adequately excluded by self-report. Since neither the subjects, nor their bed partners when available, described daytime sleepiness of the magnitude experience by persons with sleep apnea, daytime sleepiness may be a carryover effect of the sleep restriction therapy. They may have started the program feeling tired, and due to the sleep restriction imposed on the subjects, were not able to change their estimation despite improved nighttime sleep. This explanation does not account for the level of sleepiness maintained to the 3 month follow-up.

When the item rather than total means are examined, the means range from 2.81 to 3.44 indicating that the subjects endorsed the "sometimes" response. Therefore, daytime sleepiness may not actually be a serious or consistent problem. Considering other findings discussed in the sleep behaviors outcomes section, "...the maintenance of a well-consolidated nighttime sleep, with sleep efficiencies of $80 \%$ or higher and total sleep time of about 6 hours, appears to be adequate for the preservation of daytime alertness in the healthy elderly at a level comparable to or even better than that of young adults" (Reynolds et al., 1991, p. 962).

Significant Decrease in the Area of Sleep-Wake Impairment (Hypothesis 3)
Hypothesis 3 was partially supported. The sleep-wake impairment variables from the Patient Rating (PR) scale and the Patient Outcome Rating
(POR) scale demonstrated an improvement in this area. These scales were specifically developed by Morin (Morin \& Azrin, 1988) to measure sleep-wake impairment and are obviously more sensitive to change in this area. The variables from the Daily Sleep Diary and Symptom Questionnaire were selected based on face validity.

## Dysfunctional Cognitions Outcomes

Dysfunctional cognitions concerning sleep were significantly reduced for both groups after treatment. The five conceptually derived themes which comprise the Dysfunctional Beliefs and Attitudes about Sleep (DBAS) scale provided more specific insight into the change in beliefs, attitudes, expectations, and attributions regarding sleep and insomnia. Sleep requirement expectations were different between the two groups after receiving treatment. Although the post hoc contrast was nonsignificant, the sleep requirement expectations for the treatment group unexpectedly increased after treatment. Subjects increased their perception of control and predictability of sleep and improved their erroneous beliefs about sleep promoting practices.

The DBAS scale was developed by Morin and his associates (Morin et al., 1993) to identify cognitive distortions regarding sleep and insomnia. Once identified, the problematic areas are targeted for treatment with specific cognitive therapy strategies developed by Morin, (1993). The present study did not address dysfunctional cognitions and cognitive therapy was not part of the
treatment package. However, items related to the significantly changed themes (control/predictability and sleep promoting practices) address areas taught in the sleep education component of the intervention. It was thought that cognitive distortions might therefore be reduced as an indirect effect of treatment.

In a treatment outcome study of older persons with insomnia, the sleep information and support condition included information similar to the sleep education component of the present intervention (Engle-Friedman et al., 1992). The findings demonstrated that subjects were more in control of their sleep problem as indicated by increased self-efficacy. This provides some support that the sleep education component of the present study may have been responsible for the increased control and predictability experienced after treatment. An alternative explanation is that sleep became more predictable as a result of the decrease in variability of the sleep patterns.

## Mood Outcomes

## Presleep Anxiety

Both groups decreased their overall degree of anxiety about falling back to sleep after awakening using the Sleep Anticipatory Anxiety Questionnaire. The extent to which the subjects reported cognitive as compared to somatic arousal revealed no changes from pre to posttreatment when using difference scores. When the somatic and cognitive items were examined separately, no
change occurred in either type of arousal over time. Before and after treatment, the cognitive arousal scores were higher, although not significantly, than the somatic arousal scores. It appears that only overall arousal was affected by treatment. Subjects may have endorsed items referring to both types of arousal.

## State Trait Anxiety

The subjects evidenced a decrease in state and trait anxiety scores after treatment. A decrease in state anxiety complements the finding of a decrease in presleep anxiety since this probably represents a state. The finding of a reduction in trait anxiety is puzzling. It was assumed that more enduring characteristics would not be affected by the intervention. Subjects may have responded incorrectly to the stem of the trait items.

## Depression

There was a significant decrease in depression for the treatment and WLC groups after the intervention as measured by the Geriatric Depression Scale. The mean scores, as designated by the developers, were in the normal range before and after treatment. Before treatment, ten subjects were classified as normal, eleven as mildly depressed, and one as severely depressed. After treatment, fifteen subjects were normal, six were mildly depressed, and one was severely depressed.

At pretreatment, five of the scores were between 15 and 25 ; therefore they were individually evaluated for depression. None of the five subjects complained of depressive symptoms to the degree that they would be considered as having a major depression nor were they suicidal. This assessment included the one subject who scored at the lower end of the severe depression category. She was one of the most outgoing individuals in her class, had a high level of verbal participation, and regaled the class with stories of her travels around the world. She organized a car pool to the classes and was involved in several activities in the retirement community where she lived. She confided to the investigator that she was very worried about her husband who needed two orthopedic surgeries. At posttreatment, this subject was at the lower end of the mildly depressed category.

The subject in the severely depressed category after treatment was categorized at the high end. He began treatment at the upper end of mildly depressed. He was disgruntled with the intervention throughout the treatment phase but he continued with the program to the end. His wife was in a nursing home. At the end of treatment, an elderly relative who lived with him needed surgery. He was not suicidal and denied depression and the need for treatment of depression.

## Physical Health Status and Sleep Outcomes

Medical conditions did not impact on the ability of older adults to achieve therapeutic gains. It is important to be able to include older insomniacs with health problems. This makes the results more generalizable although it may affect internal validity. This is a trade off that is necessary to reflect the clinical world.

Subjects who suffered from painful conditions were able to benefit from treatment equally as well as those without such problems. In this study, subjects were asked during screening if the painful condition awakened them and kept them awake in order to rule out insomnia due to a medical condition. Morin and Gramling (1989) found that painful conditions did not differentiate good from poor elderly sleepers. The health related findings regarding sleep indicate that elders with both health problems and insomnia benefit from behavioral treatment.

## Reliability Estimates of the Instruments

Pretreatment assessment of reliability of the instruments revealed low estimates for the Geriatric Depression Scale (GDS), Symptom Questionnaire (SQ), and Patient Rating (PR) scale. The GDS had demonstrated an alpha coefficient of .94 in testing by the developers (Yesavage et al., 1983). In the current study, reliability was poor (.53). There were more scale items than cases. The variance of the items was low indicating the subjects responded in
a similar way and were homogeneous in their level of depression. These factors may have contributed to the low reliability estimate.

The SQ had not previously been subjected to reliability testing. The SQ is meant to guide treatment implementation by directing changes in the dose of sleep restriction therapy administered. Reliability in this study was poor at pretreatment (week 1: .53; week 2: .35). The scale has only four items and the low coefficients found may be due to the small number of items. A nonsignificant test-retest reliability was found over the two weeks of the pretreatment assessment phase.

The PR also has not undergone psychometric evaluation but approached adequacy (.week one:.67; week two:.63). A high test-retest reliability ( $r=.79$, $p<.01)$ was evidenced by the PR for the two weeks of pretreatment assessment. The instrument has been found to be sensitive to behavioral treatment change (Morin \& Azrin, 1987; 1988; Morin et al., 1993), a characteristic which should predominate the selection of an outcome measure (Stewart \& Archbold, 1992).

The reliability estimate for the Personal Beliefs and Attitudes about Sleep (PBAS) scale at pretreatment was high (.85). The coefficient was equivalent to the reliability obtained by Morin et al. (1993) for poor sleepers (.81).

Psychometric evaluation to date has focused on making the instrument as
sensitive to change as possible beginning with a test of its ability to discriminate between good and poor sleepers (Morin et al.).

The Sleep Anticipatory Anxiety Questionnaire (SAAQ) demonstrated high reliability (.90) at the pretreatment assessment. Bootzin, Shoham, and Kuo (in press) found a coefficient of .83 for an insomniac sample of young adults. Bootzin et al. did not estimate reliability for the cognitive and somatic items on the SAAQ; the two types of items loaded on the same factor. Alpha coefficients were estimated in this study and the somatic reliability was high (.93) while the cognitive reliability was adequate (.74). The reliabilities may need to be interpreted with caution since the items do not represent empirically distinct subscales.

The State Trait Anxiety Inventory (STAI) had a high reliability at pretreatment (state: .81; trait: .88). The normative data for the STAI revealed alpha coefficients slightly higher for an older population (Spielberger, 1983).

The reliability of the instruments was also examined at posttreatment. Traditionally, reliability has been estimated only at the pretest phase. It has been proposed that internal consistency measures may be helpful in evaluating treatment efficacy (Sidani \& Braden, 1992). Measurement error is estimated with Cronbach's alpha coefficient which is the ratio of the true score variance to the observed score variance. Therefore, reliability refers to the extent of measurement error and is a measure of interindividual differentiation. Treatment
efficacy is expected to increase interindividual differentiation which is observed in an increased score variance. Increased scores variance results in increased reliability.

Several instruments demonstrated increased reliability after treatment. The STAI showed increased alpha coefficients for both subscales (state: .83; trait: 90). The SQ, which had revealed low reliability estimates at pretreatment, continued that way until the follow-up when the reliability was high (.85). The items from the PR that were measured at posttreatment as part of the Patient Outcome Rating (POR) scale had an increase to high reliability (.84). Only the reliability for the cognitive items showed an increase in reliability (.90) for the SAAQ.

Particularly meaningful are the increases in the reliability coefficients for the POR scale and the SAAQ. The POR measures the impact of the treatment on sleep-wake impairment and is therefore a direct effect of intervention. The SAAQ measures presleep anxiety and is indicative of the subject's state of arousal when trying to go back to sleep. This represented an indirect effect of treatment since the intervention did not directly target arousal.

## Treatment Compliance

Wake after sleep onset (WASO) changed from pre to posttreatment regardless of the subjects' level of compliance. The subject who was the least compliant with treatment had a mean WASO of greater than two hours prior to
treatment. That individual decreased WASO to nine minutes after treatment. So despite the subjects perception of a low level of compliance, he or she had a great reduction in WASO. The vast majority of subjects felt they were compliant. The subjects rated themselves as "much" or "very much" compliant. Their WASO before treatment was at least over an hour and up to almost two hours. They decreased their WASO to about 35 minutes after intervention. The subjects who were "a little" or "somewhat" compliant had the least amount of improvement in WASO, about 50 minutes of WASO after treatment.

Sleep restriction therapy is difficult to comply with. It requires setting a later bedtime and getting up earlier than one may be accustomed to. Subjects regularly commented during classes on how hard it was to follow the directions. Staying up until the later bedtime was the worse part. Despite concrete plans for how to spend the evening so one would not fall asleep and flexibility with bedtimes, the complaints usually persisted for the first two classes. At that point, bedtimes were beginning to be set earlier and subjects were commenting on improvements in their sleep.

Difficulty with the compliance questions on the sleep diary was discussed in Chapter Three. A better way to measure compliance with treatment that focuses on sleep maintenance insomnia needs to be developed. A question that asks in a general sense about stimulus control instructions compliance on the previous night could be added to the diary for each day. For instance,
"During the night, if you woke up and stayed awake for more than 15 minutes, did you get out of bed and go into another room?" An additional question might ask "If you were unable to fall asleep when you returned to bed, did you get out of bed again after 15 minutes?". A Likert type response format from "never" to "always" could be used. There would only be two questions rather than the seven that were used in the current study. Although they are not as specific as the questions used in this study, they are aimed at sleep maintenance insomnia only (the target of the study) and might increase the response rate in answering insomnia treatment compliance questions. An additional improvement to measurement compliance would be to include questions at the follow-up period. There is still an opportunity to implement the above recommendations at the two year follow-up.

## Treatment Evaluation

Treatment evaluation was measured by the Therapy Evaluation Questionnaire (TEQ) after the first class and posttreatment and several questions from the Patient Outcome Rating (POR) scale.

The measurement of therapy evaluation immediately after the first class gave the subjects an opportunity to make an informed judgement about the logic of the treatment, expected success from treatment, and confidence in recommending the treatment to a friend. Most of the subjects felt the treatment was logical, much logical or very much logical. After treatment, some subjects
felt it was illogical or somewhat logical. The subjects were given detailed explanations of how the treatment was expected to work in reducing their sleep difficulties. Some subjects commented that they would rather go to bed when they are tired rather than waiting until a set bedtime. These comments inform decisions regarding future interventions and are discussed in a later section but basically deal with the logic of using sleep restriction therapy. Difficulty on the part of the subjects in implementing the sleep restriction therapy as well as the increased feeling of tiredness may have influenced these responses.

The subjects had high expectancy for success of the treatment after participating in the first class. Subjects were told in class that treatment gains could continue beyond treatment if they continued to follow the program. Posttreatment, the expectancy for success remained high for the majority of subjects but a substantial number felt it would be unsuccessful or somewhat successful.

Not only would most of the subjects recommend the treatment to a friend suffering from insomnia, they would be willing to undergo the treatment again if they were having difficulty. The recommendation question was asked on the TEQ and POR with similar responses obtained. The recommendation evaluation and willingness to undergo treatment again question probably reflect the improvement in sleep behaviors discussed in an earlier section.

The subjects rated the competence of the therapist highly and felt she was warm and supportive. The quality of the treatment was good to excellent. They believe they received the kind of treatment they wanted. Subjects consistently told the investigator that the initial attraction of the treatment was its nonpharmacological nature. The question of receiving the type of treatment they wanted was measured at posttreatment therefore the initial attraction was maintained. In spite of initial complaints regarding difficulty in following out some instructions, the subjects seemed committed to behavioral treatment of their insomnia.

Two open ended questions from the POR relate to therapy evaluation. When asked why they thought the treatment worked or did not work, the one subject who felt it didn't work offered no further explanation. The majority of responses from the subjects who offered reasons for treatment efficacy were primarily focused on two areas: changing poor sleep habits such as watching television in bed, reading in bed, and drinking caffeine before bed; and establishing new patterns, schedules, and routines.

Several comments were offered by subjects in response to a request to help improve the program. Three subjects would have liked "personal counseling", advice on "mental problems", and "comments on the individual's state of mind". There were requests for "a night or two at a sleep clinic" and "an opportunity to be tested for sleep apnea". One subject requested the
therapist to be "slightly more flexible with bedtime". Two subjects asked for "distractors" or "tricks" to occupy their minds when trying to fall back to sleep.

## Clinical Significance

The 14 day posttreatment period was examined to ascertain the proportion of subjects who improved on the WASO variable to the point that they would not qualify for admission to the study. The subject selection (sleep behavior) criteria discussed in Chapter Three were used to determine which subjects returned to normative levels of behavior on the WASO variable. At posttreatment, only four of the 22 subjects would qualify for treatment under the sleep behavior criteria. Of the 17 subjects who completed the three month follow-up sleep diaries, only four would qualify for treatment.

An exploration of sleep efficiency (SE) was conducted to determine clinical significance. The (SE) of all subjects ( $n=22$ ) was less than $80 \%$ at pretreatment. SE for older adults has been reported to be between $67 \%$ and 70\% (Coleman et al., 1981; Dement, Miles, \& Carskadon, 1982). After treatment, 15 of the 22 subjects experienced sleep efficiencies of $80 \%$ or greater. At the three month follow-up, 13 of the 17 respondents had sleep efficiencies in the $80 \%$ or greater range.

The normative comparisons for the two sleep behavior variables indicate clinically significant findings. In addition, the sleep -wake impairment ratings from the Patient Outcome Rating (POR) scale, discussed earlier, substantiate
the clinical significance. Subjects were more satisfied with their sleep and noticed less interference with daily functioning. They were less distressed about any remaining sleep difficulty, which they felt was less noticeable in its impairment of sleep quality.

Additional ratings from the POR support the clinical significance of the study. Subjects who endorsed their degree of change since enrollment as "improved" to "very much improved" experienced the most significant reduction in wake after sleep onset (WASO). The five subjects who felt they were only slightly improved did not decrease their WASO posttreatment. Subjects significantly diminished their pre to posttreatment WASO regardless of whether they felt they still had a problem with insomnia after treatment. The majority of subjects felt the quality of the treatment they received was good or excellent. The majority also felt they had received the kind of treatment they wanted.

All of the 17 subjects who completed the three month follow-up stated they did not take any sleeping medication during the 14 day assessment which comprised the follow-up period. Although regular and intermittent use of sleeping medication was not measured at follow-up, one might assume that the 2 week follow-up period is reflective of their hypnotic use. Future studies would be improved by including, at follow-up assessment, a more comprehensive question regarding use of sleeping medication.

The responses to five open-ended questions from the Patient Outcome Rating Scale (POR) which explore clinical significance were examined. Nine subjects felt that the treatment helped them in areas of their life other than insomnia while six stated that it did not. The areas in which subjects felt they were helped were more energy, able to get more accomplished, more organized, motivated to keep busy, more confident, cutting down on watching TV and saving on electric bill.

Five of 16 subjects who responded stated that the treatment interfered with other areas of their lives. One subject began napping during treatment, a behavior she did not like. Another subject did not like the restriction in waking and sleeping hours. One subject felt tired almost all day. Two female subjects found it difficult to synchronize their sleep schedules with their significant others. The remaining 10 subjects found the treatment did not interfere.

The treatment components which were thought to be the most helpful to subjects centered around sleep schedules. The rearrangement of their sleepwake patterning was the most frequently cited component. Staying up later at night and until one is tired was mentioned by several subjects. Subjects also felt that limiting naps was helpful. One subject indicated that realizing she may not need so much sleep was beneficial.

The above findings are clinically relevant because of their self-report nature. It is the subjective component of insomnia that motivates the person to
pursue treatment. The person's perspective of a health related problem is therefore important not only in research but in the clinical setting. Nurses in clinical practice rely on the verbal reports of their clients throughout the nursing process.

## Limitations and Weaknesses of the Study

There are several limitations to the present study. First, the study had a small sample size. The findings from the between group comparisons on sleep behaviors were almost exactly replicated for the WLC group, however, replications with larger samples are warranted.

The lack of polysomnography is a limitation which relates to several issues. First, without polysomnography at the screening assessment phase, other sleep disorders cannot be satisfactorily ruled out. In addition, distinctions between psychophysiological (complaints verified by polysomnography) and subjective (complaints without evidence of polysomnographic changes) insomnia cannot be made. The findings may therefore be limited to a heterogeneous group of insomnia types. Finally, the subjective estimates of sleep variables cannot be verified by the measurement of sleep stages. Selfreport estimates versus polysomnographic measurement has indicated that poor sleepers are known to overestimate sleep onset latency and wake after sleep onset as well as underestimate sleep duration (Coates et al., 1982). Thus, polysomnographic validation may be useful to determine more precisely
the extent and nature of the sleep difficulties. More current findings indicate that older women evidenced higher correlations between EEG measures and self-report measures than elderly men (Hoch et al, 1987). These findings and the fact that insomnia has a strong subjective component add some support to the use of self-report measures. .Therefore, replications that consistently demonstrate changes with subjective estimation are useful in advancing this area of research.

All of the subjects in the study were Caucasian and well educated. Although not measured, it was evident through numerous contacts with the subjects that they at least represented a middle class socioeconomic status. The subjects were quite motivated and actively sought a nonpharmacological treatment for their sleep difficulties. These characteristics reflect the subject profile of the majority of studies in this area and limit the generalizeability of the findings. More active pursual of minorities, less educated, less motivated, and less socioeconomically advantaged subjects is needed. Such samples would challenge all aspects of treatment delivery as well as extend results in a much needed direction.

The WLC group subjects were measured at all time points on the sleep behavior variables, i.e. the sleep diary. They were not reassessed prior to delayed treatment on any of the other measures. Therefore the statistical analysis was somewhat limited. The WLC group did not complete sleep diaries
during the treatment group's intervention phase. One reason for not measuring the WLC group at the two phases mentioned was a fear on the part of the investigator of burdening the subjects with so much measurement that they would drop out before their scheduled delayed treatment. Another reason, which pertains to the sleep diaries only, was Kazdin's (1974) suggestion that keeping a record can change the behavior being monitored. Recently, Morin et al. (1993) had the WLC group subjects in their study complete diaries during the immediate treatment condition without significant changes in their sleep behavior. This allows more interesting comparisons and may be included in the investigator's future studies.

Although therapy was conducted in a group format, the therapist (the investigator) had a great deal of individual contact with subjects and they received a substantial amount of attention. There was an initial phone contact, a lengthy screening interview, phone calls when daily sleep diaries were incomplete, four treatment classes, two telephone intervention contacts, and probably other miscellaneous phone contacts. The therapist provided support and encouragement, particularly in the beginning of treatment when the side effects of the intervention (e.g. feeling more tired, irritability) were apparent. These nonspecific treatment factors may have influenced the outcomes. Nonspecific factors can often be studied empirically (Kazdin, 1980). An empirical examination of factors such as amount of contact and therapist
behavior was not undertaken in this study but should be incorporated in future studies by the investigator.

## Implications for Nursing

Human field patterning assumes more complexity, diversity, and higher frequency as people age (Rogers, 1986). This is particularly true for a specific correlate of patterning, the sleep-wake experience. It has been noted that increased complexity is not necessarily a beneficial experience unless it is accompanied by pattern and organization (Reed, 1983). The intervention sought to organize current sleep-wake patterns by consolidating sleep and establishing a consistent sleep-wake schedule. The reduction in wake after sleep onset and increase in sleep efficiency after treatment demonstrates more consolidated, consistent sleep. When asked which aspect of treatment was most helpful, the subjects most frequently listed the rearrangement of the sleepwake schedule. Thus the organization of the sleep-wake experience supports framing a nursing research intervention within a nursing conceptual framework such as Rogers' model. Behavioral treatments are a logical alternative to pharmacological treatment in order to strengthen sleep-wake patterns and enhance unitary human development or aging. The empirical findings from research such as the present study have the potential for clinical utilization.

In order for nurses to use behavioral treatments in practice, not only must nurse researchers become more involved in this area, there must also be
an increase in the nurse's exposure to the science of sleep and sleep disorders at both the undergraduate and graduate levels. A recent survey by Cohen (1992) indicated that nursing programs have little sleep content in their curriculums. Scientific knowledge in the area of sleep could be enhanced for nursing practice by framing it within nursing conceptualizations that emphasize patterning. Rogers' Science of Unitary Human Beings and Newman's Health as Expanding Consciousness models would be applicable to sleep and sleep disorders.

## Implications and Recommendations for Research

The current study was a replication of Hoelscher and Edinger's (1988) treatment outcome study of older insomniacs which used four females in a multiple baseline design. The present study extended their finding of improved wake after sleep onset while improving the methodological rigor. Since this is the first replication of this package using a control group, further replications are warranted.

Several factors point toward the possibility of eliminating sleep restriction therapy from the treatment package. Empirical evidence indicates that stimulus control instructions may be more effective than sleep restriction therapy in reducing some insomnia complaints (Anderson et al., 1988). Stimulus control instructions are the gold standard against which other behavioral treatments are tested. Although the intervention was effective, the subjects complained
fervently about staying up to the scheduled bedtime. Stimulus control instructions allow the subjects to go bed when they're sleepy.

An alternative treatment package which builds upon the present study would be the addition of cognitive therapy for insomnia as developed by Morin (Morin et al., 1993). This package would resemble the package currently used by Morin et al. Therefore, an approach not yet tested would be the use of sleep education, stimulus control, an optional daytime nap, and cognitive therapy.

The issue of individuals who do not respond to treatment needs to be addressed. Insomnia researchers have called for the development of individualized treatment for persons with insomnia (Bootzin \& Perlis, 1992; Lacks \& Morin, 1992). Sensitive instruments to recognize specific subtypes of insomnia would need to be developed.

Persons who have not been included in the samples of previous insomnia treatment outcome studies must be actively sought. The inclusion of minorities, less educated, less socioeconomically advantaged, and less motivated individuals in outcome studies would improve generalizeability. In addition, different methods of delivering treatment to these individuals would have to be considered.

Previously tested interventions have been delivered by group and individual methods. Group and individual modalities must be compared. Other
methods of treatment delivery would not only provide information about differential efficacy (Lacks \& Morin) but might enable investigators to recruit previously underresearched elders with insomnia. The present study used four weeks of classes and two weeks of telephone intervention. Videotapes or audiotapes sent to the subject's home could be used to implement the educational component of the treatment. Additional sessions might be able to be conducted entirely by telephone. Printed information could supplement the telephone sessions. These alternative delivery modalities might allow, for example, recruitment of persons living in rural areas, elders without transportation, and disabled individuals. Persons in these groups could include the underresearched individuals described above.

An important component missing in this study was the quantification of the intervention. Variables such as the number of classes attended, satisfaction with classes, and how much of the treatment the subjects actually used could quantify the treatment. The influence of the variables on treatment outcomes could be examined.

The direct and moderating influence of personal characteristics on the treatment outcomes were not considered in this study. Gender, duration of insomnia problem, and severity of insomnia are some examples of possible direct and moderating influences on treatment outcomes.

An area important to nursing is the prevention of health problems. Nurse researchers should consider strategies to prevent short-term or subacute insomnia from developing into persistent or chronic sleep difficulty. Findings from longitudinal designs could inform nursing practice regarding preventative behavioral interventions.

The measurement of clinical significance in treatment outcome studies should be maintained. These findings are of great value to an applied discipline such as nursing. Certain criteria exist which are specific to insomnia, therefore, researchers must begin to develop standardized evaluations of clinical significance (Lacks \& Morin, 1992).

Finally, nurses are in an excellent position to begin to investigate the use of behavioral treatments in settings other than the community. Nurses interact with older patients in retirement residences, extended care facilities, rehabilitation settings, and acute care institutions. These patients may benefit from well designed intervention studies. Patients in these settings often have chronic sleep problems while others may develop acute insomnia problems.

## Conclusion

Significant statistical and clinical findings were established to support the use of behavioral intervention in older persons with sleep maintenance insomnia. The sleep of elders in this study became more consolidated and efficient. The older adults developed more consistent sleep-wake patterns.

This study contributes to the growing body of knowledge in the behavioral treatment of sleep difficulties in elders. Behavioral treatment for insomnia can positively affect the daily functioning of older adults and reduce presleep anxiety and dysfunctional cognitions regarding sleep. The findings support previous conclusions that the treatment of insomnia with pharmacological agents is not necessary. Furthermore, the study provides evidence that the problem of insomnia should not be ignored or treated as a normal developmental consequence that must be tolerated. Older persons with insomnia who have physical health problems need not be excluded from treatment in the research or clinical setting.

Nurses can significantly contribute to alleviating the problem of insomnia in elders. Increased scientific knowledge regarding sleep should be made available to nursing students at the undergraduate and graduate levels as well as to practicing clinicians. Dissemination of existing research findings regarding intervention with older persons can raise the awareness of nurses who have daily contact with this population. Nurses must begin to take their place in the emerging multidisciplinary approach to sleep and sleep disorders. The opportunity to contribute scientifically to behavioral intervention in insomnia exists. Research in insomnia and its treatment remains virtually an untapped area for nurse scientists.

## APPENDIX A

Instruments

## 1. NATURE OF SIEER/WAKE PRGBLEM

Do you have problem falling asleep?
Do you have problem waking up at night? in the morning?
Do you have problem waking up too early in
Do you have problem staying awake during the day?
Y

What is your usual bedtime on week days?
what time do you last awaken in the morning?
What is your usual arising time on week days?
Do you have the same sleep/wake schedule on weekends? -'clock
Do you take daytime naps? (Including unintentional naps)
$\overline{\text { YN }}$
If yes, how many days a week? days
On a typical night (past month), how long does it take
you to fall asleep after you go to bed and turn the
lights off?
on a typical night (past month), how many times do you wake up during the middle of the night? $\qquad$
On a typical night, how long do you spend awake in the middle of the night? (Total \# of min./hrs. for all awakenings) $\qquad$ hrs__min

How many hours of sleep per night do you usually get? $\qquad$ hrs $\qquad$ min
2. SLEEPING AIDS

In the past 4 weeks have you used sleeping pills? $Y$ N
If yes, which drugs and what amount?
how many nights/week?
If no, have you ever?
When did you FIRST use sleep medication?
When did you LAST use sleep medication?
In the past 4 weeks have you used alcohol to help
fall asleep at bedtime or return to sleep after awakening? yN
If yes, what kind and how many oz.?
how many night/week?
If no, have you ever?
3. SLEEPING PROBLEM HISTORY (On set, course, duration)

How long have you been suffering from insomnia? $\qquad$ Years $\qquad$ Months

When did you first start experiencing sleeping problems?
Were there any stressful life events related to its onset (e.g. death of a loved one, divorce, retirement, medical or emotional problems, etc.)?

What has been the course of your insomnia problem since its onset? (e.g. persistent, episodic, seasonal, etc.)

Have you ever received any types of treatment, other thanYN sleeping pills, to alleviate your insomnia? If so, treatment and outcome?
4. BEDROOM ENVIRONMENT

| Are you sleeping with a bed partner? | Y | N |
| :--- | :--- | :--- |
| Is your mattress comfortable? | Y | N |
| Is your bedroom quiet? | Y | N |
| Do you have a T.V. radio, phone in your bedroom? | Y | N |
| Is there a desk with paper work to be done in bedroom? | YN |  |
| Do you read in bed before bedtime? | N | N |
| What is your room temperature at night? |  |  |

5. EATING EXERCISE, AND SUBSTANCE USE HABTTS

How many time per week do you exercise?
Do you sometime exercise prior to bedtime? $\quad \mathrm{N}$
How many caff. beverages to you drink per day? after dinner?
How many cigarettes per day do you smoke?
How many oz. of alcohol per day do you drink?
6. RULE OUW OTHER SLEEP/WAKE DISORDERS

Do you fall asleep during the day? $\quad \mathrm{Y} \quad \mathrm{N}$
Have you ever worked on rotating shift? $\quad \mathbf{Y}$
Have you or your spouse ever noticed one of the following:
A. RESTLESS LEGS: Crawling or aching feelings in the legs (calf) and inability to keep legs still:
B. PERIODIC IEG MOVEMENTS: Leg twitches or jerks during the night:
C. APNEA: Snoring, pauses in breathing at night, short of breath, choking at night; morning headaches, chest pain, dry mouth;
D. NARCOLEPSY: Sleep attacks, sleep paralysis, hyp. hall., cataplexy;
E. GASTRO-ESOPHAGEAL REFLUX: SOur taste in mouth, heat burn; reflux;
F. PARSOMNIAS: Nightmares, night terrors, sleep walking, sleep talking.

## 7. MEDICAL_HISTORY/MEDICATION USE

Last Physical Exam:
Current Medical Diagnosis:
Current Medications:

## 8. PSYCHOLOGICAL SCREENING

PREVIOUS HISTORY OF PSYCHOPATHOLOGY
Are you currently receiving psychological or psychiatric treatment for emotional or mental health problems? $\quad \mathbf{Y}$

Have you or anyone in your family ever been treated for emotional or mental health problems in the past? YN

Was there a time when you or someone else thought you should see someone because of the way you were feeling or acting?
$\mathbf{Y} \quad \mathbf{N}$
Have you or anyone in your family ever been a patient in a psychiatric hospital? $\quad \mathrm{Y}$

Has alcohol ever caused problems for you? $Y$ N
Has anyone ever objected to your drinking? $\quad \mathrm{Y}$
Have you ever been treated for alcohol/substance
abuse problems?
9. CURRENT RSXCHOPATHOLOGY

Has anything happened lately that has been especially
hard for you?

What about difficulties at work or with your family? YN

In the last month, has there been a period of time when you were feeling depressed or down most of the day nearly every day? If yes, as long as two weeks? ? 123

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What about being a lot less interested in most things
or unable to enjoy the things you used to enjoy? If
yes, was it nearly every day?
12 3
For the past couple of years, have you been bothered by depressed mood most of the day, more days than not? If yes, more tan half the time? \(\quad\) ? 213
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Have you ever had a panic attack, when you suddenly
felt frightened, anxious or extremely uncomfortable?
If yes, 4 attacks within l month? ?
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Have you ever been afraid of going out of the house alone, being in crowds, standing in a line, or traveling on buses or trains? ? 12

Have you ever been bothered by thoughts that didn't make any sense and kept coming back to you even when you tried not to have them? (e.g. awful thoughts, like actually hurting someone even though you didn't want to, or being contaminated by germs or dirt) $\quad ? \begin{array}{llllll} & 2 & 3\end{array}$

In the last 6 months, have you been particularly nervous or anxious?

Do you worry a lot about terrible things that might happen? $\quad ? \quad 1 \quad 2 \quad 3$

During the last 6 months, would you say that you have been worrying most of the time (more days than not)?? $\begin{array}{llll}1 & 2 & 3\end{array}$

RULE OUT:
? = Inadequate Info.; $1=$ Absent or False; $2=$ Subthreshold; 3 = Present

## cage

1. Have you ever felt the need to cut down on your drinking?
2. Have people annoyed you by criticizing your drinking?
3. Have you ever felt badly or guilt about your drinking?
4. Have you ever had a drink first thing in the morning (eye opener)?

## MOOD ASSESSMENT SCALE

| Date SID |  |
| :---: | :---: |
| 1. Are you basically satisfied with your life? | YES/NO |
| 2. Have you dropped many of your activities and interests? | YES/NO |
| 3. Do you feel that your life is empty? | YES/NO |
| 4. Do you often get bored? | YES/NO |
| 5. Are you hopeful about the future? | YES/NO |
| 6. Are you bothered by thoughts you can't get out of your head? | YES/NO |
| 7. Are you in good spirits most of the time? | YES/NO |
| 8. Are you afraid something bad is going to happen to you? | YES/NO |
| 9. Do you feel happy most of the time? | YES/NO |
| 10. Do you often feel helpless? | YES/NO |
| 11. Do you often get restless and fidgety? | YES/NO |


| 12. Do you prefer to stay at home, rather that going out and <br> doing new things? | YES/NO |
| :--- | :--- |
| 13. Do you frequently worry about the future? | YES/NO |
| 14. Do you feel you have more problems with memory than most? | YES/NO |
| 15. Do you think it is wonderful to be alive now? | YES/NO |
| 16. Do you often feel downhearted and blue? | YES/NO |
| 17. Do you feel pretty worthless the way you are now? | YES/NO |
| 18. Do you worry a lot about the past? | YES/NO |
| 19. Do you find life very exciting? | YES/NO |
| 20. Is it hard for you to get started on new projects? | YES/NO |
| 21. Do you feel full of energy? | YES/NO |
| 22. Do you feel that your situation is hopeless? | YES/NO |
| 23. Do you think that most people are better off than you are? | YES/NO |
| 24. Do you frequently get upset over little things? | YES/NO |

25. Do you frequently feel like crying? ..... YES/NO
26. Do you have trouble concentrating? ..... YES/NO
27. Do you enjoy getting up in the morning? ..... YES/NO
28. Do you prefer to avoid social gatherings? ..... YES/NO
29. Is it easy for you to make decisions? ..... YES/NO
30. Is your mind as clear as it used to be? ..... YES/NO

## SELF-EVALUATION QUESTIONNAIRE PART I

Date $\qquad$ SID

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the phrase that indicates how you feel right now, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

1. I feel calm.

Not At All Somewhat Moderately So Very Much So
2. I feel secure.

Not At All Somewhat Moderately So Very Much So
3. I am tense.

Not At All Somewhat Moderately So Very Much So
4. I feel strained.

Not At All Somewhat Moderately So Very Much So
5. I feel at ease.

Not At All Somewhat Moderately So Very Much So
6. I feel upset.

Not At All Somewhat Moderately So Very Much So
7. I am presently worrying over possible misfortunes.

Not At All Somewhat Moderately So Very Much So
8. I feel satisfied.

Not At All Somewhat Moderately So Very Much So
9. If feel frightened.

Not At All Somewhat Moderately So Very Much So 10. I feel comfortable.

Not At All Somewhat Moderately So Very Much So 11. I feel self-confident.

Not At All Somewhat Moderately So Very Much So
12. I feel nervous.

Not At All Somewhat Moderately So Very Much So
13. I am jittery.

Not At All Somewhat Moderately So Very Much So
14. I feel indecisive.

Not At All Somewhat Moderately So Very Much So
15. I am relaxed.

Not At All Somewhat Moderately So Very Much So
16. I feel content.253
Not At All Somewhat Moderately So Very Much So
17. I am worried.Not At All Somewhat Moderately So Very Much So
18. I feel confused.
Not At All Somewhat Moderately So Very Much So19. I feel steady.
Not At All Somewhat Moderately So Very Much So
20. I feel pleasant.
Not At All Somewhat Moderately So Very Much So

## SELF-EVALUATION QUESTIONNAIRE PART II

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and circle the phrase that indicates how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.
21. I feel pleasant.

## Almost Never Sometimes Often Almost Always

22. I feel nervous and restless.

Almost Never Sometimes Often Almost Always
23. I feel satisfied with my self.

Almost Never Sometimes Often Almost Always
24. I wish I could be as happy as others seem to be.

Almost Never Sometimes Often Almost Always
25. I feel like a failure.

Almost Never Sometimes Often Almost Always
26. I feel rested.

Almost Never Sometimes Often Almost Always
27. I am "calm, cool, and collected". ..... 255
Almost Never Sometimes Often Almost Always
28. I feel that difficulties are piling up so that I cannotovercome them
Almost Never Sometimes Often Almost Always
29. I worry too much over something that really doesn'tmatter.
Almost Never Sometimes Often Almost Always
30. 1 am happy.
Almost Never Sometimes Often Almost Always31. I have disturbing thoughts.
Almost Never Sometimes Often Almost Always
32. I lack self-confidence.
Almost Never Sometimes Often Almost Always
33. I feel secure.
Almost Never Sometimes Often Almost Always
34. I make decisions easily.
Almost Never Sometimes Often Almost Always
35. I feel inadequate.

## Almost Never Sometimes Often Almost Always

36. I am content.

Almost Never Sometimes Often Almost Always
37. Some unimportant thought runs through my mind and bothers me.

Almost Never Sometimes Often Almost Always
38. I take disappointments so keenly that I can't put them out of my mind.

Almost Never Sometimes Often Almost Always
39. I am a steady person.

Almost Never Sometimes Often Almost Always
40. I get in a state of tension or turmoil as I think over my recent concerns and interests.

Almost Never Sometimes Often Almost Always

## Demographic Data Form

| Demographic Data Form |  |  |
| :---: | :---: | :---: |
| Date | SID |  |
| Age | Gender: Female | Male |

## Marital Status

1. Single
2. Married
3. Widowed
4. Separated
5. Divorced

Ethnic Origin

1. African American
2. Asian
3. Caucasian
4. Hispanic
5. Native American

## Education

Number of years of education

## Employment Status

1. Full time
2. Part time
3. None
4. Retired

## DAILY SLEEP DIARY INSTRUCTIONS

In order to better understand your sleep problem and monitor your progress during treatment, we would like you to collect some important information on your sleep pattern. After you get up in the morning, please answer all questions on the sleep diary. It is important that you complete this diary EVERY MORNING. We realize it is hard to estimate how long it takes to fall asleep or how long one is awake at night; please remember, we do not want exact numbers as this is almost impossible; rather, we want your best ESTIMATES. The following instructions provide specific guidelines for each question.

1. NAPPING: this should include all naps even though they were not intentional. For instance, if you dozed off in front of the T.V. for 10 minutes, please write this down. Make sure to specify a.m. or p.m.
2. SLEEP AID: you should include both prescribed and over-the-counter medications as well as alcohol used specifically as a sleep aid.
3. BEDTIME: This is the time you go to bed and actually turn the lights off. If you go to bed at 10:45 but turn the lights off only at 11:15, you should write both times in that space.
4. SLEEP ONSET LATENCY: provide your best estimate of how long it took you to fall asleep after you turned the light off and intended to go to sleep.
5. NUMBER OF AWAKENINGS: This is the number of times you remember waking up last night.
6. DURATION OF AWAKENINGS: please estimate to the best of your knowledge how many minutes you spent avake for each awakening. If this proved impossible, then estimate the number of minutes you spent awake for all awakenings combined. This should NOT include your very last awakening in the morning as this will be logged in number 8.
7. MORNING AWAKENING: This is the very last time you woke up in the morning. If you woke up at 4:00 and never went back to sleep, this is the time to write. However, if you woke up at 4:00 but went back to sleep for a brief period of time (for example from 6:00 to $6: 20$ ), then your last awakening would be 6:20.
8. OUT OF BED TIME: This is the time you actually got out of bed in the morning for the day.
9. FEELING UPON ARISING: Please use the following 5point scale:
1 =Exhausted; 2=Tired; 3 =Average; $4=$ Rather Refreshed; $5=$ Very refreshed.
10. SLEEP QUALITY: Please use the following 5-point scale:
1 = Very Restless; 2 =Restless; 3 =Average Quality; $4=$ Sound; $5=$ Very Sound.
11. SLEEP RATING: Please use the following 3-point scale:
1 =-Worse than usual; 2 = Same as usual; 3 = Better than usual.

Questions 12 through 18 are designed to find out if you are following the treatment instructions.

> 12. After you turned the lights off intending to go to sleep, were you able to fall asleep in 15 minutes? If true (you were able to fall asleep in 15 minutes), go directly to question 18 (skip questions 13 through 17 ). If false (you were unable to fall asleep in 15 minutes), answer questions 13 through 18 .

Questions 13 through 17 ask questions about your attempts to fall asleep when you first got into bed last night.
18. This questions asks about your attempts to fall back to sleep after awakening during the night. For EACH awakening during the night that lasted MORE THAN 15 minutes, how many times did you get out of bed? Refer to question 5 and see how many awakenings you had that were more than 15 minutes in length. Then, in question 18, list how many times you got out of bed for each awakening that was longer than 15 minutes in length.

PLEASE COMPLETE YOUR SLEEP DIARY EVERY MORNING. PLEASE REMEMBER, WE ONLY WANT YOUR BEST ESTIMATES. IF THERE SHOULD BE SOME UNUSUAL EVENTS ON A GIVEN NIGHT (ILLNESS, EMERGENCY, PHONE CALL), PLEASE INCLUDE IT IN YOUR COMMENTS (QUESTION \#13).

PLEASE CALL YOUR SLEEP DIARY RESPONSES TO THE VOICE MAILBOX EVERY MORNING AFTER COMPLETION. REMEMBER TO STATE YOUR ID\# AND THE DATE. THE TELEPHONE NUMBER IS 529-5236.





| TODAY'S DATE: |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| PLEASE ANSWER THE FOLLOWING QUESTION REGARDING YOUR ATTEMPTS TO FALL BACK TO SLEEP LAST NIGHT. |  |  |  |  |  |  |  |
| 18. For each awakening (listed in question 5) for which you did not fall back to sleep within 15 minutes, how many times did you get out of bed? |  |  |  |  |  |  |  |

COMMENTS:

## PATIENT'S RATING

dATE $\qquad$

For each question, please CIRCLE the number that best describes your answer.

1. Please rate the CURRENT (i.e. last 2 weeks) severity of your insomnia problem(s).

|  | No <br> Problem | Mild | Moderate <br> Problem | Very <br> Severe | Severe |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Difficulty Falling Asleep: | 1 | 2 | 3 | 4 | 5 |
| Difficulty Staying Asleep: | 1 | 2 | 3 | 4 | 5 |
| Problem Waking Up too Early: | 1 | 2 | 3 | 4 | 5 |

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

| Very <br> Dissatisfied | Moderately <br> Satisfied | Very <br> Satisfied |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

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

| Not at all <br> Interfering | A little | Somewhat | Much | Very Much <br> Interéering |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

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

| Not at all <br> Noticeable | Barely | Somewhat | Noticeable | Very Much <br> Noticeable |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

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

| Not at all <br> Worried | A little | Somewhat | Much | Very Much <br> Worried |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

$\qquad$
ID $\qquad$

For each question, please CIRCLE the number that best describes your answer.

1. Please rate the CURRENT (i.e. last 2 weeks) severity of your insomnia problem(s).

|  | No <br> Problem | Mild | Moderate <br> Problem | . <br> Severe | Very <br> Severe |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Difficulty Falling Asleep: | 1 | 2 | 3 | 4 | 5 |
| Difficulty Staying Asleep: | 1 | 2 | 3 | 4 | 5 |
| Problem Waking Up too Early: | 1 | 2 | 3 | 4 | 5 |

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

| Very <br> Dissatisfied | Moderately <br> Satisfied | Very <br> Satisfied |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

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

| Not at all <br> Interfering | A little | Somewhat | Much | Very Much <br> Interfering |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

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

| Not at all <br> Noticeable | Barely | Somewhat | Noticeable | Very Much <br> Noticeable |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

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

| Not at all <br> Worried | A little | Somewhat | Much | Very Much <br> Worried |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

6. Please rate the degree of change, if any, in your sleep pattern since you first enrolled in this treatment program?

| Unchanged <br> or Worse | Slightly <br> Improved | Improved | Much <br> Improved | Very Much <br> Improved (cured) |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

7. How compliant have you been in following the treatment recommendations during this program?

| Not at all <br> Compliant | A little | Somewhat | Much | Very Much <br> Compliant |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

8. How supportive has your spouse or significant other been in helping you follow these treatment recommendations?

| Not at all <br> Supportive | A little | Somewhat | Much | Very Much <br> Supportive |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

9. How would you rate the quality of the treatment you received?

| Very Poor | Poor | Fair | Good | Excellent |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

10. Did you get the kind of treatment you wanted?

| Not at all |  | Somewhat |  | Yes, definitely |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

11. If a friend had insomnia, would you recommend this treatment program to her or him?

| Not at all |  | Perhaps |  | Yes, definitely |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

12. Do you feel you still have a problem with insomnia?

| Yes, severe problems |  |  | No problem at all |  |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

13. Did this treatment help you in other areas of your life besides insomnia? If so, please explain:
14. Did this treatment interfere with other areas of your life: If so, please explain:
15. Why do you think this treatment works or does not work?
16. Which treatment component(s) do you feel was most helpful for you?
17. Please provide any other comments that will help us improve this treatment program:
$\qquad$

## THERAPY EVALUATION QUESTIONNAIRE

For each question, please CIRCLE the number that best describes your answer.

1. How logical does this treatment seem to you?

| Hllogical | Somewhat <br> Logical | Logical | Much <br> Logical | Very Much <br> Logical |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

2. How successful do you expect this treatment to be in alleviating your insomnia problems?

| Unsuccessful | Somewhat <br> Successful | Successful | Much <br> Successful | Very Much <br> Successfiul |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

3. How confident would you be in recommending this treatment to a friend or to someone close to you who was suffering from the same insomnia problem as you?

| Not at all <br> Confident | Somewhat <br> Confident | Confident | Much <br> Confident | Very Much <br> Confident |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

4. If you were having a great deal of difficulty in remaining asleep throughout the night, would you be willing to undergo this treatment again?

| Not at all | Somewhat <br> Willing | Willing | Much <br> Willing | Very Much <br> Willing |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

5. How would you rate the competence of your therapist?

| Not at all <br> Competent | Somewhat <br> Competent | Competent | Very <br> Competent | Extremely <br> Competent |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

6. How would you rate the warmth and supportiveness of your therapist?

| Not at all <br> Warm or <br> Supportive | Somewhat <br> Warm and <br> Supportive | Warm and <br> Supportive | Very <br> Warm and <br> Supportive | Extremely <br> Warm and <br> Supportive |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 |

## SYMPTOM QUESTIONNAIRE

ID \# $\qquad$ Date

## PLEASE CIRCLE THE RESPONSE THAT BEST DESCRIBES HOW YOU HAVE FELT DURING THE PREVIOUS WEEK.

## BASED ON THE PREVIOUS WEEK --

1.) Did you feel tired or fatigued during the day or evening?

NEVER RARELY SOMETIMES FREQUENTLY ALWAYS
2.) Were you sleepy or drowsy during the day or evening? NEVER RARELY SOMETIMES FREQUENTLY ALWAYS
3). Did you take any naps or fall asleep briefly during the day or evening?

NEVER RARELY SOMETIMES FREQUENTLY ALWAYS
4.) Did you feel you had been getting an adequate amount of sleep?

NEVER RARELY SOMETIMES FREQUENTLY ALWAYS
$\qquad$
Circle the one phrase that best represents the extent to which you agree with the item.

When I wake up during the night and try to fall back to sleep...:

1. my muscles are tense.

Strongly Disagree Disagree Agree Strongly Agree
2. my heart is beating rapidly.

Strongly Disagree Disagree Agree Strongly Agree
3. I feel "shaky" (trembling.)

Strongly Disagree Disagree Agree Strongly Agree
4. I become short of breath

Strongly Disagree Disagree Agree Strongly Agree
5. I become aware of my body (feeling itches, sweat, pain, nausea).

Strongly Disagree Disagree Agree Strongly Agree

When I wake up during the night and try to fall back to sleep...:
6. I can't stop my mind from racing.

Strongly Disagree Disagree Agree Strongly Agree
7. I worry that I won't be able to fall asleep.

Strongly Disagree Disagree Agree Strongly Agree
8. I worry that I won't get enough sleep.

Strongly Disagree Disagree Agree Strongly Agree
9. I worry that I won't be able to function the next day if I don't sleep.

Strongly Disagree Disagree Agree Strongly Agree
10. I worry that I will be tired and irritable the next day if I don't sleep.

Strongly Disagree Disagree Agree Strongly Agree
$\qquad$
Several statements reflecting people's beliefs and attitudes about sleep are listed below. Please indicate to what extent you personally agree or disagree with each statement. There is no right or wrong answer. For each statement, place a mark ( () along the line wherever your PERSONAL rating falls. Try to use the whole scale rather than simply placing your marks at one end of the line. Please answer all questions.

1. I need 8 hours of sleep to feel refreshed and function well during the day.

2. When I don't get the proper amount of sleep on a given night, I need to catch up on the next day by napping or on the next night by sleeping longer.

$$
\begin{aligned}
& \text { Strongly } \\
& \text { Disagree }
\end{aligned} \begin{gathered}
\text { Strongly } \\
\text { Agree }
\end{gathered}
$$

3. Because I am getting older, I need less sleep.

| Strongly |  |
| :--- | :---: |
| Disagree | Strongly <br> Agree |

4. I am worried that if I go for 1 or 2 nights without sleep, I may have a "nervous breakdown".

5. I am concerned that chronic insomnia may have serious consequences on my physical health.

6. By spending more time in bed, I usually get more sleep and feel better the next day.

7. When I have trouble falling asleep or getting back to sleep after nighttime awakening, I should stay in bed and try harder.

$$
\begin{aligned}
& \text { Strongly } \\
& \text { Disagree }
\end{aligned} \begin{gathered}
\text { Strongly } \\
\text { Agree }
\end{gathered}
$$

8. I am worried that I may lose control over my abilities to sleep.
Strongly $\qquad$ Strongly
Disagree
Agree
9. Because I am getting older, I should go to bed earlier in the evening.

10. After a poor night's sleep, I know that it will interfere with my daily activities on the next day.

11. In order to be alert and function well during the day, I believe I would be better off taking a sleeping pill rather than having a poor night's sleep.

12. When I feel irritable, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.

Strongly
Disagree $\begin{gathered}\text { Strongly } \\ \text { Agree }\end{gathered}$
13. Because my bedpartner falls asleep as soon as his/her head hits the pillow and stays asleep through the night, I should be able to do so too.

14. I feel that insomnia is basically the result of aging and there isn't much that can be done about this problem.

$$
\begin{aligned}
& \text { Strongly } \\
& \text { Disagree }
\end{aligned} \begin{gathered}
\text { Strongly } \\
\text { Agree }
\end{gathered}
$$

15. I am sometimes afraid of dying in my sleep.
Strongly $\qquad$ Strongly
Disagree
Agree
16. When I have a good night's sleep, I know that I will have to pay for it on the following night.
Strongly

Disagree | Strongly |
| :---: |
| Agree |

17. When I sleep poorly on one night, I know it will disturb my sleep schedule for the whole week.
Strongly

Disagree | Strongly |
| :---: |
| Agree |

18. Without an adequate night's sleep, I can hardly function the next day.
Strongly $\qquad$ Strongly
Disagree Agree
19. I can't ever predict whether I'll have a good or poor night's sleep.

20. I have little ability to manage the negative consequences of disturbed sleep.

$$
\begin{aligned}
& \text { Strongly } \\
& \text { Disagree }
\end{aligned} \quad \begin{gathered}
\text { Strongly } \\
\text { Agree }
\end{gathered}
$$

21. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.
Strongly

Disagree | Strongly |
| :---: |
| Agree |

22. I get overwhelmed by my thoughts at night and often feel I have no control over this racing mind.
Strongly

Disagree | Strongly |
| :---: |
| Agree |

23. I feel I can still lead a satisfactory life despite sleep difficulties.

24. I believe insomnia is essentially the result of a chemical imbalance.

25. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.

$$
\begin{aligned}
& \text { Strongly } \\
& \text { Disagree }
\end{aligned} \begin{gathered}
\text { Strongly } \\
\text { Agree }
\end{gathered}
$$

26. When I have problems sleeping, I should stay in bed and try harder.
Strongly

Disagree $\quad$| Strongly |
| :---: |
| Agree |

27. A "nightcap" before bedtime is a good solution to sleep problems.

$$
\begin{array}{lc}
\text { Strongly } \\
\text { Disagree } & \begin{array}{c}
\text { Strongly } \\
\text { Agree }
\end{array}
\end{array}
$$

28. Medication is probably the only solution to sleeplessness.
Strongly
Strongly
Disagree
Agree
29. My sleep is getting worse all the time and I don't believe anyone can help.

Strongly
Disagree $\begin{gathered}\text { Strongly } \\ \text { Agree }\end{gathered}$
30. It usually shows in my physical appearance when I haven't slept well.

31. I avoid or cancel obligations (social, family) after a poor night's sleep.
Strongly
Strongly
Disagree
Agree

## APPENDIX B

## Permission to Use Instruments

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Good hich. Fet arobwan haver goes.

het selemant
PRof PSYctaDoy AN EQUAL OPPORTUNITY EMPLOYER

# MedicalCollege of Virginia Virginia Commonwealth University 

## February 1, 1991

Dana Epstein
2141 E. Alaska Street
Tucson, AZ 85706

## Dear Dana,

I enjoyed talking with you today about your insomnia project. I think this is a very Important research area and your proposed study should make a significant contribution.

Please find enclosed several assessment instruments you've requested. You have my permission to use these in your research. I have also enclosed a copy of several articles which may be of interest to you.

Sincerely,
Ciurtes Draren
Charles Morin, Ph.D.

CM:gk]
enclosure

## APPENDIX C

Algorithm

The out of bed time will be the same every morning throughout the course of the treatment and established in accordance with the subjects habitual time of arising during baseline and daytime schedule needs such as early enough to get to work and so on. Initial retiring time will be set, to the nearest quarter hour, so that the time spent in bed equals the prescribed TIB. Regardless of the baseline subjective total sleep time no subject will be prescribed less than five hours or more than seven hours TIB at the start of treatment. Based on the initial individually prescribed TIB the following schedule of weekly increases of TIB will be followed:

## WEEKLY INCREASES OF TIB (HRS.)

|  | WEEK \# |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| INITIAL TIB (HRS.) | 1. | 2 | 3 | 4 |
| 5.0 | .5 | .5 | .5 | .5 |
| 5.25 | .5 | .5 | .5 | .25 |
| 5.5 | .5 | .5 | .25 | .25 |
| 5.75 | .5 | .25 | .25 | .25 |
| 6.0 | .25 | .25 | .25 | .25 |
| 6.25 | .25 | .25 | .25 | 0 |
| 6.5 | .25 | .25 | 0 | 0 |
| 6.75 | .25 | 0 | 0 | 0 |
| 7.0 or more | 0 | 0 | 0 | 0 |

The increments in TIB are always added to the beginning of the sleep period, such that subjects go to sieep eariier as treatment proceeds. This scheduie of fixed increased in TIB results in all subjects attaining 7 hours TIB at the end of the fourth week of treatment.

At the first of the two biweekly treatment sessions the following very brief questionnaire will be administered to determine if an increase in TIB is warranted:

Based on the previous week --

1) Did you feel tired or fatigued during the day or evening?

NEVER
2) Were you sleepy or drowsy during the day or evening? NEVER __ RARELY __ SOMETIMES__ FREQUENTLY__ ALWAYS __
3) Did you take any naps or fall asleep briefly during the day or evening? NEVER _ RARELY _ SOMETIMES_, FREQUENTLY_, ALWAYS _
4) Did you feel you had been getting an adequate amount of sleep? NEVER _ RARELY _ SOMETIMES_, FREQUENTLY_, ALWAYS

The increase may be either 25 or .5 hours per week based on the subjects answers to the four items according to the following algorithm:

Value assigned to each answer --
Q 1,2,3: $\operatorname{NEVER}=1$, RARELY $=2$, $\operatorname{SOMETIMES~}=3$, FREQUENTLY $=4$, ALWAYS $=5$ Q4: $\operatorname{NEVER}=5$, RARELY $=4$, SOMETIMES $=3$, FREQUENTLY $=2$, ALWAYS $=1$

If the sum of the values on these four questions is
(a) 9 or less, than no change in TIB
(b) 10 to 12, than TIB is increased by .25 hours for that week and another .25 hour for the next week
(c) 13 or more, than TIB is increased by .5 hours for that week and another .5 hour for the next week

## APPENDIX D

Stimulus Control Instructions(SCI)

## Modified Stimulus Control Instructions*

1. Lie down intending to go to sleep only when you are sleepy and not before the scheduled bedtime.
2. Do no use your bed for anything except sleep; that is, do not read, watch TV, eat, or worry in bed. Sexual activity is the only exception to this rule.
3. When you get into bed, turn out the lights with the intention of going right to sleep. If you cannot fall asleep within 15 minutes, get out of bed and go into another room. Engage in some quiet activity until you feel drowsy. Return to the bedroom when sleepy.
4. If you still cannot fall asleep within 15 minutes, repeat Step 3. Repeat this process as often as is necessary throughout the night. Use this procedure when you awaken during the night and cannot fall back to sleep within 15 minutes.

* Based on stimulus control instructions developed by Richard R. Bootzin, PhD, University of Arizona.
Insomnia Treatment Study, 1993


## APPENDIX E

Human Subjects

ARRONA
heaith Sciences Center


Tucson, Arizona 85721 (602) 626-6154

## MEMORANDUM

| TO: | Dana Epstein |
| :--- | :--- |
| FROM: | Leanna Crosby, D.N.Sc., R.NDe |
| DATE: | Febnary 8, 1991 |
| SUBUECT: | Human Subjects Review: |

- An Imtervention to Enhance the SleepWake Pattems of Older Adults with Insomnia'

Your project has been reviewed and approved as exempt from University review. A consent form with subject signature is not required for projects exempt trom full University review. Please use only a disclaimer format for subjects to read before giving their oral consent to the research. The Hi nan 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.
LC:dbr

## APPENDIX F

Disclaimer

Disclaimer Form<br>An Intervention to Enhance the Sleep-Wake Patterns of Older Adults with Sleep Maintenance Insomnia

I am being asked to read the following material to ensure that I am informed of the nature of this research study and how I will participate in it. By responding to the questionnaires used in the research study, I will be giving my consent to participate in the study.

I am being voluntarily invited to participate in the above titled research project. The purpose of this project is to determine the effectiveness of a behavioral treatment in establishing a consistent sleep pattern in older adults with insomnia. I am being invited to participate because I am an adult age 60 or older who experiences time awake after sleep onset that is greater than 60 minutes per night at least 3 times per week for at least the past six months. I can read and write English. Approximately 34 subjects will be enrolled in this study.

The first step in the research project is a screening interview. During the interview I will complete several questionnaires. The interview takes approximately one hour. Based on the results of the interview and questionnaires, I will be asked to complete two weeks of sleep diaries at home each morning and call them to a telephone message machine. The results of the two weeks of sleep diaries will be evaluated and the decision to accept me into the study will be made at this time by the investigator based on my sleep-wake pattern. If at this point I agree to participate in this research project, I will be assigned by chance to one of two groups. Participants in Group One will receive the behavioral treatment immediately. Participants in Group Two will receive treatment after Group One completes their treatment.

The treatment consists of classes on how to consolidate sleep hours and guides the participants in establishing a consistent sleep pattern. I will be asked to attend four weekly treatment classes. After the classroom treatment is completed, there will be two telephone treatment contacts. The telephone treatment contacts will occur once per week for two
weeks. Each class will include five to eight persons and will meet for approximately 60 to 90 minutes at the University of Arizona College of Nursing. I understand that each class and telephone contact will be audiotaped to ensure that all classes and telephone contacts are conducted in a consistent manner. The audiotapes will be transcribed to typewritten notes after each class and erased after transcription. My name will not appear on the transcribed notes.

I will be asked to call my sleep diary responses to a telephone message answering machine each morning over several time periods. This takes a few minutes to complete. I will be asked to complete several paper and pencil sleep questionnaires at different points over several time periods. The paper and pencil questionnaires take approximately 10 to 20 minutes to complete. Time one will be two weeks prior to treatment, time two will be during the six weeks of treatment, time three will be during two weeks approximately three months after completion of treatment, and time four will be during two weeks approximately two years after completion of treatment. I understand that I will not be identified on any questionnaire by name, however, I will be asked for some background information about myself.

I understand that there are no risks or costs to me beyond the time involvement as a result of participating in the study. If the treatment is effective, it is possible that I will develop a more consistent sleep pattern. I am aware that I may ask questions at any time, and have the freedom to withdraw from participation in the study at any time without incurring ill will.

I understand that any information that is collected about me during this study will be kept confidential. Analysis of the research results will only refer to the group, not to any individual. The information obtained will be used only for research purposes, and may be published at a later date.

Dana Epstein, Principal Investigator 529-5236

## APPENDIX G

Treatment Protocol Rating Checklist


Nite - Subjects/topics - now Specific 299 6 th angst Minces,

BEHAVIORAL TREATMENT FOR INSOMNIA
Brief Description of InterventionSleep education component
Provides information about sleep
Sleep efficiency treatment
Limiting the amount of time spent in bed
V Help to consolidate sleep

- Stimulus control instructions

Learn to reassociate the bed and bedroom with rapid sleep onset

- An optional daytime nap

Developing new, permanent sleep habits. I will not be doing anything to you


# 3 kines of ivinninet 

## Sleep Education

Provide you with basic information
You can set the ideal conditions for sleep to occur
Learn new sleep behaviors
Sleep architecture
Sleep stages
Five stages of sleep
Stage 1
Stage 2
Stages 3 and 4
Rapid eye movement sleep (REM sleep)
The four stages of sleep followed by REM is considered a sleep cycle and is repeated about four to six times per night

Age related sleep norms and the effect of the aging process on sleep
Experience less slow wave sleep or deep sleep
Increases in light sleep
Awakening more
 fra, $=$

Sleep is less efficient
Frequency of daytime napping increases with age
Circadian rhythm
Body rhythms that take about 24 hours to complete
Cues
Regular wake-up time
Changes in the circadian rhythms

Shortens as we grow older
Internal clock runs faster
Less active lifestyle than they did when they were younger
__ End up keeping an irregular schedule
__ Individual sleep needs and expectations regarding sleep
Amount of sleep needed by individuals differs greatly
_ People may not need as much sleep as they think they do
Time in bed spent resting is not beneficial
$\ldots$ Important to NOT spend time just lying in bed
!. Sleep deprivation
__. It is not a catastrophe to go without sleep
_. Very little performance deficit
__ Fatigue follows a daily circadian rhythm
$\frac{1}{6}$
Effect of exercise on sleep
Do not have vigorous exercise immediately prior to bedtime
$y^{\prime \prime}$
Effect of the environment on sleep Light/Dark

Noise
Delay sleep
Decrease the amount of deep sleep

- Cause more frequent awakenings
$\sqrt{ } /$ Older persons have less deep sleep. Therefore, older adults are more easily
Older pers awakened

Room temperature and firmness of mattress -

Temperatures between 65 and 70 degrees $F$ are ideal for sleeping
Effect of food on sleep
Try to eat dinner several hours before bedtime
Hunger can disturb sleep
Light bedtime snack can be helpful
Combination of carbohydrates and protein
_- Important, however, that no one eat a snack in the middle of the night
Effect of alcohol, caffeine, and nicotine on sleep
Do not drink alcohol later than 2 hours prior to bedtime
Leads to restlessness, nonrestorative sleep and the tendency to wake up during the night

Alcohol intensifies the effect of medications
/ Do not drink caffeine later than 6 hours before bedtime
A powerful and long-lasting stimulant
Brief amount of time educating the group as to which substances contain caffeine and in what amounts

- Teach the subjects the importance of checking labels/and of talking with their physicians or pharmacists

3
Strongly discourage any client from eliminating a prescribed medication without consulting the physician

Try not to smoke within several hours of your bedtime
Effect of sleep medication on sleep
Most sleeping medication is ineffective beyond two weeks of continuous use

Tolerance to the medication develops quickly
_ Sleeping medication deprives us of REM sleep causing REM rebound on
subsequent nights
Sleeping medications put older adults at risk for toxic side effects
Put the bedroom clock out of sight and hearing
Watching the clock puts unnecessary pressure on people with insomnia that is not conducive to sleep

$$
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& \text { Sleep on. wis } \\
& \text { - Spouse sleeps'. a } 9 \text { 'ami. } \\
& \text { Chime Clock - whiles } \\
& \text { other-spoise is keptrwake } \\
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\end{aligned}
$$

## Sleep Efficiency Treatment

People who have insomnia may spend a great deal of time lying in bed trying to fall asleep both at the beginning of the night and at awakenings during the night

Spending too much time in bed awake and the lack of a consistent sleep schedule can be major contributors to sleep difficulties in older adults

- See how the ideas of spending a lot of time lying in bed trying to sleep (getting in bed too early and staying in bed late in the morning) fit with the subjects' current patterns

Get an idea of what the subjects think is their TIB:TST (time in bed to total sleep time) ratio

Time is devoted to establishing an initial sleep schedule for the subjects
Each subject is then informed of the time in bed allotment
Be sure that the subject understands that the wake time remains fixed throughout treatment and the bedtime becomes earlier as sleep improves and more time in bed is allotted by the treatment

Daily sleep diary that you call in to the voice mail service provides the information for adjusting the sleep efficiency treatment schedule

We also want you to call and leave a message if you find that the schedule is not working for you
$\qquad$ Please don't change the schedule without discussing it with us
$\qquad$ First two or three weeks of treatment are the most difficult

- People need the entire 6 weeks of treatment and often continue to accrue benefits from the treatment after the six weeks are completed

Discuss ways to keep busy and stay awake
Nonsedentary activities are appropriate for the evening
Each subject should have a list of activities to pursue
_ Subjects must also avoid prolonged periods of listlessness

$$
\begin{gathered}
\text { "Wake' up" Goes } \\
\text { - protons }
\end{gathered}
$$



## CLIENTS SHOULD NOW BE TOLD TO BEGIN FOLLOWING THIS SCHEDULE TONIGHTII

## Lecture and Discussion: Stimulus Control Instructions

Much of what we do is influenced by the time and the place we are in For people who sleep well, the bed and bedroom act as a signal to feel sleepy and to fall asleep quickly
$\checkmark$ For people who have insomnia, the bed and bedroom may have become a signal for other activities

Sometimes this connection begins after something happens that disrupts normal sleep

After the disruption is over, poor sleep, frustration, and any activities that the poor sleeper may have performed while waiting for sleep (e.g., reading, watching television) remain associated with the bed and bedroom

Instruction 1: Lie down with the intention of going to sleep only when you are sleepy and not before the scheduled bedtime

By not going to bed before the scheduled bedtime and by establishing a fixed time for getting up, your body will adjust to a consistent schedule that will allow the amount of sleep you actually do need in order to function well

Have each person become more aware of his or her own feelings and signs of sleepiness and tell clients to use these feelings as a cue to go to bed

Instruction 2: Do not use your bed or bedroom for any activity other than sleep
_ Discourage clients from trying to give up these other activities. If they are doing them, they must be enjoyable or important to the client and should not be given up. Discuss other times and places to carry out these activities

Instruction 3: Establish a set of regular presleep routines that signal the approach of bedtime

Engaging in this routine is one of the beginning cues that it is time to go to sleep

[^0]__ Discuss using the strategies that they developed under instruction 4.

## CLIENTS SHOULD NOW BE TOLD TO BEGIN FOLLOWING ALL OF THESE RULES

 TONIGHT!___ Reemphasize how difficult it will be for them to follow these rules at first
_ Clients should expect their sleep to get worse the first week
__ Most likely you will be getting up many times during the night
__ You will feel tired
__ But for most people this worsening of the target behavior is temporary,
__ You should see a leveling-off effect and then a gradual improvement

## Optional Daytime Nap

_ Many people experience poor sleep at night because of the way they have scheduled their sleep during the 24 hour day

Difficulty staying asleep at night (the sleep is fragmented) and maintaining wakefulness during the day (more likely to be sleepy and take naps)

Optimum time for napping is in the afternoon. An afternoon nap coincides with people's naturally occurring time of increased daytime sleepiness.

Evening naps can interfere with nighttime sleep. A nap can be taken for no longer than one hour and only between the hours of 1 pm and 3pm. If you can't fall asleep in about 10 to 15 minutes, get out of bed and give up the idea of napping OR try again in a little while. You can only nap one time each day. Nap only in your bed

## PRETREATMENT EXPECTATIONS

__ Reviewing client reactions to this first session,
Restate your strongly held conviction that it will take the entire 6 weeks of careful and consistent practice for these instructions to have a beneficial effect
___ Don't tamper with the treatment package, don't pick and choose pieces. Need the entire package to improve sleep.


ASSIGNING HOMEWORK
Point out the homework guidelines.


Review and explain the Daily Sleep Diary
Reemphasize the crucial importance of filling these out each morning upon awakening and calling the responses in to the voice mailbox after completion
_ Be sure the subjects understand the Sleep Efficiency Treatment assignment. Reemphasize the importance of adhering to the established schedule.

$$
\begin{aligned}
& \text { * Sleep batter Aturef ficeil } \\
& \text { Nome - }
\end{aligned}
$$

## APPENDIX H

Treatment Manual

Several sources were used to develop the manual:
Glouinsky, P.B., \& Spielman, A.J. (1991). Sleep restriction therapy. In P. Hauri (Ed.), Case studies in insomnia (pp. 49-63).
New York: Plenum.
Hauri, P. (1982). The sleep disorders. Kalamazoo, Ml: Upjohn.
Lacks, P. (1987). Behavioral treatment for persistent insomnia. New York: Pergamon Press.

THERAPIST'S MANUAL
SESSION ONE

## INTRODUCTIONS

Allow about 15 minutes for this segment.
The object of the introductions is to get group members to relax, to promote their feeling of confidence in the therapist, and to arouse an expectation of success.

1. The therapist introduces himself or herself. If appropriate, the therapist says a few words about personal background or experience in the treatment of insomnia. Any personally experienced previous sleep difficulties that have since been resolved may be mentioned.
2. The therapist gives a short description of the research findings in the treatment of sleep problems, especially the sleep problems of older adults.

The object of activities 3,4 , and 5 is to break the ice and make the subjects feel comfortable with each other. The subjects will begin to experience the group process as participation is encouraged by the therapist. As the subjects listen to others describe sleep difficulties similar to their own, there is usually a feeling of relief. Sleep problems begin to be viewed as less of a stigma.
3. The therapist has each group member introduce him or herself. Group members describe briefly their own histories of insomnia in terms of how long it has been a problem, how frequently they experience these problems, how severe they perceive their problem to be, what solutions they have already tried, and what their current motivation is to seek help for this problem.
4. As each person finishes, the therapist should try to emphasize the similarities among the problems that have been described, especially any that fit into the rationale of the treatment that will be offered (e.g., performance anxiety, disrupted sleep scheduling, worrying in bed, spending too much time in bed awake).
5. Begin to foster a group interaction during this first segment. For example, after each person speaks, you might ask the other group members to comment or to ask questions about what has just been said.

BEHAVIORAL TREATMENT FOR INSOMNIA
The indented material presented below does not have to be said verbatim but the important points must be made. Most of the material can be summarized to make it concise and to the point for the subject.

## Lecture and discussion: Brief Description of Intervention

Allow 10 minutes for this segment.

1. Explain that you are going to describe briefly the treatment.
2. They should not worry if they do not fully understand the treatment right away. Shortly, you will be handing out written instructions, which you will go over point by point.
3. They should not worry about the details but instead should just try to get a feel for what the treatment consists of.

The treatment consists of several different behavior therapy approaches to a complicated problem. Included will be education about sleep, sleep monitoring (which you've done for 2 weeks), procedures called stimulus control instructions and sleep efficiency treatment, and an optional daytime nap.

The sleep education component of the treaatment provides information about sleep. Specifically, the conditions and behaviors that foster good sleeping habits are explained.

Sleep efficiency treatment is a promising new treatment for insomnia that involves limiting the amount of time spent in bed. Sleep researchers are excited by the positive results they are having with this treatment approach. Sleep efficiency treatment is based on the idea that irregular sleep schedules and excessive time spent in bed are factors which perpetuate people's sleeping problems. Sleep efficiency treatment will help to consolidate sleep time and schedule it to take place at those points of the daily sleep-wake cycle when the person is most sleepy.

Stimulus control instructions were developed by Dr. Richard Bootzin at The University of Arizona and have been widely researched across the country. With stimulus control instructions you will learn to reassociate the bed and bedroom with rapid sleep onset. The bed and bedroom will be weakened as a cue for other activities. You will learn to maximize the cues that are associated with feeling sleepy and falling asleep, and to decrease the cues that are associated with staying awake.

You will come to 3 more classes. This will provide an opportunity for us to see how well you have followed the treatment and to allow us to work as a group to solve problems and make suggestions. The final two weeks of treatment are done entirely by telephone. I will contact once each week you to make any changes in the treatment and discuss any problems you might be having. You will continue to call in your sleep diary responses to the voice mailbox each day.

Sleep researchers have found that many people experience poor sleep at night because of the way they have scheduled their sleep during the 24 hour day. For instance, many people doze on and off at odd times during the day and evening. Sleep scientists now believe that there is an optimum time of day for napping as well as a maximum amount of time to spend napping. Therefore, the behavioral treatment package includes an optional daytime nap for persons who choose to do so. However, you will be taught how to nap to take advantage of sleep science principles.

Persons with insomnia often have difficulty falling asleep. Nocturnal awakening--waking up in the middle of the night--is often one of the most troubling aspects of many older persons' sleep. The treatment package is believed not only to reduce the amount of time spent in falling asleep, but also to decrease the tendency to wake up once sleep has begun. Less time should be spent lying awake in bed. You will learn to acquire a consistent sleep rhythm through sleep scheduling. Over time, as your sleep becomes more regular, your sleep should become more restful, refreshing, and satisfying.

You will be developing new, permanent sleep habits. I will not be doing anything to you. I will be helping you discover old habits and cues that are keeping you awake. Then I will be helping you to develop new habits that will help you fall asleep rapidly and stay asleep. We will work together to develop a sleep schedule for each individual in the group that will consolidate your sleep and establish a consistent sleep-wake schedule.

For this therapy to work, you will have to monitor your behavior carefully. You will also have to practice the recommended new behaviors consistently so that they become routine or habitual. Even after you are sleeping better, you must continue to use the new habits regularly.
4. Make an analogy to new eating habits for weight control or to reduction of salt intake to control high blood pressure.

Once you have learned these new behaviors, you will use them consistently every day to ensure that they become habits. Are there any questions?
5. Make sure clients buy this explanation of insomnia and why this treatment works. Clarify any issues or uncertainties raised by group members.

## Lecture and Discussion: Sleep Education

Allow about 30 minutes for this segment.
The lecture provides the subjects with basic sleep information. The information and discussion will help to correct any misunderstandings the older person may have about sleep.

We've found that many people have little knowledge about sleep or the prevalence of sleep problems. This portion of the treatment will provide you with basic information about sleep, particularly the sleep of older adults, as well as the conditions and behaviors that are important in obtaining a satisfying night of sleep. It is especially important to remember that you cannot control sleep directly. However, you can set the ideal conditions for sleep to occur and learn new sleep behaviors and that is exactly the type of information that this component, as well as the other parts of the treatment, tries to provide. You can learn to master the sleep situation rather than feeling as though you are a victim of it but you must be willing to put the time and energy into practicing what you learn here.

Hand out the sleep education information.
The first aspect of sleep education deals with the stages of sleep.

## 1. Sleep architecture <br> Sleep stages

Typically there are five stages of sleep. Persons move through sequences of sleep in a fairly regular fashion. The following discussion of sleep stages is based on typical descriptions of younger adults' patterning (e.g. Rechtschaffen \& Kales, 1968; Kales \& Kales, 1984). We'll talk about how this differs from older persons' patterning. When persons lay back and close their eyes they are in an alpha state that is associated with wakefulness or resting. The disappearance of alpha, is a good measure of the next stage of sleep or stage 1 . Stage 1 is a transition stage that has a feeling of drifting off to sleep. Stage 2 is usually considered the stage of sleep onset. Stages 3 and 4 are referred to as slow wave, delta sleep, or deep sleep. Stage 3 and 4 sleep occurs predominantly early in the night. Raapid eye movement sleep (REM sleep) is often associated with dreaming. The body seems to have a strong need for REM sleep. REM sleep occurs approximately every 90 to 100 minutes with more of it occurring toward the end of the night. The four stages of sleep followed by REM is considered a sleep cycle and is repeated about four to six times per night.

Age related sleep norms and the effect of the aging process on sleep
Age related differences occur in the cycling of sleep stages. As persons age they tend to experience less slow wave sleep or deep sleep (stages 3 and 4) and increases in light sleep (stages 1 and 2). As a result of these changes, older adults may find themselves awakening more during the night.

The most common sleep complaints of older adults are an increase in the time it takes to fall asleep, an increase in the frequency and duration of awakenings during the night, frequent early morning awakenings, excessive daytime sleepiness, and dissatisfaction with sleep (Dement, Miles, \& Carskadon, 1982; Miles \& Dement, 1980). Sleep measurement of older adults in the sleep laboratory confirms the complaints.

Older adults also experience other changes in sleep parameters. Their sleep is less efficient in that older adults have been found to spend an excessive amount of time in bed awake trying to get to sleep or resting. (Dement, Miles, \& Carskadon, 1982). The frequency of daytime napping increases with age (Zepelin, 1973). The sleep difficulties experienced by older persons can impact on how they feel and function during the day.

## 2. Circadian rhythm

Body rhythms that take about 24 hours to complete are circadian rhythms. Examples of body rhythms or circadian rhythms are the cycles of sleep-wake, body temperature, and hormonal secretions. We use cues such as clocks, mealtimes, and a view of the outdoors to synchronize our circadian rhythms to the 24 hour cycle imposed by the sun. A regular wake-up time may be the most powerful cue we can use to synchronize our circadian rhythm because it is under our voluntary control. We can control our wake-up time by using an alarm clock, a morning shower, or a morning walk outdoors.

Research suggests that changes in the circadian rhythms may be more common in older adults. The circadian rhythm sometimes shortens as we grow older. The internal clock runs faster. For older individuals, when the clock time indicates 9 PM, their internal clock feels that it is more like midnight. Older persons may therefore go to bed early and beunable to sleep past 3 or 4 AM . Older persons also tend to nap
during the day resulting in shorter, more frequent sleep-wake periods over 24 hours.

Older adults tend to have a less active lifestyle than they did when they were younger. If older individuals are not working they may have less steady contact with people. They may not have to get up at a certain time in the morning and may end up keeping an irregular schedule. Irregular bedtime and waking hours coupled with random daytime napping can cause circadian rhythm disturbances. When circadian rhythms such as body temperature and hormonal secretion are disturbed, an optimal time for sleep may never be established.
3. Individual sleep needs and expectations regarding sleep

The amount of sleep needed by individuals differs greatly. Many individuals are very short sleepers and have obtained only two hours of sleep a night. These short sleepers have had long, productive lives. You should remember that the body will obtain the amount of sleep that it needs. People may not need as much sleep as they think they do. In addition, the idea that many older people have that lying in bed resting is helpful needs to be corrected. Time in bed spent resting is not beneficial. Reducing the amount of time spent in bed is not harmful to your well-being. If you have sleep difficulty, it is especially important to NOT spend time just lying in bed whether it's resting or trying to get to sleep.

## 4. Sleep deprivation

Many people believe that if they are deprived of sleep they will suffer unfortunate effects. It is not a catastrophe to go without sleep. Sleep researchers have found very little performance deficit after extended intervals of decreased sleep and after sleep deprivation of 8 days. The finding of very little performance deficit after sleep deprivation holds true for the elderly as well.

Persons usually feel fatigued and irritable after sleep deprivation. We know that fatigue follows a daily circadian rhythm therefore persons deprived of sleep will be tired at times when they are usually asleep and feel alert at times when they are ordinarily awake. Therefore we can see that our performance during the day is not as dependent on the previous night's sleep as we think.
6. Effect of exercise on sleep

Do not have vigorous exercise immediately prior to bedtime. Exercise stimulates the body and makes falling asleep soon afterward very difficult. Exercise just before bed does not tire us out but has the opposite effect of waking us up. In fact, people who are drowsy and trying to stay awake to study often engage in physical exercise to wake themselves up. However, moderate exercise in the late afternoon or early evening is a worthwhile pursuit and can be a good substitute for caffeine to ward off early evening drowsiness.
7. Effect of the environment on sleep Light/Dark -

A dark room will probably be more conducive to sleep. Older persons however should consider a night light for safety's sake if they must be up to go to the bathroom.

Noise -
Noise in the environment will delay sleep, decrease the amount of deep sleep and cause more frequent awakenings. The deeper asleep a person is, the more noise is needed to awaken him or her. We know that older persons have less deep sleep. Therefore, older adults are more easily awakened and have more difficulty falling back to sleep when awakened. Many people believe that they adjust to noisy environments. Sleep research has shown that this is not so. People in noisy environments, for instance playing the music of their choice, had more difficulty falling asleep, had more awakenings, and less total sleep time than those who did not play music. We know that older persons are more sensitive to noise, especially women. Therefore, a noisy environment is more likely to be disturbing.

Room temperature and firmness of mattress -
We know that their is no ideal room temperature of type of mattress. Sleep scientists have found that when temperatures over 75 degrees $F$, there is more movement during sleep, more awakenings, less deep sleep, and less dream sleep (Hauri, 1982). If temperatures are too low. people may have difficulty falling sleep. It seems that temperatures between 65 and 70 degrees $F$ are ideal for sleeping.

There are strong preferences for temperature and mattress type that people have developed over the years. When people sleep in a new environment where their preferences are not met, disturbed sleep may result. We recommend that you use common sense to make your sleep environment most conducive to sleep. Arrange for a comfortable temperature and minimum levels of sound, light, and noise.
8. Effect of food on sleep.

Try to eat dinner several hours before bedtime. Your digestive activity will be increased after a full meal and may interfere with sleep. Persons who are on a diet for weight loss may need to keep in mind that higher caloric intake is associated with long, uninterrupted sleep. Lower caloric intake is associated with short, fragmented sleep especially in the second half of the night. Since we know that hunger can disturb sleep, a light bedtime snack can be helpful. Persons on a restricted caloric intake should save some calories from earlier in the day for a prebedtime snack. Sleep researchers recommend a combination of carbohydrates and protein such as cheese and crackers or a graham cracker and milk (Hauri, 1982). Chocolate and excessive amounts of sugar can serve as stimulants. A large fluid intake in the evening is likely to cause nighttime awakenings to urinate.

If a poor sleeper does not currently eat a bedtime snack and does not complain of sleeplessness due to hunger, there is no reason to start having a nighttime snack. However, if the client is already eating such a snack and considers it important to do so, he or she may continue this practice. You may want to discuss what is being eaten and in what amounts to make sure it is an appropriate snack. It is important, however, that no one eat a snack in the middle of the night or they may train themselves to wake up at that time to eat. If someone reports consistently waking up hungry in the night, that person should experiment with a prebedtime snack.

At this point, you should discuss briefly how insomnia can result from a disruption of our natural sleep cycles by lifestyle factors or by bad habits we have acquired. These lifestyle factors and habits are called sleep hygiene. Describe briefly how most of us are born good sleepers and that this natural ability becomes disrupted by lifestyle habits we acquire as we become adults. An example might be the person who drinks
many cups of coffee throughout the day and evening or the healthconscious individual who exercises during the hour just prior to bedtime to get worn out as an inducement to sleep. Both of these activities are likely to make sleep more difficult. By changing these habits, clients may allow their bodies to reestablish the natural tendency to be a good sleeper. These new practices alone may not be sufficient to eliminate the sleep difficulty; however, they will set the stage for the other treatment procedures to work. If a person followed every action recommended in this treatment but still drank coffee at night, he or she might still continue to experience insomnia.
9. Effect of alcohol, caffeine, and nicotine on sleep.

Do not drink alcohol later than 2 hours prior to bedtime. Although alcohol is a depressant, which if timed accurately may aid you to relax and fall asleep, it leads to restlessness, nonrestorative sleep and the tendency to wake up during the night so that you will not feel refreshed the next morning. You should also be aware that alcohol intensifies the effect of medications such as sleeping pills and other depressants. We know that toxic substances stay in the bodies of older individuals for longer periods of time therefore alcohol is less tolerated by older adults.

Do not drink caffeine later than 6 hours before bedtime. Caffeine is a powerful and long-lasting stimulant that interferes with the natural sleep cycle. Sleep researchers have established that caffeine disturbs sleep even in persons who argue that it does not affect their sleep. Some individuals are very sensitive to very small amounts of caffeine.

Spend a brief amount of time educating the group as to which substances contain caffeine and in what amounts. Myths abound in this area. For example, many people believe that tea has far less caffeine than coffee although they actually have equivalent amounts. Caffeine is present in regular coffee, regular tea and in some herbal teas, hot chocolate also contains it, regular cola soft drinks, and soft drinks such as Dr. Pepper, Mountain Dew, Mr. Pibb, and Mellow Yellow. Any food containing chocolate will have caffeine. Some medications contain caffeine or other stimulants so be sure to explore any prescribed drugs they may be using. Over-the-counter medications include Excedrin, Midol, Dristan cold remedy, Sudafed decongestant, Dexatrim diet pills, Aqua-Ban diuretic, No-Doz, etc. Prescription drugs used to treat
pulmonary disorders (bronchodilators) and migraine headaches have stimulant properties, as well as amphetamines, steroids, and adrenergic blockers. Substances that usually do not contain caffeine are decaffeinated coffee or tea, many but not all herbal teas, 7-Up, Sprite, root beer, ginger ale, decaffeinated colas, plain aspirin, and Tylenol. Teach the subjects the importance of checking labels and of talking with their physicians or pharmacists about alternative medications that do not contain stimulants. The physician may also be able to recommend a different schedule for taking the medication, such as earlier in the day and not in the evening. Strongly discourage any client from eliminating a prescribed medication without consulting the physician.

If you smoke, try not to smoke within several hours of your bedtime. Like caffeine, nicotine is a powerful stimulant. Nicotine is related to difficulty falling asleep and sleep improves significantly when nicotine use is discontinued.

After each of the preceding topics, discuss clients' current patterns in regard to that activity. Reinforce any comments that are compatible with the rationale provided for avoiding these activities near bedtime. Determine if there will be any compliance problems and have the group make suggestions. These instructions often elicit a good deal of resistance because many such habits are strongly entrenched. Clients will insist that they already follow these rules or that they tried them before with no success. Do not accept this excuse. Careful questioning about what they tried and how often will usually reveal that they only partially followed the rules or did so for a short time or inconsistently. Someone may have given up coffee at night but still eats chocolate or mocha ice cream before retiring. Some clients will think that these rules are simplistic and silly. Others will feel a tremendous sense of deprivation at having to give up these substances. Many of them use stimulants to help alleviate the symptoms of fatigue from sleeplessness. Though quite a few group members may be familiar with the interfering effects of these substances upon sleep, they do not avoid them and only give lip service to the necessity to do so.
10. Effect of sleep medication on sleep

The use of sleeping medication by older adults can be potentially dangerous. In addition, most sleeping medication is ineffective beyond two weeks of continuous use. Tolerance to the medication develops
quickly and increasingly greater doses are needed to produce an effect. Sleeping medication deprives us of REM sleep causing REM rebound on subsequent nights. REM rebound nights subject us to a very restless night of difficulty falling asleep, increased dreaming, nightmares, and fitful sleep. We then believe that we must need the medication to sleep and the pill taking cycle begins again. We know that medications stay in the bodies of older adults for longer periods of time. Sleeping medications put older adults at risk for toxic side effects. There is also the possibility of toxic interaction of the sleeping medication with other drugs taken by the older adult. The National Institutes of Health has recommended that sleeping medication should not be used for the treatment of chronic sleep disturbances.
11. Put the bedroom clock out of sight and hearing

Watching the clock puts unnecessary pressure on people with insomnia that is not conducive to sleep. When the clock is not in view, it becomes less important what time it is and energy can be devoted to relaxing and sleeping. Turn the clock around if it doesn't tick or put it under your bed or in a drawer. Experiment to see if you can hear the alarm go off in its hiding place.

## Lecture and Discussion: Sleep Efficiency Treatment

Allow about 30 minutes for this section.
The amount of time people spend in bed combined with an irregular sleep schedule have an impact on sleep. People who have insomnia may spend a great deal of time lying in bed trying to fall asleep both at the beginning of the night and at awakenings during the night. Delays in falling asleep and awakenings during the night only heighten worry about sleep. Worry only makes the problem worse. Persons with insomnia often try to deal with their lack of sleep by getting into to bed too early, staying in bed late in the morning, and dozing irregularly during the daytime. Unfortunately, these are short-sighted strategies which only increase the fluctuations in time and amount of sleep resulting in an irregular sleep schedule. Sleep scientists believe that spending too much time in bed awake and the lack of a consistent sleep schedule can be major contributors to sleep difficulties in older adults.

See how the ideas of spending a lot of time lying in bed trying to sleep (getting in bed too early and staying in bed late in the morning) fit with the subjects' current patterns. Explore the consistency of the subjects' sleep schedules. The diaries have been used to evaluate the subjects' performance on these variables.

At this point, try to get an idea of what the subjects think is their TIB:TST ratio. Bar graphs have been created for each subject that depict their performance during the baseline period. The graphs can be used to validate what the subject is saying in class or to present to the subject what is actually occuring. Make notes on the subjects' particular patterns to refer to later when teaching the specific components of the intervention.

This time is devoted to establishing an initial sleep schedule for the subjects. The two week baseline sleep diaries have been used to calculate the subjects' Total Sleep Time (TST). Pass out each subject's bar graph of TST.

Based on the sleep diaries that you completed and called in to the voice mail service, we have calculated the amount of time you actually spend asleep each night.

Review each subject's average daily TST from the computer print out. (The therapist has a copy of each subject's bar graph to use for review).

Your daily sleep diaries indicate that you are sleeping _ hours per night.
Each subject is then informed of the time in bed allotment.
Based on your total sleep time of _ hours per night, sleep efficiency treatment allots you _ hours per night in bed. Now we need to choose a specific bed time and wake time in order to begin the sleep efficiency treatment. During treatment, the time chosen to wake up in the morning will remain the same. Your bedtime will be moved earlier in small increments as your sleep improves.

Write down your current wake-up time and also the earliest possible wwake-up time you would feel comfortable incorporating into your life on a permanent basis.

Be sure that the subject understands that the wake time remains fixed throughout treatment and the bedtime becomes earlier as sleep improves and more time in bed is allotted by the treatment. Now you and the subject must negotiate the bed time and wake time. Take into consideration the subject's lifestyle and habits so that the times chosen are ones he or she can live with. This insures a chance of succeeding with the treatment. Explore the practicality of various schedules. However, keep in mind the time when the person generally awakens since it may be best to keep that as the wake time. Remember that the subject must find the schedule acceptable in order to succeed. Some degree of bargaining may ensue; be flexible.

The agreed upon bed and awakening times are recorded by the therapist and a copy is given to the subject.

The daily sleep diary that you call in to the voice mail service provides the information for adjusting the sleep efficiency treatment schedule. The daily sleep diaries are the same sleep diaries you filled out for the two weeks before treatment began. We rely on your daily morning phone calls with your sleep behavior information. If we find that you are not keeping to the schedule that we have agreed upon today, we will call you to see if we can help. We also want you to call and leave a message if you find that the schedule is not working for you. We check the voice mail several times each day and will call you back. Please don't change the schedule without discussing it with us.

Provide some further information about the process of sleep restriction therapy in order to prepare the subjects.

The first two or three weeks of treatment are the most difficult. Based on previous research studies using this treatment, we know that people need the entire 6 weeks of treatment and often continue to accrue benefits from the treatment after the six weeks are completed. In other words, the treatment needs time to work. Sleep changes slowly and we are not concerned with a bad night or two. We are interested in the long-term trends in your sleep. The treatment is not a quick fix, it is designed for the long haul, to last. Over the course of treatment you can expect some daytime problems as a result of inadequate sleep. The most likely side effect is daytime sleepiness, particularly midafternoon and evening drowsiness.

The idea is to make your sleep more efficient (define).
Hand out the sleep efficiency bar graphs. Also, have the subjects look at the TIB:TST bar graph that was handed out earlier. Explain the realtionship between the TIB:TST bar graph and the sleep efficiency bar graph.

Discuss ways to keep busy and stay awake. Begin with the activities they are doing now before bedtime and in bed before truning off the lights, such as reading, and help them find another place to do it. Any tasks should not be mentally demanding or excessively stimulating. Exercise would be appropriate in the afternoon. Nonsedentary activities are appropriate for the evening: light housekeeping, organizing a closet, putting photographs in a picture album, or record filing. Each subject should have a list of activities to pursue. The subject must not be left to search for methods on his or her own. The therapist should also note each subject's plans. Proposed activities should be noted by the subject on the Activity Sheet provided.

If the subject falls asleep in the late evening, before the selected bedtime, no matter how briefly, that night's sleep may be a disaster. Subjects must also avoid prolonged periods of listlessness. To highlight this point you can use the following metaphor:

You can look at the evening's activities and your preparation for bed as though you were piloting a glider in for a landing. If you lose altitude (get sleepy) too soon, you will land (fall asleep) short of the runway, and therefore you will not reach your objective (a good night's sleep). You get only one chance in the glider so you need to make it count.

## CLIENTS SHOULD NOW BE TOLD TO BEGIN FOLLOWING THIS SCHEDULE TONIGHT!!

## Lecture and Discussion: Stimulus Control Instructions

Allow about 30 minutes for this section.
It is important that all of the following information be communicated to the group. However, the therapist needs to learn the material thoroughly so that it can be presented in an informal way, rather than giving a droning lecture or even reading it verbatim. Most of the participants will not be familiar with the concept of stimulus control although they can readily understand it if presented in terms of their everyday experiences.

The same is true of sleep restriction therapy and an optional daytime nap. The rationale for the use of sleep restriction and daytime napping can be explained in simple terms.

Much of what we do is influenced by the time and the place we are in. The stimulus, or characteristic of a situation, gets paired with the behavior that occurs in that situation. The characteristics of the situation then become a signal or cue for that behavior.

There are many examples from your everyday life of this phenomenon. For example, did any of you ever eat a large meal, feel entirely satisfied, and then go to a movie? What experience did you have when you entered the lobby of the theater? Many of you probably wanted a box of popcorn and a soda (or candy etc.) even though you knew that you were not in the least hungry! Through years of experience of having popcorn most of the times that you went to the movies, the lobby of the theater has come to be a strong cue for you to want popcorn. The stimulus controls, or cues, the behavior. Other common examples are feeling hungry when the clock says noon even if you ate only 2 hours before; wanting a cigarette after each meal or with each cup of coffee; feeling alarmed when the phone rings in the middle of the night, but not experiencing any anxiety when the phone rings during the day.

See if group members can come up with their own examples.
For people who sleep well, the bed and bedroom act as a signal to feel sleepy and to fall asleep quickly. You may hear these people complain that each time they put their head on the pillow they fall asleep immediately even when they had intentions to read for a while. It may have been very hard for you to feel much sympathy for their dilemma. For people who have insomnia, the bed and bedroom may have become a signal for other activities. These activities include lying awake, thinking and worrying, feeling frustrated about not sleeping, reading, watching television, and other similar behaviors.

Sometimes this connection begins after something happens that disrupts normal sleep. For example, a stressful event such as divorce, a change in your job, or a new baby may have this effect.

See if any clients connect the beginning of their insomnia with a specific event and encourage discussion on this point.

> After the disruption is over, poor sleep, frustration, and any activities that the poor sleeper may have performed while waiting for sleep (e.g., reading, watching television) remain associated with the bed and bedroom. Subsequently, the bed remains a cue for these nonsleeping behaviors and for being awake. The occasional nights of poor sleep that everyone experiences reinforce these connections.

Pass out the stimulus control instructions.

## Stimulus Control Instructions

1. Lie down intending to go to sleep only when you are sleepy and not before the scheduled bedtime.
2. Do not use your bed or bedroom for any activity other than sleep. You should not watch television, read, talk on the telephone, worry, argue with your spouse, or eat in bed. The only exception to this rule is that you may engage in sexual activity in bed.
3. Establish a set of regular presleep routines to signal that bedtime approaches. Lock the door, plug in the coffee machine, brush teeth, set the alarm, and perform any other behaviors that make sense for this time of night. Do these activities in the same order each night. Use your preferred sleep posture and combination of favorite pillows and blankets.
4. When you get into bed, turn out the lights with the intention of going right to sleep. If you cannot fall asleep within a short time (about 10 minutes), get up and go into another room. Engage in some quiet activity until you begin to feel drowsy and then return to the bedroom to sleep.
5. If you still do not fall asleep within a brief time, repeat the previous step. Repeat this process as often as it is necessary throughout the night. Use this same procedure if you awaken in the middle of the night and do not return to sleep within about 10 minutes.

For each instruction:

1. Read the instruction.
2. Elaborate the instruction.
3. Have each client discuss implementing the instruction, including concrete strategies for using it in their life.

When appropriate, record the planned new behaviors to serve as a reference in future sessions.

Instruction 1:
Lie down with the intention of going to sleep only when you are sleepy and not before the scheduled bedtime.

Many insomnia sufferers go to bed before they are sleepy. If they had a hard time getting to sleep the night before, they probably feel tired and they reason that they should get an earlier start on their sleep tonight. Sometimes these people spend 10 to 12 hours in bed trying to get 8 hours of sleep. Let your body tell you when it is drowsy. If you go to bed when you are sleepy, you are more likely to go to sleep right away, reinforcing the association between bed and sleep. If you are not sleepy, you might toss and turn, begin to think, and get mentally and physically aroused. That would only reinforce the old habit patterns we are trying to eliminate. Remember, being tired does not necessarily mean you are drowsy or ready for sleep. (We'll talk more about differentiating between being tired and being drowsy or sleepy)

Some people worry that they will not get enough sleep if they follow this rule because the time they have to get up cannot change, due to work and schedule demands. But, by not going to bed before the scheduled bedtime and by establishing a fixed time for getting up, your body will adjust to a consistent schedule that will allow the amount of sleep you actually do need in order to function well. Eventually your body will send you this message by getting sleepy when it is time for you to go to bed.

Discuss how clients are now determining when they will go to bed (e.g., a fixed versus flexible bedtime or one that is linked to the spouse's bedtime). Ask how sleepy or awake they feel when they go to bed. Determine how clients can tell when they feel sleepy (e.g., yawning, rubbing eyes, flickering eyelids). It is amazing how many insomniacs think that they have no way of knowing when they are drowsy. Many have to be taught concretely how to recognize the cues of drowsiness. Tell clients that these cues will be a little different for each of them. Have each person become more aware of his or her own feelings and signs of sleepiness and tell clients to use these feelings as a cue to go to bed.

Instruction 2:
Do not use your bed or bedroom for any activity other than sleep. You should not read, watch television, talk on the telephone, eat, argue with your spouse, or worry in bed. Sexual activity is the only exception to this rule. If you do engage in sexual activity and do not feel sleepy afterwards, do not use the bed for other activities at that time. Doing other things in bed is "misusing" the bed. There is an appropriate time and place for everything. Doing other things reinforces the notion that a variety of actions are appropriate in that setting. For example, if you often watch television in bed, going to bed can become a cue to want to watch television or to begin thinking about things you have seen on television. If the bed is reserved for sleep alone, then climbing in bed will be a strong cue for you to fall asleep.

Have clients discuss other activities they currently carry out in bed. Be sure to include thinking, worrying, feeling frustrated about not falling asleep, phone conversations, important discussions, and arguments with their spouse. Restate that there is an appropriate time and place for everything. Discourage clients from trying to give up these other activities. If they are doing them, they must be enjoyable or important to the client and should not be given up. Discuss other times and places to carry out these activities. For example, time can be set aside earlier in the evening to have a discussion with a spouse in the living room. One can also select a half hour before or after dinner to review in one's mind the events of the day and to plan the upcoming one. Get concrete solutions to carrying out these activities in places other than the bed and bedroom. These solutions often include moving things such as television sets and desks out of the bedroom. The therapist should jot down these plans for reference during future sessions.

## Instruction 3:

Establish a set of regular presleep routines that signal the approach of bedtime. The hour before bedtime should be one during which you prepare for sleep, a time to wind down. Presleep activities often include some kind of relaxation, a putting aside of the troubles of the day just past and of the day to come. Typical ways to relax at this time are to take a warm bath, to read, or to watch television. It is not relaxing to begin a new project, to start an argument with a spouse, to go for a 3mile jog, make an important business call, or plan the business agenda
for the following day. Those kinds of things should be scheduled for earlier in the day. Many good sleepers have a regular group of prebedtime activities -- such as locking the door, brushing their teeth, setting the alarm -- that they carry out consistently. Engaging in this routine is one of the beginning cues that it is time to go to sleep.

## Instruction 4:

When you get into bed, turn out the lights with the intention of going right to sleep. If you find that you cannot fall asleep within a short time, get up and go into another room. Stay up as long as it takes until you begin to feel drowsy, and then return to the bedroom to sleep. Although I do not want you to be a clock watcher, I want you to get out of bed if you do not fall asleep fairly soon. Remember, your goal is to come to associate your bed with falling asleep quickly! Use a period of about 10 minutes as your guideline. If you are in bed awake more than this amount of time and have not gotten out of bed, you are not following the treatment.

Return to bed only when you feel sleepy. The object is for you to connect the bed and bedroom with sleeping. Often, the bed originally became a cue for other activities because the poor sleeper would watch television, eat, read, and engage in other activities as a distraction from the primary concern -- not falling asleep. With time, however, because of this lengthy association of the bed with these activities, it has become a signal to engage in these other behaviors whenever in bed.

If you stay in bed, the bed also becomes a cue for worrying about insomnia and all the anxiety and frustration over not falling asleep. As a result, the insomnia sufferer comes to fight the bed. Some poor sleepers even refer to their bed and bedroom as the enemy. This process is the reason some people who suffer from insomnia fall asleep better in places other than their own beds, for example in a chair while watching television or in a hotel or even in a sleep laboratory with wires glued to their head. Good sleepers show just the opposite pattern -- they have more difficulty falling asleep outside of their own bed.

See if any clients have the experience of falling asleep easily outside of their own bed. Discuss with clients what they do now when they cannot fall asleep. Elicit concrete examples. Help clients plan what activities they will engage in outside of the bedroom when they get up. Discuss
where they will go and what they will do when they cannot fall asleep. Begin with the activities they are doing now, such as reading, and help them find another place to do it. For example, some may decide that they will read. They should know what they will need to prepare for this activity -- the book or magazine, reading glasses, a small flashlight (or a night light), and a robe set aside in a convenient place so they do not disturb their bed partner when they get up. Consider the activities developed for staying awake until the scheduled bedtime in the SET. Be sure that the activities developed in the SET component are appropriate for the SCl component. In other words, the SET activities are nonsedentary - we want the person to stay awake until the scheduled bedtime. The SCl activities aie more sedentary - to bring on sleep. Be sure to tell persons engaged in the SCl that they are NOT to lie down on the sofa or recliner. They should keep the lights dim, use a reading light, and be aware of signs of sleepiness so they can return to bed before they fall asleep. Make any changes necessary or come up with different activities. Make a note of each person's list of activities. Be sure they have also noted what they will do on the Activity Sheet provided.
Encourage clients who are already following this rule to some extent.
Shape their behavior to conform to the rule more completely and consistently. Do not continue with the session until each client has some concrete alternatives for what to do if he or she does not fall asleep right away.

Instruction 5:
If you still have not fallen asleep, repeat the previous step. Repeat this process as often as it is necessary throughout the night. Also repeat the process of gettinng out of bed if you awaken during the night and cannot get back to sleep within about 10 minutes. The new habits will come only with repeated practice. When you begin this treatment, it is common to have to get up many times each night. In fact, when you return next week, many of you will probably feel that your insomnia is worse than when you began therapy for it. We frequently hear people say at the second session that the cure is worse than the problem they came with. Do not despair. After this first week you will not have to be getting out of bed so often. Also, you will probably not be losing any more sleep than you did before; it will just seem like it. To prove my prediction, I am going to have you keep track of how many times you get up each night. It will be the last question on the Daily Sleep Diary. Although this instruction may be the single most difficult one for you to
comply with in the treatment, it is probably also the single most important one for you to follow.

Impress upon the group members that it takes good sleepers from 5 to 10 minutes to fall asleep. Group members should also use this getting-out-of-bed procedure any time that they wake up in the middle of the night. Discuss what they do now if they wake up during the night. Discuss using the strategies that they developed under instruction 4. Be sure that the activities used in instruction 4 will be appropriate if they awaken and must get out of bed during the night. Record the activities each subject will use during the night. Have the subject record them on their Activity Sheets.

## CLIENTS SHOULD NOW BE TOLD TO BEGIN FOLLOWING ALL OF THESE RULES TONIGHT!!

It is important that you reemphasize how difficult it will be for them to follow these rules at first. Initial difficulty is typical for any new behavior a person is trying to incorporate. Clients should expect their sleep to get worse the first week. They will not want to comply with the instructions as they realize it is difficult and seems to be making their sleep go downhill. Predict for them these immediate negative consequences.

For the first few nights you may be getting up many times before falling asleep and most likely you will be fetting up many times during the night; you will get little sleep, and you will feel tired and you may find it difficult to to your daily tasks. During these first few days you will probably feel quite discouraged and may even consider dropping out of the treatment program. But for most people this worsening of the target behavior is temporary, a few nights or a week at most. After that you should see a leveling-off effect and then a gradual improvement. The temporary negative consequences are the inevitable result of breaking old habits and of establishing a consistent sleep rhythm when there was none before.

## Lecture and Discussion: Optional Daytime Nap

Allow about 10 minutes for this section.
Sleep researchers have found that many people experience poor sleep at night because of the way they have scheduled their sleep during the 24 hour day. For instance, many people doze on and off at odd times during the day and evening. Sleep scientists now believe that there is an optimum time of day for napping as well as a maximum amount of time to spend napping.

Explore the subjects' current nap patterns. Make notes on the subjects' particular nap patterns to refer to later when teaching the specific components of the intervention.

Sleep researchers have found that many people experience poor sleep at night because of the way they have scheduled their sleep during the 24 hour day. For instance, many people doze on and off at odd times during the day and evening. Sleep scientists now believe that there is an optimum time of day for napping as well as a maximum amount of time to spend napping.

Explore the subjects' current nap patterns. Make notes on the subjects' particular nap patterns to refer to later when teaching the specific components of the intervention.

As we discussed earlier, an optional daytime nap can be helpful for older adults if it is scheduled at a certain time of day and for a limited amount of time. Sleep scientists believe that as we grow older we have difficulty maintaining both sleep and wakefulness over extended periods of time. In other words, the older adult has difficulty staying asleep at night (the sleep is fragmented) and maintaining wakefulness during the day (more likely to be sleepy and take naps). When older persons perceive their sleep as becoming "worse", they will try to stay in bed longer. As you learned earlier, this approach can lead to disruptions in your circadian rhythm that can make the problem far worse. Sleep efficiency treatment is directed at the problem of spending too much time awake in bed trying to sleep. But what about the difficulty maintaining wakefulness during the day? This is where the optional daytime nap comes in. The crucial point is when to schedule the nap. Sleep scientists have found that the optimum time for napping is in the afternoon. An afternoon nap
coincides with people's naturally occurring time of increased daytime sleepiness. Since people are usually more sleepy in the afternoon, naps at this time are very refreshing. Morning and evening naps are not beneficial because they do not coincide with the time of natural sleepiness. Evening naps can interfere with nighttime sleep. A nap can be taken for no longer than one hour and only between the hours of 1 pm and 3pm. If you can't fall asleep in about 10 to 15 minutes, get out of bed and give up the idea of napping OR try again in a little while. You can only nap one time each day. Nap only in your bed - remember- you want to associate sleeping with the bed not with other places like the recliner or sofa.

## PRETREATMENT EXPECTATIONS

Allow about 15 minutes for this section.
Near the end of the first session, we want to have clients indicate their initial reactions to the description of the treatment being offered. We ask clients to complete the Therapy Evaluation Questionnaire (4 item scale) that indicates how logical the treatment seems, how confident they are it will be successful, and how confident they would be in recommending it to a friend with insomnia. Ask the group to fill out the form as candidly as possible. Have them place all the questionnaires in one envelope provided and ask one of the subjects to seal it. Explain that it will be given to the project director and you will not see their responses.

By reviewing client reactions to this first session, we can gain some feedback on how well the presentation has gone and how it has influenced the client's expectations. During the explanation of the rationale and the description of the therapy, it will be important that the group members come to accept the therapist and buy into the rationale. Although group members will typically indicate in writing that they have high expectations for what you have described, you can also expect some verbal resistance in the group discussion. It is not uncommon for one or more participants to report that they have already tried this therapy or some parts of it. With further exploration, you will usually find that they did only some part of it, usually for a very brief time and rarely with any consistency.

With that information, you can restate your strongly held conviction that it will take the entire 6 weeks of careful and consistent practice for these instructions
to have a beneficial effect. Also state that some of the instructions may seem simplistic, silly, or unnecessary. However, each part of this treatment package is derived from a good deal of research with a large number of insomnia sufferers. Each part is designed to contribute to the final positive result. If the clients tamper with the overall plan, picking and choosing only those elements that they want, they will seriously compromise their chances of improving their sleep. We insist that they really have nothing to lose by cooperating fully. They have suffered for a long time now or they would not be here. They have gone to a lot of time and trouble to end up in this group. We are asking them to do possible things for a very short period of time. So for 6 weeks, doesn't it make the most sense to go ahead and give it their best try? Once you have a sense of which group members have bought the rationale and are willing to give it a try, use them to bring peer pressure on those who are expressing doubts.

Hanclout the TEQs to complete.

## ASSIGNING HOMEWORK

Allow about 10 minutes for this section.
Point out the homework guidelines.
Repeat the importance of following the sleep efficiency and stimulus control instructions every day. Explain that an important part of building new, better sleep habits is monitoring sleep-related behaviors closely to identify and strengthen which cues are associated with falling asleep quickly. The clients also need to identify and weaken those cues associated with staying awake. Thus, throughout treatment clients will be closely monitoring and charting their sleep-related behaviors. Stress the personal scientist approach that includes trial and error, good record keeping, and fine tuning of the treatment. You, as the therapist, have presented the guidelines for the treatment and now the subject must test them.

Review and explain the Daily Sleep Diary. They should be familiar with the diary because they completed it during the two week baseline period. Explain that they will receive a Daily Sleep Diary for each day to fill out as soon as they get up in the morning.

Review the schedule in the subjects' notebooks, point out the homework, the instruments, and their due dates.

Point out the diaries for the week.
Reemphasize the crucial importance of filling these out each morning upon awakening and calling the responses in to the voice mailbox after completion. The subjects should bring the completed Daily Sleep Diaries with them to class each week. In each future session, a good deal of time will be spent going over the diaries, so it is important that each client fill out these diaries, call in the responses faithfully, and bring them to all sessions.

Point out the Practice Records. Explain their use and how to complete them.
Point out the Insomnia Symptom Questionnaire (ISQ). The subjects should be familiar with this instrument since they completed 2 during the baseline period. The ISQ must be completed on the day marked on the schedule and the responses should be phoned in to the answering machine. They can phone in the responses to the ISQ at the same time that they phone in the responses to the DSD.

Be sure the subjects understand the Sleep Efficiency Treatment assignment. Reemphasize the importance of adhering to the established schedule. They must not make any changes in the schedule. If they feel that a change must be made, they should consult with the therapist first by phoning in a message to the answering machine requesting a consultation with the therapist.

Describe briefly what will happen in future sessions. Ask for questions and comments. Make sure each group member understands the homework assignment.

The end of the session is also a good time to emphasize the importance of the upcoming meetings, and to point out that 6 weeks of treatment is not very long and that their attendance at all meetings will be necessary for the maximum benefit. The dates and times of all sessions have been explained to the subjects prior to this class. Reannounce the dates and times of all the sessions.

## SUBSEQUENT SESSIONS

The majority of the next 3 sessions will be spent in a collaborative troubleshooting of any problems that group members have encountered in adhering to the treatment during the week. Although some new material is introduced in terms of readjusting the sleep schedule for the sleep restriction
therapy, the problem solving will take up most of the time. A standard format is used for the problem solving. The following procedures should be used to discuss any difficulties that arise as clients attempt to carry out the rules of the therapy.

## FORMAT FOR PROBLEM SOLVING

1. Use the practice records to elicit any problems with adherence to treatment.

You will have copies of the subjects' sleep diaries as well as graphs of total sleep time, wake after sleep onset, time in bed, and naps. You should have an idea of each subjects' sleep status, their compliance in terms of diary completion, and you may be able to anticipate problems from certain individuals based on the data and their reactions to the first session. Knowing what the actual data are will also help you to combat effectively any tendency for a client to exaggerate negatively what really happened during the week. Use a few minutes at the start of the class time to organize your papres and thoughts so that the subjects can use this time before the formal meeting starts to talk among themselves and get to know each other better.

Use the first part of each of sessions 2 through 6 to address the questions listed below. The questions will be used to guide the group discussion. All problems will be listed on the blackboard so the therapist can refer to the list to be sure all of the following areas have been covered. Encourage the group to refer to their DSDs and Practice Records to provide information about their sleep-wake schedules.

First, let's discuss any problems you encountered in following the sleep treatment instructions.

Did you fall asleep before your scheduled bedtime?
Briefly tell us your activities from dinner to bedtime?
Briefly tell us what were your activities in getting ready for bed?
How sleepy were you when you first went to bed last night?

Did you pay attention to how you feel when you get sleepy?
How did you recognize that you were getting drowsy?
Tell us any activities you carried out in bed?
Did you have any difficulty carrying out the instruction about turning out the lights as soon as you get into bed with the intention of going right to sleep?

How about the instruction about getting out of bed if you can't fall asleep in about 10 minutes and repeating the process of getting out of bed during the night if you can't fall asleep when you awaken?

What kind of things did you do when you got out of bed during the night?

Check if the activities match those proposed by the subject in the first class meeting.

Did you have any difficulty getting up at your scheduled awakening time?
Did you feel sleepy during the day?
Did you nap? How often?

Allow only one question/problem to be discussed at a time. Take up each question/problem separately and go around the group asking all members to report what experiences and problems they had. List them on the black board and identify similar problems as well as unique problems.
2. Get a full description of the problem.

If clients report having encountered difficulties during the week, ask each person to describe the problem. Have them each be as precise as possible. Try to determine if the problem was the client's inability or unwillingness to carry out the procedures or if it was the environment that made it difficult for the client to follow the rules. Ask clients to explain how they formulate the problem, what they see as the difficulty.

If the problem seems inconsequential, let the client know that it will have little effect on the ability to gain better sleep habits and that there is no need to continue to worry about it.
3. Try for a group problem solving process as much as is possible.

Let the client and the group come up with possible solutions for each problem. Encourage discussion and a sharing of experiences. What worked for other clients in similar situations? At first generate as many solutions as possible without any criticisms. After this brainstorming, combine and improve suggestions. Make the solutions as specific as possible.
4. Maintain a commitment to the research study's approach to the treatment of insomnia.

Strongly emphasize the importance of following the rules every night. Do not tolerate clients' breaking the treatment rules or not carrying out the behaviors they agreed to do. Remind clients of the rationale behind each of the three components of the treatment package and why it is an effective treatment for insomnia.
5. Decide upon a course of action for the coming week.

Choose the solution that has the most useful consequences and that the client seems most likely to implement. Maintain an air of confidence. Communicate to the client that problems are routine and solvable and any particular difficulty is neither unique nor insurmountable. Predict what the likely consequences will be including any possible side effects.
6. Have the client try the behavior during the week.

Stress the "personal scientist" strategy of problem solving. Once a potential solution is identified, that course of action can be implemented with a trial and error philosophy. The behavior is being tried conditionally pending its outcome. If it does not work, one simply decides on another potential solution. During the experiments, clients should monitor the success of the new behavior so that they can report back to the group the following week.
7. Defer a problem solution if necessary.

If the group or the therapist cannot come up with a solution immediately, have the client carefully monitor the problem and behavior connected with it for the next week. Present this as a routine way to find solutions. Do not communicate the message that the therapist has never faced this problem before. During the week, we will devise a solution. If the problem still exists the following week, present the proposed solution to the client.
8. Always follow up on progress.

Be sure to pursue problems discussed the week before and how well the solutions worked. This therapist behavior conveys the attitude that you are always monitoring client progress and that you take adherence to treatment seriously. Do not tolerate clients' not employing suggestions. Find new solutions if necessary.
9. Restate the philosophy of the treatment program.

Remind clients that they are learning new habits and that these behaviors must be practiced consistently over at least the 6 week treatment period to work and to become routine. Treat all reports of progress with surprise and respond to expressed lack of change with encouragement and patience. Individualize success by saying something like, "Well it's great that the treatment is working for you, but most permanent changes don't begin to occur until the procedures have been followed for at least a few weeks." This approach prevents those clients who have not yet succeeded from becoming discouraged.
10. Reinforce progress.

Point out any improvements in the clients' ability to follow the rules and new routines. Give plenty of praise and encourage-ment. Use the group members to praise and support each other.

The therapist should keep notes of problems and proposed solutions for each subject so we can assist the subject in monitoring his or her progress. We will have the audio tape but it is best not to rely solely on the recording. Noting the problems and proposed solutions also conveys to the subjects that you are interested and serious about
helping them find solutions and monitor progress.

## SESSION 2

Expect the second session to be the hardest. Many of the clients are going to feel frustrated and discouraged; some may even be angry that their symptoms and distress got worse during this week. Your position should be that you warned them that this worsening would take place. If their sleep did deteriorate during the past week, then they were foilowing the treatment instructions. This worsening means that they are right on track and the treatment is taking its expected course.

One topic that almost always surfaces in this second session is the extreme aversion clients have toward getting out of bed after a brief period of sleeplessness. They find all kinds of reasons why they do not want to leave the comfort of their warm bed, especially in winter months. As much as you may be tempted to modify this requirement, do not do it! This instruction is essential to the success of the program. Instead, focus your efforts and those of the group on ways to make the task less aversive. Preparation ahead of time of all the materials needed to get out of bed and go to another room does a lot to facilitate the behavior. Contrast the immediate discomfort of leaving the bed with the long-term gains of improved sleep. In the near future, with better sleep, there will no longer be a need to get out of bed. Usually there will be at least one group member who has faithfully complied with this requirement and is already starting to notice some alleviation of the sleep problem. Use this person as an example and encourage him or her to coach the others.

Another frequent excuse for not getting out of bed is that it might disturb the bedpartner. When more details are gained, it often turns out that the partner has never complained about being disturbed or may not even be aware that the poor sleeper has left the bed. Because chronic insomniacs have so much performance anxiety about their own sleep being disturbed, they often attribute the same concerns to good sleepers. Just as often, worry about disturbing someone else serves as a convenient excuse not to engage in a difficult behavior.

Encourage the client to discuss the matter with the bedpartner. Find out exactly what behaviors the partner would object to or would find disturbing. Do not allow the client to assume what the partner is thinking without checking it out. Most likely the bedpartner is willing to endure a bit of inconvenience
temporarily if it will lead to improvements in the client's sleep. It is unlikely that the noise and movement of the client's leaving the bed are any more disturbing than that of the client's tossing and turning while awake in bed. Some spouses may sabotage treatment, but more often they do not know how to be supportive of the insomniac. Encourage clients to tell their family what their needs are and to solicit their support.

Another difficulty that will be reported by a number of group members is adherence to sleep hygiene rules. Giving up certain substances or practices after many years can result in strong feelings of deprivation. These clients will require a lot of support and encouragement from the therapist and other group members. The importance of good sleep hygiene in eliminating insomnia should be reiterated and methods of active problem solving promoted.

Other topics that usually come up in the second session are questions about what kinds of activities are appropriate when waiting to become drowsy, what cues help you know when you are drowsy, and how you estimate when a period of 10 minutes has passed. The choice of activities for the period before bedtime or when the poor sleeper has left the bed is an important issue. All of these issues were discussed in the first session and now is a good time to reivew them as necessary.

Some examples of inappropriate choices when following SCl during the night are starting on the last 50 pages of a book the client has been reading, reading an engrossing thriller novel, watching a television movie and wanting to see how it ends, or doing work brought home from the office. The ideal passtime will be something that can just as readily be discontinued after 2 minutes, 15 minutes, or 2 hours, whenever the client gets sleepy. Most clients choose to read either something very boring or a magazine with brief articles, or to watch the equivalent on television, such as a late-night variety show. They should not engage in anything that will stimulate them to think or ruminate. Be sure to review with each person what to do during sleepless periods in order to make sure that it is an appropriate task.

Also review the nonsedentary activities used prior to going to sleep while following the SET instructions.

Some poor sleepers insist that, "I never get sleepy." We suspect that they are confusing the words sleepy and drowsy. Cues to drowsiness for most people are yawning, eyelids feeling heavy, eyes rolling back, reading the same line several times and not understanding it, having
minilapses of attention while watching television, and the head drooping. Some people may have more idiosyncratic responses, such as eyes watering or difficulty maintaining visual focus while reading. Generally, a brief discussion of these signs suffices to clarify the cues of readiness for sleep.

Because many poor sleepers tend to have an obsessive quality to their personality, it is not unusual to have clients ask for guidance in being able to determine when exactly 10 minutes of sleeplessness have passed. Some have very creative suggestions, like a clock that projects the time on the bedroom ceiling. I heard a report of one woman who had clocks scattered all over her bedroom so that whatever position she took in her bed she could see what time it was. The therapist should deemphasize the use of clocks in general. Clockwatching only leads to performance anxiety. Whenever clients have been in bed for a short time and they feel they have lost their sense of drowsiness, they should get out of bed. It is not so important that they wait for the whole 10 minutes. Much more important is that they do not lie there too long and begin to ruminate, feel anxious, or have racing thoughts. Because of their years of practice insomniacs tend to be rather accurate estimators of the passage of time. One suggestion is that during the day they can practice estimating a 10 -minute period using a kitchen timer.

## Sleep Efficiency Treatment: Assignment of SET, Emphasizing Compliance, and Reviewing Graphs.

Many of the problems and questions the subjects encountered in following the sleep efficiency treatment will have been addressed in the problem solving portion of the class. The therapist should take this time to assign the new SET for the week. Most likely, there will be some time needed for discussion and adjustment of the new schedule. The graphs can be passed out to bolster the rationale for the new SET or, as may occur, a continuation of last week's SET schedule. An emphasis on compliance with the agreed upon SET schedule should be woven into all discussions.

## Sleep Hygiene

The material about sleep hygiene that was discussed in Session 1 is reintroduced. The notes taken by the therapist during Session 1 regarding the subjects' sleep hygiene practices will guide this portion of the session. The handout on sleep hygiene is brought out. Each rule is reviewed separately
along with a report by each of the subjects' on their status for each rule. The therapist needs to explore with the subjects the problems they are having with adherence using the problem solving format. Support and encouragement from the group members is necessary. Strategies for promoting sleep hygiene must be noted by the therapist for review in Session 3.

## Establishing a Prebed Routine

Just as the bed and bedroom. can become cues for feeling sleepy and falling asleep quickly, prebed activities can also be a cue to feel sleepy, once a bedtime routine has been established. Some good sleepers report that just getting ready for bed is enough to make them feel more sleepy. Research has shown that children who assume the same particular posture when going to bed fall asleep faster.

Have your clients look over their responses to the Practice Record question concerning activities while getting ready for bed. Ask them to look for patterns of behaviors they always or usually performed. What was the order in which the activities were carried out? How consistent or varied are their presleep routines now? Discuss how sleepy they felt when they began to get ready for bed.

Use their current activities and whatever pattern they found as a starting point to develop a routine. Have clients list the behaviors they want to include in their routine. The therapist may also want clients to discuss the position they usually sleep in and the combination of pillows and blankets they prefer. Have the clients place the behaviors in the order that seems most convenient and logical to each of them personally. Discuss the routines and how convenient they will be for clients to carry out. Look for any parts of the routine that may get in the way of falling asleep. For example, planning the next day's schedule, assembling clothes to wear, and organizing papers to take to work may take too long and be too mentally arousing to include in a prebedtime routine. Those activities are better placed earlier in the evening. Change the routines as necessary. Record the routines. Make sure the clients have each recorded their personal routine.

Instruct clients to carry out the routines in the same order every night. Tell them to begin getting ready for bed only after they have begun to feel sleepy. Emphasize the importance of monitoring actual presleep behaviors in the future. They will then be able to note progress in establishing a stable prebed routine and to monitor where changes in the routine need to be made.

## Assigning Homework

At the end of each session, clients should be reminded of their homework tasks and the importance these assignments play in the overall therapy. The homework for each week is: follow the treatment guidelines every day and night; complete the sleep diaries every morning and complete the ISQ on the assigned date, call in responses, and complete the practice record. Point out the instruments, etc. in the subjects' notebooks.

## SESSION 3

As in Session 2, the first half of this meeting will consist of going over the practice records in detail and troubleshooting any difficulties encountered. The therapist should have the notes made on what specific behaviors each person was going to attempt during the week. Clients should be asked to report specifically on their progress in carrying out their individual assignments. Check to see if they had any problems in establishing a prebedtime routine. Then go on to the following new material for this session.

## Shaping Awareness of Improved Sleep Behavior

Many times subjects will exhibit improvements in their sleep yet they do not seem to be aware of this. In their opinion, their sleep patterns have not changed. Often this is because they are not feeling better, i.e. their daytime functioning may not have improved. It is important to review several points with the subjects:

1. Carefully scrutinize the DSDs. You will know before class who has improved, but the DSDs must be reviewed with the subject. Use the bar graphs to emphasize your point about improvement.
2. Discuss with the subject, "You're telling me..., but when I look at the DSDs and the bar graphs I see your sleep has improved. How do you account for this discrepancy? What's your theory about why this is happening?" The subjects may bring up that their daytime functioning has not improved. Discuss that it may take some time for daytime fuctioning to catch up with their sleep improvement. The important point is that they realize that improvement is taking place.
3. Lead the subject to answer the question "What have you done to improve your sleep pattern?" What are they doing "right" now? What are they doing differently?

Be sure to give time to those who are not showing signs off improvement. Emphasize points such as:

1. There are individual differences and everyone progresses at a different pace.
2. Insomnia is an old habit that is hard to break. A great deal of practice is necessary.
3. If these are individuals who have not followed the directions, you must emphasize that their sleep will not change uniless they foilow the entire intervention as prescribed. Make an analogy to taking an antibiotic; if you don't take the entire prescription, the infection will not resolve. Review the idea that they have nothing to lose by cooperating fully, they've suffered for a long time otherwise they wouldn't be here, 6 weeks is not a long time to work at solving a problem, etc. Use group members who have followed the treatment in its entirety to bring some peer pressure on those who have not followed the directions. Hopefully, this will have already occurred through statements such as "If I can do it, you can do it.".

## Discriminating Behaviors Associated with Good and Poor Sleep

For most people, some activities and events of the day, the evening, and from just before bedtime can affect sleep. Some may have a positive effect, some a negative effect. Most of you are probably already aware of some of the events and behaviors that help or hinder you in sleeping.

Have clients discuss this topic in terms of their own experiences. Generate a list of things that have a negative effect on sleep. Examples might be drinking coffee in the evening, worrying, reading certain kinds of materials, or having discussions on certain topics, such as finances. List things that have a positive effect on sleep, like exercise during the day, an hour of relaxation before bedtime, or pleasant conversation with spouse late in the evening.

Sometimes even though you think about possible connections,
you miss some that are important. By looking at the data in your Practice Records, you may be able to see connections that you were unaware of, and to discover some things to change in your daily routine.

Present this search through the Practice Records in terms of each client being their own personal scientist or sleuth. Have clients look over their Practice Records to determine their 3 best and 3 worst nights of sleep. Have them examine the records again for only the good nights to highlight any specific patterns. Repeat this process for the poor nights to see if any different patterns exist. You can see that the success of this exercise will be dependent on the accuracy and detail of the Practice Records. Focus primarily on the following 4 areas: (a) activities from dinnertime to bedtime, (b) activities in getting ready for bed, (c) activities carried out in bed, and (d) content of thinking in bed. Conduct a group discussion and help each person find any patterns they may have missed.

Once clients have pinpointed events and behavior associated yith a good night of sleep, discuss ways to make these behaviors a part of their daily routine. Be concrete. Get all of the clients to make a commitment to change their behavior. Record the changes each client agrees to make. Repeat this process with the behaviors and events associated with a poor night of sleep. Discuss ways to eliminate these events or behaviors. If some interfering event or behavior cannot be eliminated, discuss ways of minimizing its impact. Announce that at the next meeting the group will assess the results of implementing these changes in their routines and then work to fine-tune these changes. End the session by assigning the routine homework. Add to this the importance of working to increase behaviors associated with a good night of sleep and to decrease behaviors associated with a poor night of sleep.

## Assigning

## Homework

At the end of each session, clients should be reminded of their homework tasks and the importance these assignments play in the overall therapy. The homework for each week is: follow the treatment guidelines every day and night; complete the sleep diaries every morning and complete the ISQ on the assigned date, call in responses, and complete the practice record. Point out the instruments, etc. in the subjects' notebooks.

## SESSION 4

The first half of this last session will be conducted just like the previous two. Using the Practice Records and the standard format for problem solving, review any difficulties encountered during the week. Specifically address problems with carrying out the sleep hygiene and stimulus control instructions, establishing a prebedtime routine, and discriminating behaviors associated with a good and a poor night of sleep. Be sure to include the shaping of awareness of change component from session 3. Then move on to the 2 new topics for this meeting.

## Maintenance and Follow-up

Although the fourth week marks the last classroom treatment session, the treatment program is not over, only the formal teaching part. This last session marks only the beginning of the last week of therapy. They should continue to fill out all the homework forms and diaries during the upcoming weeks. Emphasize the importance of continuing to fill out the DSDs and calling the responses to the voice mailbox each morning.

## Assigning Homework

At the end of each session, clients should be reminded of their homework tasks and the importance these assignments play in the overall therapy. The homework for each week is: follow the treatment guidelines every day and night; complete the sleep diaries every morning and complete the ISQ on the assigned date, call in responses, and complete the practice record. Point out the instruments, etc. in the subjects' notebooks.

Arrange a time to contact the subject by phone one week from today for the 5th session.

## TELEPHONE SESSIONS (SESSIONS 5 AND 6)

At this point, the emphasis should be on the SET. The subjects should have resolved most of their problems concerning compliance with the treatment as well as strategies for managing the treatment. If problems arise on the phone, use the problem solving format.

Review what they have been doing to see if there is complete and consistent utilization of the therapy.

Discuss the SET prescription for the upcoming week.
Continue to shape the subjects' awareness of sleep behavior change as discussed in sessions 3 and 4.

Reemphasize the use of the DSDs, calling in the DSDs responses, filling out the ISQ and when to call that in, and using the practice record.

At the end of session 5, set up a telephone appointment for the following week.
At the end of session 6:
You should remind the subject to continue to call in the DSDs, the ISQ, and use the practice record for the upcoming week.
Also remind the subject that he or she will receive a number of questionnaires to fill out over the two weeks after treatment ends.

They should continue to practice all their new routines until they become automatic parts of their behavior. If they find their sleep deteriorating, it is probably because they have lapsed in their dedication to the new behaviors.

Remind the subjects that they will receive a follow-up call and a package of diaries about 12 weeks after treatment ends. The follow-up serves the purpose of giving the therapist feedback about the continiued progress of the group members. Knowing that they will be contacted may also give clients some added motivation to continue their efforts to alleviate their sleep problems.

The therapist should also say a few words about how to avoid having an occasional bad night evolve into a pattern of insomnia. Everyone from time to time has one night or a brief period of sleep troubles, especially during periods of increased stress. If they use the techniques that they have learned during those times and especially if they fight against the tendency to develop performance anxiety, they are highly likely to avert any more serious or persistent pattern of sleep disturbance. For those clients who are not showing much improvement at the end of treatment, explain that some habits are more difficult to change and more practice may be needed. Six weeks is the average length of time for improvement to become evident; some people take less time and some take more. In fact, some research studies have found that improvement continues after treatment ends and this is another reason to follow-up in 3 months.

## APPENDIX I

Intervention Instructions

## SLEEP HYGIENE INFORMATION

1. Avoid vigorous exercise immediately prior to bedtime. Moderate exercise in the late afternoon or early evening can help ward off early evening drowsiness.
2. A dark room is more conducive to sleep. Consider a night light for safety's sake.
3. Noise in the environment delays sleep, decreases the amount of deep sleep, and may cause more frequent awakenings. Older adults are more sensitive to noise.
4. There is more movement during sleep, more awakenings, less deep sleep, and less dream sleep when room temperatures are over 75 degrees. If temperatures are too low, people may have difficulty falling asleep. Room temperatures between 65 and 70 degrees are probably ideal.
5. Try to eat dinner several hours before bedtime. Digestive activity after a full meal may interfere with sleep. Hunger can disturb sleep so a light bedtime snack may be helpful. Do not eat a snack in the middle of the night or you amy inadvertently train yourself to wake up at that time to eat.
6. Do not drink alcohol later than 2 hours prior to bedtime.
7. Do not drink caffeine later than 6 hours before bedtime.
8. Do not smoke within several hours off your bedtime.
9. Put the bedroom clock out of sight and hearing.

## OPTIONAL DAYTIME NAP INSTRUCTIONS

We suggest you take a nap only if absolutely necessary. The less time you spend asleep during the day, the more likely you are to sleep in a consolidated fashion during the night. As we discussed in class, an optional daytime nap should be scheduled at a certain time of day and for a limited amount of time. Sleep scientists have found that the optimum time for napping is in the afternoon. An afternoon nap coincides with people's naturally occurring time of increased daytime sleepiness. Since people are usually more sleepy in the afternoon, naps at this time are very refreshing. Morning and evening naps are not beneficial because they do not coincide with the time of natural sleepiness. Evening naps can interfere with nighttime sleep.

## INSTRUCTIONS:

A nap can be taken for no longer than one hour and only between the hours of 1 PM and 3 PM. If you cannot fall asleep within 15 minutes, get out of bed. You can only nap once each day. Your bed is the only place in which you should nap. Remember, one of the goals of the treatment is to learn to associate your bed with sleep. If you sleep in places other than a bed, you are not learning to associate the bed with sleep.

Insomnia Treatment Study, 1993

## SLEEP EFFICIENCY TREATMENT BCHEDULE

WEEK 1: TUEBDAY, MAY 18 THROUGH MONDAY, MAY 24 BED TIME: $\qquad$
WANE TIME: $\qquad$

WEEK 2: TUESDAY, MAY 25 THROUGR MONDAY, MAY 31 BED TIME: $\qquad$
WAKE TIME: $\qquad$

WEEK 3: TOEBDAY, JUNE 1 THROUGH MONDAY, JUNE 7
BED TIME: $\qquad$
WAKE TIME: $\qquad$

WEEK 4: TUESDAY, JUNE 8 THROUGE MONDAY, JUNE 14 BED TIME: $\qquad$
WAKE TIME: $\qquad$

WEEK 5: TUEBDAY, JUNE 15 THOUGE MONDAY, JUNE 21 BED TIME: $\qquad$
WARE TIME: $\qquad$

WEEK 6: TUESDAY, JUNE 22 THROUGH MONDAY, JUNE 28 BED TIME: $\qquad$
WAKB TIME: $\qquad$

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[^0]:    Instruction 4: When you get into bed, turn out the lights with the intention of going right to sleep. If you find that you cannot fall asleep within a short time, get up and go into another room. Stay up as long as it takes until you begin to feel drowsy, and then return to the bedroom to sleep

    Goal is to come to associate your bed with falling asleep quickly! Use a period of about 10 minutes

    Return to bed only when you feel sleepy
    Some people who suffer from insomnia fall asleep better in places other than their own beds

    Help clients plan what activities they will engage in outside of the bedroom when they get up

    The SCl activities are more sedentary - to bring on sleep.
    Instruction 5: If you still have not fallen asleep, repeat the previous step. Repeat this process as often as it is necessary throughout the night. Also repeat the process of gettinng out of bed if you awaken during the night and cannot get back to sleep within about 10 minutes

    When you begin this treatment, it is common to have to get up many times each night many of you will probably feel that your insomnia is worse than when you began therapy for it

    Although this instruction may be the single most difficult one for you to comply with in the treatment, it is probably also the single most important one for you to follow.

