THE NATURE AND TREATMENT OF INSOMNIA COMPLAINTS IN OLDER ADULTS:

FINAL REPORT

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RÉSUMÉ

Un grand nombre d'individus âgés qui manifestent de pénibles perturbations de sommeil ne s'en plaignent néanmoins pas. Notre recherche part du principe que la compréhension pourquoi certaines personnes ne se plaignent pas, malgré les dérangements qu'ils subissent, est la clé qui nous permettra: (1) de définir les paramètres de l'insomnie non-médicale chez l'individu âgé, et (2) d'identifier les composantes efficaces des stratégies d'intervention qui préviendraient ou atténueraient les difficultés persistantes et perturbantes associées à l'initiation et le maintien du sommeil, coexistantes avec la croissance de l'utilisation des soins hospitaliers et médicamenteux.

Notre enquête actuelle comporte trois études conçues pour: (1) examiner les caractéristiques des modes de vie, les événements de la vie et les ajustements psychologiques d'individus âgés et pour analyser comment ces facteurs sont reliés au sommeil, (2) sonder les cours naturels des plaintes de sommeil dans la population dite "à risque", et (3) développer un traitement efficace contre l'insomnie tout en évaluant ces effets à court et long terme.

Les sujets choisi pour ces études on été sélectionnés parmi un groupe de 742 individus âgés, résidant en communauté (âge moyen=68) qui ont antérieurement participé à un aspect ou autre de notre recherche sur le sommeil et le vieillissement. Les moyens administrés nous ont fourni des données sur des facteurs démographiques, une panoplie de paramètres de sommeil, et, sur les perceptions subjectives de la qualité du sommeil, le style cognitif, l'effet et les ajustements psychologiques.

La nature des plaintes d'insomnie. Nos résultats nous indiquent que d'importants aspects de la plainte d'insomnie est rattachée plus aux cognitions éveillées et au style affectif qu'aux paramètres du sommeil tel que le temps total du sommeil ou du temps d'éveil quotidien. Nos données suggèrent (1) que la maîtrise et la gestion de l'anxiété sont importantes dans le traitement de l'individu affligé par la qualité de son sommeil, (2) l'activité quotidienne de jour ne semble être apparentée au paramètre de sommeil ou de détresse, et (3) les bons ou mauvais dormeurs avec de hauts ou bas niveaux de détresse-associative ne sont pas distingués par leur mode de vie ou caractéristiques démographiques mais par leurs évaluations cognitive-affectives.

La qualité du sommeil a long terme. Les résultats nous démontrent aussi qu'après une période de 2 ans, les bons dormeurs demeurent de bons dormeurs et que seulement 5% de ces individus ont subi une détérioration substantielle. De plus, 83% des individus initialement caractérisés comme ayant une qualité de "sommeil moyen" se sont soit amélioré ou sont demeurés inchangés après 2 ans. Même auprès des sujets dit "mauvais dormeurs" non traités, la qualité du sommeil fut améliorée dans 31% des cas. Ce pourcentage a augmenté jusqu'à 60% chez les sujets qui on été traités avec notre brève intervention de 2 semaines. En effet, les données indiquent qu'en général, sur une période de deux ans, la plupart des sujets demeurent

inchangés. Entre 30 et 60% des individus se sont améliorés, et relativement peu, soit 12%, se sont détériorés. Par conséquent il parâit que vieillir de deux ans ne semble pas être relié à la détérioration de la qualité du sommeil.

Le traitement de l'insomnie. En rapport avec le traitement efficace de l'insomnie nous avons démontré l'efficacité de la maîtrise de soi et de nos interventions "Countercontrol Plus-Relaxation" et "Countercontrol Plus-Audiobook" à court et moyen terme. Nos recherches ont établi un raisonnement fondamental afin de choisir entre les stratégies d'intervention, tel que la réévaluation de la période du sommeil, le dérangement de pensées gênantes, la maîtrise de l'anxiété, et le traitement de la condition dépressive lorsque nous développons des traitements pour les individus âgés.

ABSTRACT

A substantial number of aging individuals who manifest severe sleep disruptions do ***not*** complain of insomnia. Our research is based on the premise that understanding ***why*** some people do not complain, even though they experience the problem, is key in allowing us to (1) define the parameters of non-medically based insomnia in older individuals and (2) identify the effective components of coping strategies which could prevent or alleviate persistent and distressing difficulties in initiating and maintaining sleep - with its concomittent increased use of healthcare facilities and medications.

The present investigation consisted of three studies designed to: (1) investigate lifestyle characteristics, life events, and psychological adjustment in older individuals and to examine how these factors are related to the sleep experience, (2) explore the natural course of sleep complaints in a population "at risk", and (3) develop an effective insomnia treatment and evaluate both its short term and long term effects. Subjects for the three studies were selected from a pool of 742 community dwelling older individuals (mean age = 68) who have participated in various aspects of our research on sleep and aging. Measures administered yield information on demographic factors, a range of sleep parameters, and on subjective perceptions of sleep quality, cognitive style, affect and psychological adjustment.

Nature of the insomnia complaint. Our findings indicate that important aspects of the insomnia complaint are more closely related to waking cognitive and affective style than to sleep parameters such as total sleep or wake time. The data suggest that (1) anxiety management is important in the treatment of individuals highly distressed by their sleep quality, (2) daytime fatigue appears to be unrelated to sleep parameters or to distress, and (3) good sleepers and poor sleepers with high or minimal associated distress are distinguished not by the nature of demographic characteristics or lifestyle, but by their cognitive-affective evaluations.

Long term course of sleep quality. The results also show that, after a two year period, people who started out as good sleepers generally remain good sleepers; substantial deterioration was found in only 5% of these individuals. In addition, 83% of people initially characterized as experiencing "medium quality" sleep either improve or remain unchanged after two years. Even among untreated poor sleepers, sleep quality improved in 31% of cases; this percentage reached 60% in subjects treated with our brief (two - week) intervention. Indeed, the findings indicate that, on the whole, during a 2 year period, most individuals remain unchanged. Between 30% and 60% of individuals improve, and relatively few - only 12% - deteriorate. Thus, getting 2 years older seems to be unrelated to deterioration of sleep quality.

Insomnia treatment. With respect to effective treatments for insomnia, we have demonstrated the efficacy of self-monitoring and our Countercontrol Plus-Relaxation and Countercontrol Plus- Audiobook interventions in both the short and long term. Our findings establish a rationale for choosing among treatment strategies, such as re-evaluation of the sleep experience, disruption of intrusive thoughts, anxiety management, and treatment of depression, when developing insomnia treatment packages for older individuals.

INTRODUCTION AND PROBLEM CONTEXT

There are a host of age related changes in sleep and wakefulness; all are in the direction of impaired sleep (Morin, 1993). Older people generally experience a reduction in deep sleep, increased nighttime wakefulness, more frequent early morning awakenings, and increased fragmentation of sleep; there is also some reduction in deep sleep, rapid-eye movement (REM) sleep, and total nighttime sleep (Brabbins et al., 1993; Buysse et al., 1992; Carskadon et al., 1982; Dement et al., 1985; Hauri, 1982; Miles & Dement, 1980; Prinz et al., 1990).

Psychophysiological factors associated with aging resemble the pattern in non-elderly insomniacs (e.g., Engle-Friedman & Bootzin, 1981) and it seems clear that the changes accompanying normal aging are likely to predispose older individuals to perceive themselves as suffering from a sleep disorder. Indeed, while the prevalence of insomnia complaints has been estimated at 30% - 40% for the general population (American Psychiatric Association, 1994), it is between 50% and 60% for individuals age 60 and over (Chen & Foley, 1994; Monjan, 1994). Persistent and distressing difficulties in initiating and/or maintaining sleep (DIMS) have been estimated at between 10% and 35% of people over 65, with concomitant increased use of medical facilities and medications (Brabbins et al., 1993; Dement et al., 1982; Ford & Kamerow, 1989; Gallup Organization, 1991; Mellinger, et al., 1985; Monjan, 1994; Tait, 1992).

Despite developmental psychophysiological changes in sleep patterns, not all older adults complain of impaired sleep (Dement, et al., 1982; Monjan, 1990). The question arises, Why do not ***all*** aging individuals report insomnia? Why does the magnitude of the sleep complaint not match the severity of the psychophysiological deficit in older individuals, as it usually does (Bootzin & Engle-Friedman, 1987; Prinz, et al., 1984) in middle aged adults?

Because we believe that understanding this phenomenon is a key factor in allowing us to (a) define the parameters of non-medically based insomnia in older individuals and (b) to identify the effective components of coping strategies which would prevent or alleviate the debilitating experience of insomnia, much of our research is directed towards identifying those factors which differentiate older individuals who do and those who do not complain of insomnia.

OBJECTIVES OF THE PRESENT INVESTIGATION

Specifically, the present investigation had the following three goals: (1) to investigate lifestyle characteristics, life events, psychological well-being and adjustment in older individuals and to examine how these factors relate to the sleep experience, (2) to explore the natural course of sleep complaints in a population "at risk," and (3) to design an effective insomnia intervention and evaluate the short term and long term effects of treating the insomnia complaint.

METHODOLOGY

Measures

This section includes all measures used in the various studies. Both frequently used, well validated instruments are described, as well as measures developed by our team.

Demographic and Socioeconomic Factors

Background Information Form. This is a modified version of a short questionnaire used in our previous studies on aging (Libman, et al., 1989a, 1989b). It provides socioeconomic, personal and demographic descriptors (e.g., age, sex, marital status). Education is evaluated in 3 categories (higher = more) and income in 6 (higher = greater). Adequacy of income is assessed using a 9-point scale (1 = inadequate, 9 = more than adequate).

Sleep Measures

Sleep Questionnaire. This brief objective questionnaire inquires about typical sleep experiences, including time spent in bed, hours slept per night, duration and frequency of nocturnal arousals, sleep medication use, bedtimes and arising times during a typical week, and frequency (0-7 days/week) of: daytime fatigue due to lack of sleep, naps, experienced difficulty falling asleep, getting back to sleep after nocturnal awakenings, and falling asleep after waking up too early. It also inquires how frequently (0 - 7 days/week) each of these three sleep problems is accompanied by feelings of distress. The information provided allowed us to (1) diagnose the presence or absence of a disorder of initiating or maintaining sleep (DIMS)(ASDA, 1990), (2) obtain ratings of respondents' subjective perceptions of the frequency of sleep problems (Sleep Difficulty: Occurrence of Sleep Problems 1 = very rarely, 10 = very often) and the associated distress (Sleep Distress: Level 1 = not at all, 10 = very much), and (3) compute two derived frequency scores - Sleep Difficulty: Frequency of Problem Episodes and Sleep Distress: Frequency of Distress Episodes - which provide single summary frequency scores (0-21: higher scores indicate more frequent sleep problem/distress episodes experienced during the week). Our data show that scores based on this measure have acceptable psychometric properties for research use; test-retest correlations indicate reasonable temporal stability ($\underline{r}$ values range from .58 to .92) and, the pattern of correlations among variables shows logical, highly significant relationships (Fichten, Creti, Amsel, Brender, Weinstein, & Libman, 1995; Fichten, Libman, Creti, Amsel, Tagalakis, & Brender, 1995).

Self-Efficacy Scale (Sleep). This 9-item scale evaluates individuals' beliefs about their ability to influence their own sleep-related motivation and behavior. Validity data provided by the scale's authors indicate higher scores (stronger sleep self-efficacy expectations) after behavioral treatment for insomnia (Cook & Lacks, 1984; Lacks, 1988). Our data on older individuals indicate reasonable temporal stability for the measure, $\underline{r}(57)=.77$, $\underline{p}<.001$.

Sleep Behaviors Listing. Participants indicated what they do when experiencing trouble

sleeping in response to two interview questions ("What do you do when you can't sleep?" "What self-help remedies have you tried for your sleep problem?") and one open-ended questionnaire item ("Describe what you do when you have problems falling asleep"). Responses were pooled and scored in accordance with a coding manual (Creti, Fichten, Lennox, & Libman, 1994) into 20 behavior categories (e.g., have an alcoholic drink, pray, read). Total scores reflect the total number of different sleep behaviors noted.

Sleep Behaviors Scale:60+. This measure, newly developed by our team, is based on the open-ended Sleep Strategies Listing completed by some of the participants, Respondents rate, on a 5-point scale, how often they engage in each of 30 activities when having problems falling asleep or getting back to sleep at night (0 = never or hardly ever, 4 = very often). Ratings are summed to provide an overall score which reflects the frequency of using sleep strategies. In addition, the measure contains 4 relatively independent subscales: Relaxation Behaviors, Active Behaviors, Cognitive Activities, Medication Use and 4 additional single items. Our data indicate good validity and reliability for this scale (Libman, Creti, Amsel, Brender, & Fichten, 1995; Fichten, et al.,1995a).

Daily Sleep Diary. This is a modified version of Lacks' measure (Lacks, 1987; 1988) which allows participants to monitor their subjective complaint of insomnia on a daily basis (Libman, Creti, Levy, Brender, & Fichten, 1995). It includes 15 items which assess sleep latencies, frequency and duration of nocturnal awakenings, total sleep time, quality of the sleep and waking experience, napping and the use of sleep medication (the Sleep Diary completed during the treatment phases of this investigation also assesses compliance with the treatment program).

"Objective" variables derived from this measure include four sleep-wake parameters that refer to time (measured in hours): (1) Sleep Onset Latency (SOL): time to fall asleep, (2) Waking After Sleep Onset (WASO): the duration of nocturnal arousals, (3) Total Sleep Time (TST): respondents' perceptions of how long they usually sleep per night, and (4) Sleep Efficiency %: hours slept divided by hours in bed. A more subjective sleep variable is also obtained from this measure: Sleep Quality; this is a subjective rating of the quality of sleep on a 5-point scale (1=very poor to 5 = very good)]. In addition, 2 of the items evaluate daytime "consequences": Daytime Functioning [participants rate how well they were functioning each day on a 5-point Likert-type scale (1=very poorly to 5=very well) and Morning Restedness [participants rate how rested they feel in the morning on a 5-point scale (1=very poorly rested to 5=very well rested)]. Two items measure somatic and cognitive arousal: Physical Tension [a subjective rating of the level of physical tension upon going to bed (1=very tense to 5 very relaxed)] and Mental Activity [a subjective rating of the level of pre-sleep mental activity (1=very active to 5=very quiet)].

Test-retest reliability for Lacks' instrument is high for estimates of sleep onset latencies (SOL) and number of minutes spent awake after sleep onset (WASO) (Bootzin & Engle-Friedman, 1981). Lacks (1988) also found differences in SOL between insomniacs (means range from 37 to 82 minutes) and good sleepers (means range from 9 to 14 minutes).

Psychological Adjustment: Sleep Related (State) Measures

Stanford Sleepiness Scale (Hoddes et al., 1973). This frequently used measure of daytime sleepiness consists of seven Guttman-scaled items ranging from 1 (feeling active and vital; alert; wide awake) to 7 (lost struggle to remain awake). Respondents select the one option which best describes how sleepy they feel most days. Reported alternate forms reliability yielded an agreement of 88%. Concurrent validity data show that the measure is reasonably highly correlated with vigilance (r = .68) and memory test (r =.47) scores. Also, scores were shown to be sensitive to sleep loss effects. We modified the measure to evaluate how sleepy subjects felt "on most days." Our data on older individuals indicate acceptable temporal stability for this modification, $r(47)=.56$, $p<.001$.

Pre-Sleep Arousal Scale. Sixteen 5-point rating scale items assess the phenomenology of the pre-sleep state. Two scores are derived: Somatic and Cognitive arousal (e.g., "a tight tense feeling in your muscles," "thoughts keep running through your head," respectively). Nicassio et al. (1985) showed good psychometric properties for this scale. Subscales were shown to be internally consistent and stable over time. Means for insomniacs were significantly higher than for normal sleepers for both subscales, reported Cronbach's alphas for subscales ranged from .67 to .88, and test-retest correlations ranged from .72 to 76. Test-retest correlations obtained in our laboratory on older individual are more modest; Somatic subscale, $r(56)=.36$, $p<.01$; Cognitive subscale, $r(56)=.52$, $p<.01$.

Tension Thermometer. A single item inquires about the level of tension typically experienced while trying to fall asleep (11 point scale: 0 = not at all tense, 100 = very tense, with ratings made at 10-point intervals). Our data indicate reasonable temporal stability for the measure, $r(35)=.67$, $p<.001$, and the pattern of correlations between scores on this measure and relevant sleep and adjustment variables shows logical, highly significant relationships (Fichten et al., 1995a; 1995b).

Anxious Self-Statement Questionnaire (ASSQ). The frequency of anxious self-talk is evaluated by this 32 item self-report measure. Kendall and Hollon (1989) indicate that reliability for the questionnaire is acceptable (split half reliability was .92, item-total correlations ranged from .45 to .79) and that it is sensitive to a stressful event. Higher scores indicate more anxious self-talk. In our studies, the measure was modified by asking participants to base their responses on periods of sleeplessness; our data on older individuals indicate acceptable temporal stability in this context, $r(56)=.69$, $p<.001$.

Overall Thought Pleasantness While Trying to Fall Asleep. This single Likert-type rating scale item inquires about the pleasantness of respondents' thoughts while trying to fall asleep; higher scores indicate mostly pleasant thoughts, and lower scores indicate mostly unpleasant thoughts. Reasonable temporal stability [test-retest correlation, $r(35) = .63$, $p < .001$] and validity data reported elsewhere (Fichten et al., 1995a; 1995b) suggest acceptable reliability and validity for research purposes.

Cognitive Content Questionnaire. This thought listing form consists of ruled lines which allow respondents or interviewers to indicate, in an open-ended manner, the content of an individual's thoughts when trying to fall asleep as well as the valence [pleasant (+) or unpleasant (-)] of each thought reported. Participants answered the following open-ended question, "When people can't sleep, they may think of many things. When you are trying to fall asleep, what are the things you usually think about?" After listing their thoughts, subjects indicated whether each thought was pleasant (+) or unpleasant (-). Where respondents failed to indicate valence, 2 trained coders, blind to the sleep status of participants, classified thoughts as pleasant (+), unpleasant (-), or neutral / unclassifiable. Scores are reported as valenced (Positive and Negative) thought frequencies and as States-of-Mind (SOM) ratios.

In two seminal papers Schwartz and Garamoni (1986, 1989) proposed that adaptive thinking is characterized not by either positive or negative thoughts but by the balance between the two. They proposed 5 distinct States-of-Mind (SOMs) on the basis of specified ranges of thought ratios [Positive / (Positive + Negative)]. These SOM categories define different types of internal dialogues which reflect differing degrees of adaptive thinking. "Positive Dialogue" (PD), characterized by 63% positive thoughts, is considered optimal. As thinking becomes less positive, this balance shifts toward 50% and below. The SOM model predicts that ratios lower than PD reflect increasing levels of maladaptive thinking.

An impressive body of evidence reviewed by Schwartz and Garamoni (1986, 1989) as well as data from recent investigations by others (e.g., Bruch, Hamer, & Kaflowitz-Lindner, 1992; Fichten, Amsel, Robillard, & Tagalakis, 1991, Fichten, Robillard, Tagalakis, & Amsel, 1991, Heimberg, Bruch, Hope, & Dombeck, 1990) demonstrate that ratios with lower values do, indeed, reflect less functional thinking about events (e.g., coping with a stressor, anxiety, depression) than ratios with higher values. Although the SOM ratio does permit comparisons across studies, numerous conceptual concerns related to thought content and valence exist. Therefore, we typically report both valenced thought frequencies as well as SOM ratios.

Criteria developed by Fichten and Lennox (1993) were used to score valence. Average inter-rater agreement on three spot checks of reliability on valence was 83%, with a minimum of 76%. Data indicate that Positive and Negative frequency scores based on this measure are logically related to relevant criterion variables (Fichten et al., 1995a; 1995b).

The measure also provides descriptive data about the content of thoughts experienced while trying to fall asleep. Not only thought valence [pleasant (+), unpleasant (-), neutral], but also thought content (e.g., events of next day, current affairs) can be scored. Since worry may be a hallmark of distress associated with insomnia, negative thoughts were also designated as "worry" or "nonworry" thoughts. Worry thoughts consisted of references to uncertain future outcomes, rumination about past events or losses, and thoughts reflecting hopelessness about the future (cf. Andrews & Borkovec, 1988).

We derived 18 categories to code the content of thoughts during periods of insomnia

(Fichten & Lennox, 1993). Two coders, trained to a minimum of 70% item-by-item inter-rater agreement (which required approximately 30 hours of training) who were blind to subjects' sleep characteristics, classified responses into the 18 content codes. Inter-rater agreements were assessed on three checks of reliability (a total of 235 codes on the protocols of 69 subjects). Average inter-rater reliability for content was 74%, with a minimum of 70%; the Kappa coefficient was .67. Agreement on Worry was 100%.

Temporal stability for thought frequencies was acceptable for Negative thoughts, $r(41)=.65$, $p<.001$, Worry thoughts, $r(41)=.45$, $p<.01$, and for SOM ratios, $r(30)=.40$, $p<.05$. The coefficient for Positive thought frequency, however, was not significant, $r(41)=.08$, $p>.05$.

Self-Statement Test: 60+ (SST:60+). This 34 item inventory measure of valenced thoughts experienced during times of wakefulness was developed by our team (Fichten et al., 1995b). Item content is based on thought listings on the Cognitive Content Questionnaire. Respondents indicate, using a 5-point scale (0 = never or hardly ever, 4 = very often) how often during periods of wakefulness they experience each of 17 positive and 17 negative thoughts (e.g., "enjoyable things I did during the past few days" "poor health of family members or friends"). The 5-point scale format is used in most popular measures of thoughts and self-statements (e.g., Glass & Arnkoff, 1982; Glass, C., Merluzzi, T., Biever, J., & Larsen, K., 1982; Clark, 1988). Because of concerns raised by Robert Schwartz (1992 personal communication) and empirically verified by our team (Amsel, Wright, & Fichten, 1993; Amsel, Fichten, Creti, Wright, & Libman, 1994; Amsel & Fichten, 1995), a 0 to 4 rather than a 1 to 5 response rating scale was used. Positive and Negative frequency scores are each summed. The measure yields 2 thought frequencies - Positive and Negative - as well as a States-of-Mind (SOM) ratio [Positive / [Positive + Negative)] (Schwartz & Garamoni, 1986; 1989). Our data indicate good psychometric properties for this test: internal consistency was shown to be high (Cronbach's $\alpha = .903$ for Positive and .898 for Negative thoughts). Temporal stability was also shown to be high (test-retest correlation coefficients ranged from .79 to .95) and construct validation data indicate that the measure is a valid index of self-statements during periods of nocturnal wakefulness in older individuals (Fichten et al., 1995a; 1995b).

Psychological Adjustment: Trait Measures

Brief Symptom Inventory (BSI) (Derogatis, et al., 1976). A brief (53 item) self-report psychological symptom inventory, the BSI has subscales for 9 symptom dimensions (e.g., Depression, Anxiety) and 3 global indices (Global Severity Index). It is a brief version of the SCL-90 (Derogatis, 1977) - a frequently used instrument with acceptable reliability and validity. Validation data indicate correlations from .92 to .98 between the symptom dimensions and global indices of the BSI and the SCL-90 (Derogatis, 1977). Normative data for an elderly sample are provided by Hale, Cochran, & Hedgepeth (1984). Lower scores indicate better adjustment.

Eysenck Personality Inventory (EPI) (Eysenck & Eysenck, 1968). This reliable and valid empirically based questionnaire is among the most frequently used measures of personality

(Digman, 1990). It evaluates the dimensions of Neuroticism and Extraversion-Introversion, as well as the tendency to respond in a socially desirable direction. Only the Neuroticism subscale is of interest in the present investigation. Higher scores indicate greater Neuroticism.

Penn State Worry Questionnaire (Meyer et al., 1990). On 16 items respondents indicate, using a 5-point scale, how typical of them each statement is. Internal consistency evaluations obtained in the 8 validation studies conducted by the questionnaire's authors ranged from coefficient alpha scores of .91 to .95. Test-retest reliability coefficients ranged from .74 to .92. Data provided concerning concurrent and criterion group validity showed acceptable results. Higher scores indicate a more worrying personality style.

Satisfaction with Life Scale. Developed by Diener et al. (1985), this scale evaluates the cognitive, judgmental aspect of subjective well-being. It consists of 5 items which use a 7-point Likert scale. Higher scores indicate greater life satisfaction. Data reported by the scale's authors as well as in later investigations (Pavot et al., 1991) indicate good psychometric properties; the measure has been shown to be internally consistent (item-total correlations varied from .55 to .80), items loaded on a single factor, and scores were found to be highly correlated with other measures of life satisfaction. What makes this measure different from most of the others used in the present investigation is that ***it measures the presence of good adjustment***, rather than the absence of psychological problems.

Lifestyle Activities Measures

Activities Questionnaire. Designed by our team to examine the nature, quality, and regularity of respondents' daytime activities (Creti, Libman, Weinstein, Lennox, Gay, Bailes, Brender, Amsel, & Fichten, 1992), this measure elicits information regarding how occupied respondents experience themselves to be (How Busy: 10-point scale). In addition, respondents indicate the frequency (0 to 7 days/week) and pleasantness (1=very unpleasant, 10 = very pleasant) of 23 obligations and leisure activities (e.g., visits to doctor, caring for pets, watching TV, volunteer work, socializing). The frequencies of pleasant and unpleasant activities is summed to yield 2 scores: Positive Activities, Negative Activities. A "Diversity of Activities" score is the number of different activities carried out at least once a week (maximum = 23).

Daytime Activity Record Form. This single page, which reflects a 1 week segment, is used in our clinical evaluation battery at the SMBD Jewish General Hospital Behavior and Sex Therapy Service (Libman, 1988). The format allows respondents to note, on a daily basis, what time specific routines occur (e.g., wake-up, meals, bedtime) and what activities occur in the time segments between these routines. Here, we report a "Variability in Meal Times" score which reflects the mean of the daily deviations of meals from the weekly averages. Scores are expressed in hours; higher values indicate greater variability. A "Daytime Quality" rating (1 = very unpleasant, 5 = very pleasant) was also included for each day; the mean of the week's ratings provides information on overall subjective quality.

Life Events Scale. This is a 10-item checklist of potentially stressful major life events

experienced by older individuals (e.g., retirement, death of a close friend). Subjects indicate which of these they experienced in the last six months. This measure has been used with an aging sample in a recent study (Siegal, 1990) in which stress response was shown to vary with certain personal environmental factors. Higher scores indicate a greater number of stressful life events. In the present investigation, a modified version was used which includes two additional items: "personal major illness or injury" and "none of the above". The latter was included to confirm that participants have read the questionnaire and none of the items apply to them. Scores on the measure were prorated (out of 10) to render them comparable with Siegal's (1990) data.

Treatment Study Only: Intervention Related Measures

Client Satisfaction Questionnaire. Developed by Larson, Attkinson, Hargreaves, and Nguyen (1979), this 8-item measure assesses subjects' evaluation of the credibility of a treatment and their satisfaction with diverse aspects of the treatment. Higher scores indicate greater satisfaction.

Intervention Evaluation Form. This is a modified version of Borkovec's (1972) credibility/expectancy-for-improvement scales which were used to assess different therapy rationales. Five 10-point scale items were adapted for use with insomnia rather than speech anxiety; this resulted in four 10-point items which are summed and prorated out of 5 (to render scores similar to those on the original measure). Higher scores indicate greater credibility.

Treatment Compliance. Extent of Compliance in the intervention phase of the treatment study was evaluated on the Sleep Diary.

Interviews

Telephone Screening Interview. The first individual contact for some of the participants consisted of a standardized interview which included an introduction of the researcher and of the research project. Potential participants were queried about exclusion criteria including age, language, current serious medical or personal problems which may have affected participants' sleep, current medical or psychological consultations, and medication use.

Structured Sleep History Interview. A modified version of the clinical instrument developed by Lacks (1987) was used. Most questions require a Yes/No answer, with prompts in case of suspected difficulty. The measure provides information on exclusion criteria such as sleep apnea, parasomnias, physical disorders, sleep phase disorder, medication use, use of hypnotics and sedatives, and physical and psychological status. Operational definitions for specific exclusion criteria are noted in the measure.

Termination Interview. At the end of the treatment study, participants were given a standard open-ended interview. Questions included what participants liked and disliked about the treatment, if they felt they still had an insomnia problem and how distressed they were about

this. At this time, any questions participants had were answered and appropriate referrals were made when necessary.

Long-Term Follow-Up Interview. Approximately 2 years after they were tested, we attempted to contact all participants for whom we had a name and either a telephone number or an address. We asked these individuals to provide additional information about their sleep. A brief version of the Sleep Questionnaire was administered either via an interview or in the form of a mailed questionnaire (with a stamped, self-addressed envelope). Participants' questions were answered at this time, individuals who asked to be seen by our team were provided with a free individual consultation, and appropriate referrals were made when necessary.

Subjects and Procedure

Grouping Participants Into Three Sleep Status Groups: Good Sleepers, High Distress Poor Sleepers, and Low Distress Poor Sleepers

Poor Sleepers. Those who met the ASDA (1990) criteria for the diagnosis of psychophysiological insomnia (30 minutes of undesired awake time at least 3 times per week, problem duration at least 6 months) and whose Sleep Questionnaire responses indicated both a relatively high Sleep Difficulty: Frequency of Problem Episodes score (4 or greater) as well as a relatively high subjective rating of Sleep Difficulty: Occurrence of Sleep Problems (at least 6) were classified Poor Sleepers.

High Distress Poor Sleepers. Poor Sleepers whose subjective Sleep Distress: Level of Distress was 6 or greater and whose Sleep Distress: Frequency of Distress Episodes score was at least 9 were classified High Distress Poor Sleepers.

Low Distress Poor Sleepers. Poor Sleepers whose subjective Sleep Distress: Level score fell below the mid-point on the scale (5 or less) and whose Sleep Distress: Frequency score was 8 or less were classified Low Distress Poor Sleepers.

Good Sleepers. Individuals who (1) failed to meet the criteria for diagnosis of psychophysiological insomnia, and who met the following requirements were classified Good Sleepers: (2) Sleep Difficulty: Frequency score 3 or lower, (3) subjective Sleep Difficulty: Occurrence score below the mid-point of the scale, (4) Sleep Distress: Frequency score below 3, and (5) subjective Sleep Distress: Level score 3 or lower.

"Medium Quality" Sleepers. Individuals whose data indicated "mixed" Good and Poor Sleeper attributes (i.e., at least one Good Sleeper and one Poor Sleeper score) were classified as "Medium Quality" Sleepers.

These elaborate criteria for classifying sleep status resulted in very good and very poor sleepers in our contrast groups.

Participants

742 older individuals, approximately 1/3 men and 2/3 women (mean age = 68.35, range = 55-91) who met the following selection criteria served as subjects in this research: over age 55, community resident, volunteer, sufficient cognitive and language skills to complete the measures in English. Depending on the requirements of each aspect of each investigation, participants completed measures in our laboratory, on the telephone, in a seniors' group context, or at home.

Overall, participants can be characterized as "middle class." For example, they were well educated: approximately ½ of subjects belonged to university or college seniors' groups, and most of the participants had completed at least high school. Responses to a question on the Background Information Form which deals with Income Satisfaction indicate that participants generally felt that their incomes were "adequate" in meeting their needs.

Sub-sets of this large number of participants served as subjects for the various studies, depending on the requirements of the investigation in question. Relevant procedural aspects are described separately for each study. All subjects completed at least a brief version of the Background Information Form and the Sleep Questionnaire. All participants who so requested were given an interview with a senior member of the research team and appropriate referrals were made when necessary.

STUDY 1: PSYCHOLOGICAL AND LIFESTYLE CHARACTERISTICS OF OLDER GOOD AND POOR SLEEPERS

Although it is well documented that pain, medical and psychiatric illness, and drug side effects - i.e., "comorbidities" - all adversely affect sleep in seniors, the ubiquity of chronic sleep complaints, even in the "well elderly," has prompted a variety of explanations related to lifestyle factors. The following have all been proposed: irregular schedules permitted by retirement, napping, early bedtimes, overly long periods spent in bed, unrealistic expectations about sleep needs, and erroneous beliefs about how well comparable age peers sleep, as well as major life stresses such as death or illness in a loved one. Given the pervasiveness of such beliefs and the numerous successful treatment programs which focus on changes in these realms (e.g., Bootzin, 1985; Edinger et al., 1992; Hoelscher & Edinger, 1988; Morin et al., 1993a), the lack of confirmatory data for these assumptions is truly astounding.

It has also been suggested that hyperarousal - physiological, cognitive or affective - plays a key, predisposing part in insomnia. In particular, a central role has been postulated for cognitive arousal (e.g., Borkovec et al., 1981; Fichten & Libman, 1991; Coyle & Watts, 1991; Kuisk et al., 1989; Lichstein & Fanning, 1990; Lichstein & Rosenthal, 1980; Morin et al., 1993; Sanavio et al., 1990). Indeed, most researchers and clinicians now implicate negative, worrying and intrusive thoughts in the experience and maintenance of sleep disorder (Morin, 1993). Evaluation of cognitive therapies addressing aspects such as beliefs and attitudes about sleep has recently begun (Morin, 1994; Morin et al., 1993b). However, there has been little systematic investigation into the nature of thoughts which people have when trying to fall asleep (Fichten et al., 1995b), even though available data indicate that thoughts, in general, do distinguish between younger good and poor sleepers (Marchini et al., 1983; Van Egeren et al., 1983).

There is a vast literature on personality and psychological adjustment factors in younger and middle aged individuals experiencing sleep problems (e.g., Coursey et al., 1975; Hauri & Fisher, 1986; Kales et al., 1984; Paulsen & Shaver, 1991; Schneider-Helmart, 1987) as well as on the import of daytime stressors (Healey et al., 1981; Rubman et al., 1990; Waters et al., 1993; White & Nicassio, 1990). With several notable exceptions (Frisoni et al., 1993; Morin & Gramling, 1989; Gourash-Bliwise, 1992, Monk et al., 1992; Morgan et al., 1988, 1989), there is little available information about the relationship between sleep parameters and psychological and lifestyle factors for aging individuals, even though the sleep complaint of most older persons differs from that of younger insomniacs - i.e., sleep maintenance as opposed to sleep onset latency problem.

In spite of the well known axiom that people seek treatment for insomnia when they are distressed by the problem (e.g., Morin, et al., 1993a) or by its consequences (Stepanski et al., 1989), until recently definitions of psychophysiological and subjective disorders in initiating and maintaining sleep (DIMS), such as those available in DSM-III-R (American Psychiatric Association, 1987) and the ICSD Diagnostic and Coding Manual (ASDA, 1990), focused primarily on the objective, behavioral aspects of the sleep disruption. Only relatively recently has the concept of distress related to the sleep problem been recognized as a central feature of insomnia (American Psychiatric Association, 1994). In evaluating predisposing factors for insomnia, cognitive, affective and lifestyle aspects have usually not been considered, even though there is evidence that stress - psychological (Waters et al., 1993; White & Nicassio, 1990), environmental [e.g., poverty (Tait, 1992)], and physical [e.g., ill health (Healey et al., 1981)] - is associated with poor sleep.

The distress experienced by people who complain of insomnia and the decline of psychosocial functioning often seen among insomnia patients have been proposed as intervention targets in their own right. For example, Chambers and Keller (1993), in their recent review of the literature, concluded that the relatively small amount of sleep deprivation in many insomniacs cannot account for the magnitude of their complaints or their reported daytime sleepiness and fatigue. There are other reasons, also, for targeting more general aspects of adaptation. Adam et al.'s (1986) data revealed metabolic differences between good and poor sleepers which are compatible with the commonly observed high anxiety and arousal in people

complaining of DIMS; these investigators interpreted their findings as indicating that people complaining of insomnia may need more sleep for anabolic restoration, but actually get less. Therefore, intervening in potentially modifiable aspects of adjustment and lifestyle in older individuals may result in beneficial changes to the experience and complaint of insomnia.

In view of such findings and their implications, one major goal of the present investigation was to explore and compare psychological adjustment and lifestyle in older adults with and without insomnia. It has been suggested that the insomnia complaint is possibly more closely related to waking lifestyle and adjustment than to nocturnal factors (Bootzin, 1985; Chambers & Keller, 1993). Therefore, our examination included not only nocturnal sleep parameters, but also the accompanying thoughts, feelings and behaviors, as well as various indices of lifestyle and daytime activities, adjustment, and functioning.

When we applied this broadened evaluative process in our earlier studies, to our surprise we were able to identify three distinct categories: the expected two groups; good sleepers with no complaints and poor sleepers who were highly distressed by their insomnia and a second reasonably large group of very poor sleepers - people who manifested fairly severe DIMS, but were minimally or not at all distressed by this. Although the existence of such individuals has been suggested (e.g., Chambers & Keller, 1993; Lichstein & Rosenthal, 1980; Seidel et al., 1984; Stepanski, et al., 1989), their characteristics have not, as yet, been identified.

In their thought provoking review of studies comparing sleep parameters of good sleepers with those of self-identified poor sleepers, Chambers and Keller (1993) demonstrate that, on average, insomniacs' total sleep time is only 35 minutes less than that of good sleepers. The absolute magnitude of this difference is small compared to reductions in sleep well tolerated by normal sleepers. Therefore, they postulate that other aspects, most specifically state and trait anxiety (c.f., Chambers & Kim, 1993), contribute to poor sleepers' complaints both about the magnitude of the sleep problem as well as about their daytime experience of fatigue and sleepiness.

Although the general rationale is compelling, Chambers and Keller's (1993) attempt to minimize the difference in sleep parameters between good sleepers and insomniacs puts a strain on their argument; the upper range of mean differences between good and poor sleeper groups still approached 1-1/4 hours, at which point it is difficult to deny clinical significance. The ideal comparison group for the evaluation of the role of wake time factors in the experience of insomnia is precisely the Low Distress Poor Sleeper group which we identified - i.e., people who manifest a similar magnitude of sleep disruption to that of insomnia complainers, while demonstrating a generally low level of distress about their sleep disruption, making them resemble good sleepers in this regard.

Therefore, the major objective of this aspect of the present investigation was to explore the relationship between trait and state aspects of psychological adjustment, lifestyle factors, and sleep parameters in older good sleepers and in older poor sleepers who were either highly distressed or minimally distressed by their disrupted sleep. A second goal was to substantiate

some of the widely held - but poorly documented - assumptions about sleep, aging, lifestyle and insomnia in aging individuals.

Subjects and Procedure

Sample 1. Sample 1 included 189 older individuals (62 men and 127 women; mean age = 70 range = 55 to 89) who met the selection criteria for our larger investigation of sleep, aging, and non-drug treatment of insomnia. For this larger investigation, both good and poor sleepers were recruited through media publicity consisting of press releases, presentations and mailings to seniors' groups, and notices in community clinics and residences for seniors. Selection criteria were: (a) age 55 and over, and (b) community resident, (c) prescription sleep medication, if used, was currently taken less than 3 nights per week (this criterion is consistent with sample selection in published studies on psychological interventions for insomnia), (d) psychological status: currently not receiving psychiatric or psychological care, no evidence of psychopathology or depression, (e) physical status: absence of major illness or drug use directly associated with sleep disturbance (cf. Lacks, 1987; Nicassio & Buchanan, 1981), (f) no evidence of physically based sleep disturbance (e.g., sleep apnea, restless leg syndrome, nocturnal myoclonus), based on subjects' self-reported history, and (g) no evidence of parasomnias or sleep phase disorder (e.g., phase delay, phase advance, or deregulation of circadian cycles).

Of the 189 individuals in Sample 1, 116 participants (mean age = 70, range = 55 to 87) met the rigorous criteria for one of the three sleep status categories: Good Sleeper (n = 60), Low Distress Poor Sleeper (n =29), or High Distress Poor Sleeper (n = 27). The sex ratio in all samples was approximately 1/3 male and 2/3 female.

Poor Sleepers had experienced insomnia for a mean of 16 years (range = .5 to 60), suggesting that they were experiencing a chronic, rather than an acute sleep problem; there was no significant difference between Low and High Distress Poor Sleepers on this variable. In general, subjects were "middle class" (the typical subject's income was approximately $ 30,000 and almost 40% of subjects had attended university).

Subjects completed questionnaires assessing socioeconomic, psychological, and physical health factors as well as a wide range of sleep characteristics: Background Information Form, Sleep Questionnaire, Self-Efficacy Scale (Sleep), Sleep Strategies Listing, Stanford Sleepiness Scale, Pre-Sleep Arousal Scale, Anxious Self-Statement Questionnaire, Cognitive Content Questionnaire, Brief Symptom Inventory(BSI), Eysenck Personality Inventory (EPI), Penn State Worry Questionnaire, Satisfaction With Life Scale, Activities Questionnaire, Life Satisfaction, Life Events Scale. These were completed on an individual basis under the supervision of a member of the research team during two sessions in our laboratory. Sessions were spaced 1 week apart. The Structured Sleep History Interview was administered during the first session. Subjects returned the Daytime Activity Record Form, which required one week of recording at home, at the time of the second session. Poor sleepers who were not appropriate for our ongoing treatment study or whose sleep complaint appeared to have a medical basis were given appropriate referrals.

Sample 2. 445 individuals (136 men, 309 women, mean age = 68, range = 55 to 88) completed measures in Sample 2. While they were not participating in the larger investigation described earlier, they were recruited in similar ways. However, the only eligibility requirements were: over age 55, community resident, volunteer. Individuals participated on an anonymous basis and completed measures either in a seniors' group context or at home. Approximately 75% of subjects belonged to university or college seniors' groups.

280 of the Sample 2 participants met the criteria for the 3 sleep status groupings: Good Sleeper (n = 189), Low Distress Poor Sleeper (n = 55), and High Distress Poor Sleeper (n = 36). Because of the treatment aspects of the larger investigation, Sample 1 contains a disproportionately large number of Poor Sleepers; Sample 2 probably better resembles population parameters of well-functioning older community residents in this regard (cf. Prinz, 1994). The sex ratio in all samples was approximately 1/3 male and 2/3 female. The three groups differed slightly, but significantly, on age (see Table 4). Poor Sleepers had experienced insomnia for a mean of 13 years (range = 1 to 63); there was no significant difference between High and Low Distress Poor Sleepers on this variable.

All subjects completed an abbreviated version of the Sleep Questionnaire. They also completed the following measures: Self-Statement Test: 60+ (SST:60+), Tension Thermometer, and Sleep Behaviors Scale:60+.

Results

To simplify presentation of the results, findings for Samples 1 and 2 are presented together.

Relationships Among Sleep Characteristics

The pattern of correlations in Table 1 suggests that scores based on the Sleep Questionnaire have acceptable validity for research, as there were logical, strong, and highly significant relationships among variables. It is noteworthy that while all measures of nighttime functioning are significantly related to one another, Daytime Functioning scores do not follow this trend. Indeed, most correlations between the two Daytime Functioning measures and scores which reflect actual time spent asleep and awake are generally low and non-significant. Also, it is interesting that sleep Self-Efficacy is more closely related to the likelihood of Sleep Difficulty and Distress than to variables measuring time spent asleep or awake during the night. The data also show moderate but significant correlations between poorer sleep and the use of more varied Sleep Behaviors, with individuals experiencing poorer sleep engaging in a greater number and diversity of sleep behaviors. Moreover, Desired Sleep is most closely related to actual sleep time - i.e., people who slept more expected to sleep longer.

Table 1 here

Differences Among Groups: Sleep Characteristics

Nighttime functioning. As is evident in Table 2, which presents means and test results for sleep and insomnia variables not used to classify subjects into the 3 sleep status groups, the sleep characteristics of the three sleep status groups in Sample 2 are similar to those of Sample 1. Good Sleepers in both samples experienced considerably better sleep than either group of Poor Sleepers; for example, they slept between 1-1/2 and 2-1/2 hours more than Poor Sleepers. A multivariate analysis of variance (MANOVA) and a series of 1-way analysis of variance (ANOVA) comparisons on these variables were all highly significant ($p < .001$). Tukey HSD test results, with alpha level set at .05, show that on all three key variables related to time (Total Sleep Time, Total Wake Time, Sleep Efficiency), the scores of Poor Sleepers - both High and Low Distress - were significantly different from those of Good Sleepers in both samples. The same is true for sleep Self-Efficacy and for the variety of Sleep Behaviors engaged in. Although the worst scores on these variables were obtained by High Distress Poor Sleepers, differences between High and Low Distress Poor Sleepers were generally minimal and, for the most part, non-significant.

Daytime functioning. The pattern of findings on Daytime Functioning is quite different. While High Distress Poor Sleepers reported experiencing considerably greater Sleepiness and more frequent Fatigue than Good Sleepers, Low Distress Poor Sleepers resembled Good Sleepers in this regard.

Expectations and beliefs. Findings on Desired Sleep Time, presented in Table 2, indicate that both Good Sleepers and High Distress Poor Sleepers desired a similar amount of sleep - approximately 7 hours. Low Distress Poor Sleepers had more modest expectations; they desired significantly less sleep than either Good Sleepers or High Distress Poor Sleepers, who did not differ significantly. Frequency data indicate that 82% of Good Sleepers believed they slept better than others their own age. Fifty-two percent of both Low and High Distress Poor Sleepers believed their sleep experience to be similar to that of others, with less than half believing it to be worse.

Table 2 here

Differences Among Groups: Psychological Adjustment

Low Distress Poor Sleepers experienced substantial sleep problems. By definition, they were not appreciably distressed by these. Therefore, we expected people in this group to be better adjusted, especially on state measures, than High Distress Poor Sleepers. Because anxiety and psychological maladjustment can be both the cause and the consequence of a sleep problem, we did not make specific predictions about comparisons between Good Sleepers and Low Distress Poor Sleepers, although we did expect Good Sleepers to be better adjusted on all variables than High Distress Poor Sleepers.

To ascertain whether the three groups of subjects differed on state and trait measures of psychological adjustment, MANOVAs were made on psychological adjustment scores for

Sample 1 and Sample 2 separately; as these were significant, a series of 1-way ANOVA comparisons was also made. Means and test results are available in Table 3.

Table 3 here

It was possible that differences between groups on psychological adjustment were due to differences in sleep problem severity, even though others have shown that the severity of insomnia (based on sleep onset latency) was generally unrelated to psychological adjustment (Levin, et al., 1984; Shealy, et al., 1980). Therefore, a series on analysis of covariance (ANCOVA) comparisons were made on psychological adjustment variables, using Sleep Efficiency as the covariate; in all cases, the same comparisons were significant as on the ANOVAs.

Lifestyle and Socioeconomic Variables

To evaluate similarities and differences in factors associated with lifestyle and daily living, MANOVAs on valenced (positive\negative) and non-valenced lifestyle and demographic variables were made. Means and test results for a series of 1-way ANOVA comparisons on these variables are listed in Table 4; as was the case for psychological adjustment, ANCOVAs, with Sleep Efficiency as the covariate, indicated the same significant findings.

Table 4 here

In general, comparisons on non-valenced variables were not significant, while those on valenced variables were. For example, the results show that the three groups were very similar on a vast range of socioeconomic and lifestyle variables: (1) Education, Age, Life Events, Income Level, Adequacy of Income, (2) regularity of habits - both sleep and non-sleep, (3) lifestyle characteristics such as Diversity of Daily Activities and ratings of How Busy participants perceived themselves to be, and (4) sleep lifestyle factors such as Naps, Bedtimes, Arising Times, Time Spent in Bed, and Falling Asleep Outside the Bedroom. The X^2 test indicates that Good Sleepers and High and Low Distress Poor Sleepers did not differ significantly on Ease Sleeping Outside the Bedroom; indeed, only 16% of Good Sleepers and 21% of both groups of Poor Sleepers found it easier to fall asleep in places other than their bedrooms. When the lifestyle variables included valence (i.e., positive and negative aspects of lifestyle), however, the findings were quite different. Here, the results suggest that it is the presence of positive, favourable ratings which characterizes Good Sleepers and, to a lesser extent, Low Distress Poor Sleepers, in comparison with High Distress Poor Sleepers. For example, Good Sleepers evaluated the Quality of their daytime experiences as significantly more pleasant than High Distress Poor Sleepers. Also, the 1-way ANOVA on Positive Activities was significant. While the means were in the expected direction, the comparison on Negative Activities was not significant. However, as in the case of valenced thoughts, the Group x Valence interaction on the 2-way ANOVA comparison (3 Groups X 2 Valence) was significant; this indicates that Good Sleepers indicated relatively more Positive and fewer Negative Activities than High Distress Poor Sleepers.

Relationships Between Psychological Adjustment, Lifestyle, and Sleep

Pearson product-moment correlation coefficients in Table 5 show that adjustment and lifestyle factors are most consistently related to sleep parameters which have appreciable cognitive and affective loading (i.e., ratings of sleep Self-Efficacy and Distress concerning one's sleep problem). Correlations with more "objective" aspects of the sleep experience, such as sleep parameters related to actual amount of time spent asleep or awake (i.e., Total Sleep Time, Total Wake Time, Sleep Efficiency) were generally small and nonsignificant.

Table 5 here

Sleep expectations (Desired Sleep) were not related to psychological adjustment; none of the coefficients are significant and r values range from 0 to .07.

It is noteworthy that, as was found using ANOVAs, scores on measures of good adaptation (Satisfaction With Life Scale) were not as closely related to sleep parameters as were measures of poor adjustment. Again, the reverse was true for lifestyle variables, where positive rather than negative evaluations showed closer relationships with cognitive-affective sleep parameters. Consistent with views expressed by many sleep researchers and clinicians, data in Table 5 also show that Cognitive aspects of state anxiety were more closely related to troubled sleep than Somatic aspects. This suggests that the high correlations found in this investigation between "Tension" and sleep parameters probably reflect cognitive rather than somatic "tenseness." Finally, state and trait aspects of anxiety appear to be equally good correlates of sleep parameters, suggesting that poorer adaptation in highly distressed poor sleepers is not limited to the sleep experience.

Discussion

We must stress that while the number of participants in this investigation was reasonably large, 634 people, our samples consisted of individuals who lived in the community and were generally healthy, well-adjusted, educated, and financially comfortable. Therefore, the findings may not be generalizable to other, less advantaged older populations. It is also possible that our volunteer poor sleepers' insomnia problems may not have been as severe as those of people who seek medical treatment. While this, too, could affect the generalizability of the findings, we consider it unlikely. The sleep parameter scores of our poor sleepers show severe sleep problems. For example, they slept, on average, between 4 and 6 hours and had sleep efficiencies under 70%. In addition, the literature suggests that poor sleeper volunteers do not differ on sleep characteristics from people who seek out treatment (Stepanski, et al., 1989). Furthermore, available data demonstrate that severity of insomnia is generally unrelated to psychological adjustment (Levin, et al., 1984; Shealy, et al., 1980).

It should also be noted that many of the significant correlations we discuss are based on r values which hover near the .30 level. These, of course, are relatively low. The findings are consistent and robust, however; all are in the same direction, the relationships hold for multiple

measures of the same constructs, and findings are replicated in two samples. Nevertheless, confirmation from other laboratories is needed before making definitive conclusions based on these data.

Good and Poor Sleep and Psychological Adjustment

Almost half of our older participants neither experienced nor were troubled by poor sleep. When various sleep parameters were examined more closely, these individuals indeed appeared to sleep longer and to manifest substantially less frequent and severe sleep disruptions than people diagnosed as poor sleepers. Might it be that this segment of individuals escaped the usual physiological age-related changes in sleep architecture? This question, obviously, can not be answered without polysomnographic (PSG) examination. Indeed, one of the major limitations of our investigation is the absence of such PSG data (cf. Libman et al., 1995b). What our findings do show is that in addition to having good sleep, these fortunate individuals were also conspicuously free of psychological maladjustment (although neither they nor the low distress poor sleepers demonstrated the presence of especially good adjustment). Given the substantial number of such people, further investigation of the contributors to good sleep in older individuals is clearly warranted.

Poor sleepers in our samples experienced considerably worse sleep than good sleepers on "objective" aspects - total sleep time, total wake time, and sleep efficiency. Poor sleepers reporting high and low distress about the problem were fairly similar on severity as well as duration of the problem. On both trait and state measures of psychological ***mal***adjustment and ***negative*** adaptation, however, it was usually the good sleepers and the minimally distressed poor sleepers who had similarly low levels of anxiety and maladjustment, in comparison to those who were highly distressed about their sleep problem.

The highly distressed poor sleepers' scores reflect an anxious, depressed, worrying and negative cognitive-affective set. Also, our data indicate that scores on measures of poor psychological adjustment correlated particularly well with those sleep parameters which reflect the ***complaint*** of insomnia, such as Sleep Distress, Self-Efficacy, and Daytime Functioning. Correlations between scores on measures of poor adjustment and more "objective" criteria of poor sleep, such as sleep and wake times, however, were low and generally non-significant.

The finding of poorer psychological adjustment in older people with insomnia is similar to results reported by others (e.g., Gourash-Bliwise, 1992; Morgan et al., 1989; Morin & Gramling, 1989). Our findings are unique in demonstrating the existence of substantial numbers of older poor sleepers who are not distressed by their sleep disorder and in describing their characteristics. This group of poor sleepers differs from those who are highly distressed not in that they experience less problematic sleep, nor, as the findings on lifestyle factors attest, in that they lead more regular or stress free lives. What distinguishes them is that, unlike their highly distressed peers, low distress poor sleepers ***do not manifest poor psychological adjustment.*** Adding to hints and reports in the literature that some "insomniacs" do not experience high levels of anxiety, tension, or arousal (Chambers & Kim, 1993; Lichstein & Rosenthal, 1980;

Seidel, et al., 1984; Stepanski et al., 1989) and to demonstrations that amount of sleep deprivation in insomnia complainers in many cases is of no great clinical significance (Chambers & Keller, 1993), our data support the proposition that more or less sleep or wake time does not fully explain the severity of the insomnia complaint or the accompanying daytime fatigue and impairment that is typically reported.

The huge differences in sleep parameters between good sleepers and low distress poor sleepers, together with the similarities between these two groups on adjustment and cognitive-affective responses, corroborate our initial impression that the "low distress poor sleeper" group is critical to understanding the ***complaint*** of insomnia in older individuals. People in this category represent a poorly documented but substantial segment of the aging population: those who are coping well with the psychophysiological changes in sleep architecture which typically accompany the aging process. We also found that both state and trait aspects of anxiety were closely related to the insomnia complaint, suggesting that poorer adaptation in highly distressed older poor sleepers is not limited to the sleep experience.

Whether psychological maladjustment in highly distressed poor sleepers precedes the onset of insomnia (e.g., Healey et al., 1981) or whether it results from sleeplessness (e.g., Morgan et al., 1989) cannot be determined by our data. Whatever their source, anxiety, depression, and a negative cognitive-affective set may contribute to sleep problems as well as to associated distress.

Biopsychosocial Factors in Older Individuals' Sleep Experience

Equally important are our consistently negative findings on lifestyle and demographic factors; these show that the three groups of older individuals closely resembled each other in virtually all aspects of lifestyle. For example, there were no differences in the diversity of activities engaged in or in perceptions about how fully one's time was occupied. Nor did the three groups differ on education or on either income level or adequacy. Our findings support other investigators who have shown economic dissatisfaction to be unrelated to sleep quality in older individuals (Frisoni et al., 1993). Epidemiological surveys have found that people with low incomes were considerably more likely to experience poor sleep than people with higher incomes (e.g., Tait, 1992). Here, however, other health and psychosocial variables related to poverty must be taken into consideration.

Exposure to stressful life events (such as the death of a loved one) was also similar in our three groups. While major negative life events have been implicated in the onset of insomnia (Healey et al., 1981; Kales, et al., 1984), it seems that large, but infrequent stressors are not involved in the maintenance of chronic sleep problems.

While negative findings can never be conclusive, our results add to the growing body of evidence (e.g., Gourash-Bliwise, 1992; Morin & Gramling, 1989) which highlights the absence of differences in lifestyle in older individuals with and without insomnia.

A dramatically different pattern emerged when cognitive-affective evaluations of lifestyle were considered. Good sleepers perceived their days to have been spent more pleasantly than did highly distressed poor sleepers. All participants in our study engaged in some activities which they viewed as aversive. A more favourable balance between activities evaluated as positive and as negative was maintained by good sleepers and minimally distressed poor sleepers, however, compared to their highly distressed poor sleeper counterparts. Whether our findings reflect a global tendency to perceive one's situation in a more positive - or negative light - or to actual differences in activities (e.g., Marchini et al., 1983) is an empirical question.

Addressing Popular Myths About Insomnia in Older Adults

Unrealistic expectations. It has been suggested that older individuals complaining of insomnia have unrealistic beliefs and expectations which, when not met, increase anxiety and distress, thereby perpetuating and aggravating the sleep problem (Morin & Gramling, 1989). Our data do not support the hypothesis that older poor sleepers have unreasonable expectations. For example, poor sleepers in our study were surprisingly optimistic about how their sleep experience compared to that of others. Although poor sleepers were definitely in the minority, approximately 50% of both the low and high distress poor sleeper groups indicated that their sleep was much the same as that of others their age. Also, good sleepers and highly distressed poor sleepers wanted similar amounts of sleep - approximately 7 hours - the amount actually obtained by our good sleepers. It is the low distress poor sleepers who had particularly modest expectations - ones which were more consistent with their more modest actual sleep times. While low distress poor sleepers may have adjusted their standards to fit their own realities, it is also possible that they are naturally short sleepers who do not need - or desire - the 7 hours obtained by their good sleeper peers. As do older good sleepers, this interesting category of low distress poor sleepers deserves further examination.

Maladaptive sleep lifestyle factors and erratic daytime and sleep schedules. The popular and highly effective stimulus control treatment for insomnia (Bootzin, 1985, Bootzin & Nicassio, 1978) is based on the assumption that the bed and bedroom have become conditioned to sleep incompatible behaviors such as reading, worrying, or tossing and turning. In keeping with this formulation, it is commonly believed that people with primary insomnia, "may fall asleep more easily when not trying to do so (e.g., while watching television, reading,..." and that, "they sleep better away from their own bedrooms" [DSM-IV, p. 553 (American Psychiatric Association, 1994)]. Our data provide no support for the hypothesis that older poor sleepers fall asleep more easily away from their bedrooms; in this regard they were no different from good sleepers. Approximately 20% of individuals in all three groups indicated it was easier for them to fall asleep outside their bedroom. And when this did happen, it occurred with similar frequency in the three groups.

There are suggestions and assertions in the literature that poor sleep in older individuals is associated with maladaptive sleep lifestyle practices and poor "sleep hygiene," such as spending excessive amounts of time in bed, going to bed too early, taking frequent naps, and erratic bedtimes and arising times (Hoelscher & Edinger, 1988; Marchini et al., 1983). Our data

show that the three groups were very similar on these dimensions. First, they experienced similarly regular lifestyles; they did not differ on variability in meal times or in the times they went to bed or got up in the morning. As demonstrated by others (Monk, et al., 1992), the hypothesis that impaired sleep in older individuals stems from an irregular lifestyle was not supported by our data. Second, all three groups spent similar amounts of time in bed - an average of approximately 8 hours. They also had similar bed times and arising times and they napped equally frequently; these, too, are findings similar to those reported by others (Gourash-Bliwise, 1992; Morgan et al., 1989; Morin & Gramling, 1989). All suggest that neither sleep lifestyle factors nor faulty sleep hygiene play a role in the poor sleep experienced by many older individuals.

The efficacy of aspirin in alleviating headaches is never used to infer that lack of aspirin causes headaches. Evidence on the effectiveness of lifestyle changes in alleviating sleep complaints (e.g., Edinger et al., 1992) cannot not be used to justify the assumption that older poor sleepers' maladaptive sleep hygiene and lifestyle practices cause either poor sleep or the complaint of insomnia.

STUDY 2: THE NATURAL COURSE OF SLEEP COMPLAINTS IN A POPULATION "AT RISK"

The objective of this investigation was to examine developmental trends longitudinally in order to explore the natural course of sleep problems in a population "at risk" (people over the age of 55) by conducting a 2 year follow-up of participants in our sleep and aging project. To accomplish this, we examined demographic, physical, personality and sleep characteristics of people who changed categories (Good, "Medium Quality", Poor Sleeper) and those who did not. Thus, our plan was to develop predictors of "high risk" and of "invulnerability" for developing significant insomnia complaints.

Specifically, we set out to identify characteristics that predict (1) which Good Sleepers remain Good Sleepers and which deteriorate 2 years later, (2) which "Medium Quality" Sleepers remain unchanged, deteriorate, or improve, and (3) which Poor Sleepers remain unchanged and which improve.

Method

Subjects and Procedure

One hundred and ninety-three individuals took part in this study. Subjects were participating in the larger investigation and completed the Pre Test battery of measures in our laboratory, in a seniors' group context, or at home. The Pre Test battery included a variety of measures. Of relevance to this investigation are the following: Background Information Form, Sleep Questionnaire, Pre-Sleep Arousal Scale, Brief Symptom Inventory (BSI), Eysenck Personality Inventory (EPI), Satisfaction With Life Scale, and Activities Questionnaire. It should be noted that some of the participants who complained of insomnia were administered a brief (2 week) analogue treatment intervention shortly after the Pre Test (Creti, Libman, &

Fichten, 1994).

Approximately 2 years later we tried to contact all 309 participants for whom we had either a name or an address or a telephone number. We were able to contact only 255 individuals; the rest were either dead or we were unable to locate them (moved - no forwarding address, telephone number not listed, telephone number not answered for at least 2 months, mailed questionnaire returned "unknown"). We asked these 255 individuals to complete a second set of questionnaires, including the Sleep Questionnaire and the Life Events Scale. These were administered either in interview format on the telephone or they were mailed together with a cover letter and a stamped, self-addressed envelope. 206 individuals (81% of those contacted) provided usable data.

Out of 206 individuals on whom follow-up (FUP) data were collected, 193 (56 Males and 137 Females) had sufficient data to be classified as Good, "Medium Quality" or Poor Sleepers at both testing times. The mean Follow-Up Duration was 27 months (SD=6 months, range = 13 to 43 months). Because of the requirements of the treatment study, Treated subjects were contacted between 13 and 26 months (M = 18.94) after they were last seen in our laboratory.

Of the 193 participants, 60 met the criteria for Good Sleeper, 36 for "Medium Quality", and 97 for Poor Sleeper status. Mean age at the Pre Test was 69.50 (range 58 to 90). The sex ratio in all samples was approximately 1/3 male and 2/3 female. Poor Sleepers at Pre Testing had experienced insomnia for a mean of 14 years (range = 1 to 60).

Results

The frequencies which reflect what happened to the 193 subjects during the follow-up period are available in Table L1. These show that the majority of individuals who experienced Good or Poor Sleep at Pre Testing continued in these categories. Of those who changed, most changed only 1 category - to "Medium Quality" Sleeper status. Those who experienced Medium Quality Sleep at the Pre Test were more likely to change categories. This may well reflect a measurement artifact since the criteria for the Medium Quality category required subjects to report mixed Good and Poor characteristics. Therefore, relatively minor changes could occasion a change in sleep status for this group.

Table L1 here

Table L2 presents the frequency information in the form of deterioration and improvement. As is evident from these data, although most people (60%) remained Unchanged, there was both substantial Deterioration (24% of those who were not Poor Sleepers at Pre Testing deteriorated) as well as Improvement (41% of those who were not already Good Sleepers at Pre Testing improved). The data in this table also highlight the different Improvement rates for the 43 Treated subjects and the 90 Untreated Medium and Poor Sleeper subjects: there was a 60% Improvement rate in Treated subjects (none deteriorated) compared to Improvement in only 31% of Untreated subjects. Given the substantial difference between Treated and Untreated subjects' Post Test outcomes, in subsequent significance tests - both ANOVAs and discriminant analyses - Treatment status was taken into account whenever this was relevant.

Table L2 here

PREDICTORS OF POST TEST SLEEP STATUS

To evaluate predictors of Post Test sleep status, two kinds of analyses were made. First, 1-way ANOVA comparisons [3 Post Test Status (Good/ Medium /Poor)] were made on scores of subjects who were Good, Medium or Poor Sleepers at Pre Testing. Second, a series of stepwise discriminant function analyses were made to predict Good, Medium and Poor Sleeper status at Post Testing; again, this was done separately for the Pre Test Good, Medium and Poor groups. The predictor variables were selected to represent demographic factors, sleep parameters, daytime functioning, psychological adjustment, and lifestyle variables: Age, Sleep Distress Level, Follow-Up (FUP) Duration, Daytime Fatigue Due to Lack of Sleep, Sleep Efficiency %, Diversity of Activities, Life Events (6 months prior to Post Testing), Satisfaction With Life, Depression (BSI), Pre-Sleep Arousal - Cognitive, and Neuroticism (EPI). (Follow-Up Duration was included because the substantial differences in this variable among subjects may result in greater changes in Age in some individuals.)

Although data for all 193 subjects were potentially available for the ANOVAs, the discriminant analyses require that there be no missing data among predictors. Because complete data on all Pre Test variables were available for only 121 individuals (46 Good Sleepers, 26

"Medium Quality" Sleepers, and 49 Poor Sleepers), only these 121 subjects' data were used in the discriminant analyses. Because 39 of these subjects - mostly Poor Sleepers (n=30) - had been exposed to an analogue insomnia treatment intervention in our lab shortly after the Pre Test, Treatment Status was also entered into the discriminant analyses. Since the subjects were split on status at Pre-Testing, this variable was not expected to be a significant predictor for Good or Medium Sleepers and, in fact, was not.

Prediction of Good, "Medium Quality," and Poor Sleeper Status

Good Sleepers (at Pre Testing). The 60 Good Sleepers were grouped into Post Test Good, "Medium Quality," and Poor categories and 1-way ANOVA comparisons were made on the Pre Test predictor variables. None of the comparisons were significant. This may have been partially due to sample size effects; most subjects (n=43) remained Good Sleepers, with only 14 becoming: "Medium Quality" and 3 becoming Poor Sleepers.

On the discriminant analysis, when the 46 Good Sleepers' predicted sleep status at Post Testing was compared to their actual group membership, none of the predictors made a significant contribution, singly or in combination. This is similar to the ANOVA results, where there were no significant differences found.

Poor Sleepers (at Pre Testing). Similarly, none of the 1-way ANOVA comparisons on the 97 Poor Sleepers was significant, with the exception of Follow-Up Duration. As was the case for Pre Test Good Sleepers, the non-significant ANOVA results may have been attributable to sample size effects, as there were only 9 subjects in the Post Test Good and 28 in the "Medium Quality" groups, while 60 subjects remained Poor Sleepers. The one significant test shows a shorter Follow-Up Duration for subjects who improved [to Post Good Sleepers (M=24.38 mo.) and to Post "Medium Quality" Sleepers (M = 25.78 mo.)] compared to those who remained Poor Sleepers (M = 28.71 mo.), $F(2, 94) = 3.35$, $p < .05$. Because comparisons on both Pre Test and Post Test Age were non-significant, the significant finding on FUP Duration probably reflect the fact that Treated subjects, most of whom improved, generally had shorter Follow-Up times.

On the discriminant analysis, results show that for the 49 Poor Sleepers, Pre Test scores on two measures were able to correctly classify only 52% of the individuals who fell into the Post Test Good (n=8), "Medium Quality" (n=21), and Poor (n=20) groups. The two measures that separated the groups, in order of entry into the discriminant function, were: Age and Neuroticism [$F(4,90) = 2.78$ based on Wilks' Lambda, $p < .05$]; the canonical correlation was .48, showing that they accounted for only 23% of the variance. Only the "Medium Quality" and Poor Sleeper groups were separated significantly. As well, the following variables: Pre Sleep Arousal - Cognitive (r=.33), Daytime Fatigue (r=.28) and Depression (r=.24) correlated moderately to the discriminant function.

"Medium Quality" Sleepers at Pre Testing. Means and the results of the ANOVAs for the 36 subjects who were designated "Medium Quality" Sleepers at Pre Testing are presented in Table L3. Significant findings show: (1) that younger subjects were more likely to become Good Sleepers and older subjects were more likely to become Poor Sleepers, with subjects of

intermediate age remaining unchanged "Medium Quality" sleepers, (2) that those who became Good Sleepers had higher Sleep Efficiency scores, and those who became Poor Sleepers had lower scores (with intermediate scores for those who remained "Medium Quality" Sleepers), and (3) that there was a trend for those who became Good Sleepers to have fewer adverse Life Events during the 6 months prior to Post Testing - and for those who became Poor Sleepers to have more - than individuals who remained "Medium Quality" Sleepers. The absence of significance on Follow-Up Duration and the presence of significant Age effects suggest that the significant Follow-Up Duration findings for Pre Test Poor Sleepers reflects Treatment status, rather than Age.

Table L3 here

On the discriminant analysis, results show that for the 26 "Medium Quality" Sleepers, Pre Test scores on four measures were able to correctly classify 76% of the individuals who fell into the Post Test Good (n=10), "Medium Quality" (n=12), and Poor (n=4) groups, although pairwise examination of the groups showed that while the function discriminated the Good from the "Medium Quality" and Poor groups, the latter two were not significantly different. The measures that separated the three groups, in order of inclusion in the discriminant function, were: Sleep Efficiency, Neuroticism, Pre-Sleep Arousal - Cognitive, and Age [$F(8,40) = 2.26$ based on Wilks' Lambda, $p < .05$]; the canonical correlation was .75, accounting for 56% of the variance. In addition to these four variables, one other, Diversity of Activities, correlated moderately well to the discriminant function (r=.33) but was not included because the unique variation was not high enough due to correlations among the predictor variables.

Summary

In summary, the results of the discriminant analyses indicate that this set of predictor measures was only moderately successful in predicting sleep status at Post Testing. The function for the "Medium Quality" group at Pre Testing, using Sleep Efficiency, Neuroticism, Pre Sleep Arousal - Cognitive and Age succeeded in distinguishing Good from "Medium Quality" or Poor Sleepers at Post Testing. The function using Age and Neuroticism on subjects who were Poor at Pre Testing succeeded in distinguishing the Poor from "Medium Quality" sleepers at Post Testing. Pre Sleep Arousal - Cognitive also correlated moderately to this function. Although this set of variables is successful to some degree in predicting the Poor group's sleep status at Post Testing, none of these variables univariately distinguishes among the groups.

PREDICTORS OF IMPROVEMENT AND DETERIORATION

As can be seen in Tables L1 and L2, most people remained Unchanged. Of those who changed, most changed only 1 category. ANOVA and discriminant function analyses on Post Testing Sleep status are hampered by the fact that there are very few subjects in some cells. Therefore we performed both ANOVA and discriminant function analyses where the goal was to predict Unchanged, Improved, and Deteriorated status. Because Pre Test Good Sleepers cannot improve - and Pre Test Poor Sleepers cannot deteriorate - two sets of evaluations were made: prediction of Unchanged or Improved status (Poor and "Medium Quality" Sleepers) and prediction of Unchanged or Deteriorated status (Good and "Medium Quality" Sleepers).

Improvement

ANOVA. To examine Pre Test scores of individuals who Improved at least one category (from Poor or Medium Sleeper status), we conducted 2-way ANOVA comparisons on Pre Test scores of Unchanged and Improved subjects who were categorized Medium or Poor in Pre Sleep status. Because participants who received our analogue treatment intervention had a higher rate of improvement than untreated subjects, we separated subjects in each change category into Treated and Untreated. Results of the 2-way ANOVA comparisons [2 Change (Unchanged/Improved) x 2 Treatment (Treated/Untreated)] in Table L4 show only two significant Change main effects: those who Improved reported less Depression (BSI) and had lower Neuroticism scores than those who remained Unchanged. There was a trend for Improved subjects to be somewhat younger. The results also show that Treated subjects had shorter follow-up times than Untreated subjects, again suggesting that any significant findings on Follow-Up Duration reflect not Age or elapsed time but Treatment effects. Table L4 also reveals a significant interaction on Depression and Sleep Distress; these show that Treated subjects who improved were less Depressed than Treated subjects who remained unchanged and that Untreated subjects who Improved were less Distressed than Untreated subjects who remained Unchanged.

Table L4 here

Discriminant function analysis. Of the 46 "Medium Quality" and Poor Sleeper subjects at Pre Testing, 27 remained Unchanged and 19 Deteriorated. Neuroticism was the only variable which univariately distinguished between the two groups [$F(1,44) = 5.03$, $p < .05$]. Means in Table L4 show that the group which remained Unchanged had higher Neuroticism scores than the group which Improved. In addition to Neuroticism, Age, Life Events, Sleep Distress Level, and Pre Sleep Arousal - Cognitive contributed sufficient unique variation to be entered into the discriminant function. The canonical correlation is .50. The set of variables which seems most able to predict Improved - Unchanged Status at Post Testing are: Neuroticism, Age, Pre-Sleep Arousal - Cognitive, Life Events, and Sleep Distress. Examination of the table of correlations to the discriminant function (see Table L5) shows moderately high correlations for three of the five predictors. Sleep Distress Level and Age seem to be suppressor variables, while Diversity of Daily Activities, $r = .23$ and Depression, $r = .22$, did not enter the

equation because of insufficient unique variation. The classification analysis based on 5 variables shows a 65.5% success rate with 63% of the Unchanged group and 70% of the Improved group correctly classified.

Table L5 here

Deterioration

ANOVA. To examine Pre Test characteristics of people who Deteriorated at least one category (from Good or "Medium Quality" Sleeper status), we conducted a series of 1-way ANOVA comparisons [2 Change (Unchanged / Deteriorated)]. Treatment status was not included because (1) most of the Treated subjects were Poor Sleepers at Pre Testing, and so they could not Deteriorate, and (2) because none of the Treated "Medium Quality" subjects Deteriorated. Test results revealed no significant differences.

Discriminant function analysis. Results indicate that of the 58 "Medium Quality" and Good Sleepers at Pre Testing, 17 Deteriorated and 41 remained Unchanged. The set of 11 variables was unable, singly or in combination, to distinguish between these two groups ($p > .05$).

Summary

This set of results may be an indication that the chosen set of predictors, while capable of distinguishing the potential for Improvement, cannot significantly separate those who will Deteriorate from those who will remain Unchanged.

Discussion

The results also show that, after a two year period, people who started out as good sleepers generally remain good sleepers; substantial deterioration was found in only 5% of these individuals. In addition, 83% of people initially characterized as experiencing "medium quality" sleep either improve or remain unchanged after two years. Even among untreated poor sleepers, sleep quality improved in 31% of cases; this percentage reached 60% in subjects treated with our brief (two week) intervention. Indeed, the findings indicate that, on the whole, during a 2 year period, most individuals remain unchanged. Between 30% and 60% of individuals improve, and relatively few - only 12% - deteriorate. Thus, getting 2 years older seems to be unrelated to deterioration of sleep quality.

Others, too, have found that age, by itself, was unrelated to deterioration. For example, a very recent epidemiological survey reported that, "age was not associated with either insomnia or not feeling rested after adjusting for differences in health status." The investigators concluded that existing measures of sleep disturbances were not sufficiently sophisticated and objective to establish the true prevalence of insomnia in the older population (Foley, Monjan, Brown, Simonsick, Wallace, & Blazer, 1995).

Our findings too, indicate that sleep disorder does not appear to develop as a consequence of increasing age alone. Furthermore, our findings have shown that a substantial number of older people are minimally distressed even by fairly severe sleep disruption (Fichten et al., 1995b). Therefore, it seems that the important issue is not the development of more accurate measures to determine the prevalence of insomnia, but rather the identification of factors related to maintenance of good quality sleep in older people, the improvement of poor quality sleep, and the reduction of distress related to the experience of impaired sleep.

None of the variables evaluated in this investigation, singly or in combination, could predict deterioration. The findings on improvement, however, are different. Here, our data suggest that the absence of poor adjustment (i.e., lower neuroticism, lower cognitive arousal pre-sleep, lower depression, and fewer adverse life events) and being somewhat younger are related to improvement over a two year period. Thus, the people who improved are characterized by better psychological adjustment and lower levels of intrusive thought activity during the presleep period. Intrusive cognitive activity in individuals with poor sleep is a potentially modifiable area to target in insomnia treatment.

STUDY 3: TREATING THE INSOMNIA COMPLAINT

Our studies in the area of sleep and aging have revealed that approximately half of our older participants neither experienced nor were distressed by poor quality sleep. Of the other half whose sleep quality was manifestly worse than that of these good sleepers, a substantial number were minimally distressed by their disrupted sleep. For these individuals, a generalized absence of psychological maladjustment appeared to be reflected in their adaptive coping with reduced sleep quality. Nevertheless, there remains an important segment of the older population who experience severe disorders in initiating and maintaining sleep (DIMS) and who are highly distressed by this. It is likely that these are the individuals who complain of insomnia and who traditionally have been prescribed sedative-hypnotic medication - with its attendant major adverse effects.

We know that the psychological intervention programs developed in our previous CQRS funded research effectively improve sleep quality in the short term. The goal of the present study was to explore the effective components of these interventions and to investigate their long-term effects.

Method

SUBJECTS AND PROCEDURE

Forty-one older, community dwelling individuals with an insomnia complaint participated in this investigation. They were volunteers who also took part in a larger investigation on aging and good and poor sleep. Those interested in participating were screened on the telephone as well as on the Structured Sleep History Interview to assess whether they met the initial selection criteria which included: (a) age 55 and over, (b) able to read and write English well enough to complete the questionnaire measures, (c) prescription sleep medication, if used, was currently taken no more than 3 nights per week (this criterion is consistent with sample selection in published studies on psychological interventions for insomnia and allows for the selection of a reasonably "typical" sample of elderly insomniacs (cf. Lichstein & Fischer, 1985), (d) psychological status: currently not receiving psychiatric or psychological care, no evidence of psychopathology or depression, (e) physical status: absence of major illness or drug use directly associated with sleep disturbance (cf. Lacks, 1987; Nicassio & Buchanan, 1981), (f) no evidence of physically based sleep disturbance such as sleep apnea, restless leg syndrome, or nocturnal myoclonus, and (g) no evidence of parasomnias or sleep phase disorder (e.g., phase delay, phase advance, or deregulation of circadian cycles).

189 volunteers who met these criteria, including good and poor sleepers, participated in the larger investigation of sleep and aging. They were administered an initial full evaluation battery. Of interest in the present investigation are: Background Information Form, Sleep Questionnaire, Stanford Sleepiness Scale (SSS), Sleep Self-Efficacy Scale, Pre-Sleep Arousal Scale, Anxious Self- Statement Questionnaire (ASSQ), Brief Symptom Inventory (BSI), Eysenck Personality Inventory (EPI), Penn State Worry Questionnaire, Satisfaction with Life Scale, and the Life Events Scale. Administration of the test battery took two sessions and was followed by a brief description of the treatment study.

All individuals were briefly informed about the goals of the sleep and aging study, the insomnia treatment offered, and what would be required of them. They were then asked if they were interested in participating. Those who agreed to participate read and signed a consent form. Insomnia was not operationally defined for participants because, as is typical of the literature, self-defined insomniacs were of interest. After verifying that they met the selection criteria, those interested in participating were given an appointment to begin the initial (Pre-Treatment) evaluation. Fifty-two individuals agreed to participate and receive an experimental, short-term, non-pharmacological treatment for insomnia. Individuals who declined to participate were given a booklet on improving sleep and were offered a free consultation for their sleep problem with a psychologist on the research team.

Subjects were blocked on sex and randomly assigned to one of three treatment conditions: Self-Monitoring Only (SM), Countercontrol - Plus Relaxation (Relaxation), Countercontrol - Plus Audiobook (Audiobook). Of the 52 participants who entered the treatment study, 41 completed all phases of the program. The distribution of drop-outs from the

three experimental conditions was not statistically significant. The final sample sizes in the three intervention conditions were: SM = 13, Relaxation = 14, Audiobook = 14.

The final sample of 41 subjects consisted of 28 women and 13 men whose age averaged 67.49 years (range = 55-85). They were predominantly married (68%) and living with a spouse or other companion (72.5%). Although socioeconomic background varied extensively, most participants were Jewish (61%; perhaps due to the project's location at the Jewish General Hospital), well educated (61% had at least a high school education), currently not employed (76%), had an income greater than $30,000 (61%), and were reasonably satisfied with their income (75% indicated that their income was "adequate" or "more than adequate" in meeting their needs).

Participants had an insomnia problem for an average of 15.24 years (range = 1 to 50). Two participants met the criteria for sleep onset insomnia, 16 met the criteria for sleep maintenance insomnia, 17 met the criteria for both sleep onset and sleep maintenance insomnia, and 6 participants met none of the criteria. Twelve participants (29.27%) were using prescribed or over-the-counter sleep medication an average of 1.71 times a week (range = 1 to 3) and had been using this medication for an average of 5.17 years (range = 2.5 months to 15 years).

The treatment program and its evaluation consisted of three two-week phases: Pre-Intervention Evaluation (Pre-Testing questionnaire battery, followed by two weeks of self-monitoring using the Daily Sleep Diary), Intervention (includes Relaxation or Audiobook intervention plus two weeks of self-monitoring), Post-Intervention Evaluation (post testing using a partial questionnaire battery), Follow-Up Evaluation (two weeks of follow-up self-monitoring which ended with a follow-up partial questionnaire battery administration). Approximately two years later participants were again tested using a partial questionnaire battery (Long-Term Follow-Up).

Pre-Intervention Evaluation Phase

Participants first received a standardized introduction and subsequently were asked to provide written consent to participate in this phase of the sleep and aging project. They were then administered the Structured Sleep History Interview to ensure that all selection criteria were met. Individuals whose responses suggested that their insomnia may have been due to disorders such as sleep phase disorder or sleep apnea, or to physical or psychiatric illness were excluded from the study and referred to their physicians or to the Sleep Disorders Clinic at the Royal Victoria Hospital.

After verifying that the next five weeks were expected to be reasonably "typical," all participants were asked to complete Daily Sleep Diaries every morning for 14 consecutive days. To assure that participants understood how to use this self-monitoring form, they completed the Daily Sleep Diary with an experimenter in the office, basing their responses on the previous night's sleep. To ensure monitoring on a daily basis, participants were asked to call the experimenter every morning to report their responses. If an experimenter was not available,

they were asked to read their responses onto an answering machine. If participants did not call, a member of the research team called them.

Intervention Rationales

After two weeks of pre-intervention self-monitoring the participants were seen again. Daily Sleep Diaries were collected and participants were given one of three intervention rationales.

Countercontrol - Plus Audiobook. Participants in this condition were told that thoughts, whether distressing or just mentally involving, could keep their minds and bodies awake and thus interfere with going to sleep. Therefore, a "cognitive refocusing" technique which involved listening to audiotaped novels could help their minds and bodies get into a more favourable sleeping state. It was explained that the audiotapes would interrupt the sequence of negative or involving thoughts and allow them to relax mentally and physically so that they could fall asleep.

Countercontrol - Plus Relaxation. Participants in this condition were also told that thoughts, whether distressing or just involving, could keep their minds and bodies awake and therefore interfere with going to sleep. Therefore, a "passive relaxation" technique, which involved listening to audiotaped passive relaxation instructions, could help get their bodies into a more favourable state for sleeping. It was explained that the audiotape would allow them to focus on and to relax different parts of their bodies. Their bodies would relax, making them more likely to fall asleep.

Self-Monitoring Only. Participants in this condition were asked to monitor their sleep for two more weeks with a rationale that the additional information would provide more data about their sleep pattern and thus, help us with the treatment. After 2 weeks of self-monitoring, these subjects were re-assigned to either the Countercontrol - Plus Relaxation or the Countercontrol - Plus Audiobook Conditions.

Intervention Instructions

Individuals in the two Countercontrol-Plus treatment groups were given a demonstration of the equipment they were to use at home. This consisted of a tape recorder which shuts off when the tape is finished, a flat pillow speaker designed to fit unobtrusively under the pillow, and a supply of audiotapes. During a pilot project it was found that without the visual image which characterizes television, it was sometimes difficult to focus attention on the audiotape and that easy manipulation of the tapes and tape recorder required some practice. Therefore participants were instructed to practice using the equipment and get familiar with focusing attention on the audiotapes for 3 days before using the tapes at night. Specifically, they were told to listen to the tapes twice a day for ten minutes on the first day, twice a day for 20 minutes on the second day and twice a day for 30 minutes on the third day. The experimenter discussed what times, during the following three days, the participant could set aside for this practice.

Participants were told that they would be called after a day or two of practice and once during the two weeks of treatment to see how they were doing and to answer any question they may have.

Participants were instructed to set up the tape recorder on their night table before bedtime and to set the volume of the tape so that it was just comfortably audible on the pillow speaker. Participants were permitted to adhere to their usual pre-sleep practices during all phases of the study with one exception: participants were to discontinue practices that interfered with the intervention (e.g., watching television after lights out). After lights out, they were to use the tapes every time they had difficulty falling asleep. That is, if they were not asleep 10 minutes following lights out (or after 10 minutes spent awake during the night), they were to turn on the tape recorder. They were to make sure that they listened to the audiotape and brought their attention back if it wandered. Of course, if they were drifting off to sleep they were to let it happen. They could leave the tape stop by itself or they could turn it off. In the morning they were to complete the Intervention Daily Sleep Diary and call the experimenter with their responses.

It was emphasized that it was important that participants use the tapes every time they had difficulty falling asleep and that if they did not use the tapes for more than two consecutive nights of sleep difficulty they would be required to terminate their participation in the treatment study. Once participants understood the rationale and instructions of their treatment they were asked to read and sign a treatment contract which requested the participants to: (1) carry out the treatment as specified earlier, and (2) return the equipment at termination. Participants were then provided with written treatment instructions to take home along with the equipment and were then asked to complete the Intervention Evaluation Form.

Countercontrol - Plus Audiobook intervention. Audiobooks were selected from commercially available materials; these consist of plays, dramatized novels, and radio dramas. This type of audiobook was selected because a pilot study showed that it was harder to habituate to verbal content when there were frequent changes in tone, accent, level, and pitch. Audiobook intervention subjects were given 42 hours of audiotapes (3 hours per night for 14 nights) for the treatment period and an equivalent number of tapes for the follow-up period.

Countercontrol - Plus Relaxation intervention. The relaxation intervention consisted of an audiotape of a modified version of Bernstein and Borkovec's (1973) progressive muscle relaxation instructions. The tape used contained only the relaxation component of the tension and relaxation progressive relaxation technique. This was selected because the tensing component of muscle relaxation could pose problems for individuals with conditions such as arthritis. Data show that passive relaxation (i.e., muscle relaxation instructions without the tensing instructions) is an effective treatment for insomnia (Woolfolk & McNulty, 1983). Fichten's (1990) audiotaped version of the passive relaxation instructions was used since it contains all relaxation instructions for each of the 16 muscle groups specified in Bernstein and Borkovec's (1973) manual and because it is an audiotaped version of the treatment shown to be effective by Woolfolk and McNulty (1983). To allow subjects a continuous relaxation

experience, the full text was recorded three times onto each side of a 90 minute audiotape. This was done in order to permit audiotapes in the two intervention conditions to be similar in length and to involve the same amount of cassette manipulation.

Post-Intervention Evaluation Phase

Participants returned for Post-Treatment evaluation approximately 17 days after they began treatment. Sleep Diaries were collected and the following "partial" questionnaire battery was administered: Sleep Questionnaire, Pre-Sleep Arousal Scale, Sleep Self-Efficacy Scale, Anxious Self-Statement Questionnaire and Client Satisfaction Form. Participants in the two treatment groups were told that for the next two weeks the use of the tapes was optional but that they were to continue self-monitoring with the Daily Sleep Diaries and to phone in their responses every morning.

Participants in the Self-Monitoring Only group were randomly assigned to the two treatment groups at this time. They were administered the relevant rationales, instructions, and contracts and asked to continue to self-monitor, completing the Intervention Daily Sleep Diaries for 14 additional days. From this point, they followed the same procedures as the two Countercontrol-Plus treatment groups.

Participants who did not wish to continue participation were asked to complete the Client Satisfaction Form and were administered the Termination Interview. They were also given a booklet on improving sleep. If they expressed distress about their remaining insomnia problem, they were offered a free consultation with a psychologist on the research team. This same termination procedure was followed in the Follow-Up Evaluation phase.

Follow-Up Evaluation Phase

All participants were re-administered the questionnaire battery they completed two weeks earlier at the Post-Intervention Evaluation phase. In addition, the Follow-Up Sleep Diaries and the equipment were collected, the Client Satisfaction Form was completed and the Termination Interview was conducted. Participants who requested audio tapes were given the passive relaxation tape and they were given the names of libraries and book stores where they could acquire audiobooks.

Long-Term Follow-Up

Participants were contacted by telephone between 13 and 26 months ($\underline{M}$ = 18.94.) after completing the follow-up evaluation. At this time, they were administered a brief interview version of the Sleep Questionnaire on the telephone.

RESULTS

DATA MANAGEMENT

Means of Daily Sleep Diary variables were calculated as follows: (1) Baseline means included the first of the two week Pre-Intervention monitoring period. This was chosen in order to reduce testing effects. A minimum of four days of completed Sleep Diaries were required to calculate a mean. (2) Intervention means included the second week of the two-week intervention monitoring. (3) Follow-Up means included the second week of the two-week Follow-Up monitoring.

DESIGN AND STATISTICAL ANALYSIS

The effects of short-term non-pharmacological treatment of insomnia were evaluated using multivariate repeated measures designs. First, a 3 X 2 MANOVA included the 3 Experimental Groups (Audiobook, Relaxation, and Self-Monitoring Only) and 2 Testing Times (Pre- and Post-Intervention). Subsequent to the reassignment of subjects in the Self-Monitoring Only group to the two Countercontrol - Plus Treatment groups (Relaxation and Audiobook), three more MANOVAs were done: (1) a 2 X 2 MANOVA included the two Treatment groups and two Testing Times (Pre- and Post-Intervention), (2) a 2 X 3 MANOVA included the two Treatment groups and three Testing Times, including the Follow-Up, (3) a 2 X 4 MANOVA included the two Treatment groups and four Testing Times, including the Long-Term Follow-Up. Subsequently, the original sample of 41 participants was reduced to 26 by eliminating subjects with low insomnia distress. The 4 MANOVAs were then repeated with this High Distress sample.

Descriptive statistics were employed to define the sample. Univariate statistics (i.e., chi-square, ANOVA, t-test) were used to investigate the homogeneity of treatment and control groups at baseline and to examine gender differences at the Pre-Intervention Evaluation.

Whole Sample

Demographic Characteristics

Group differences. Insomniacs in the three treatment conditions were compared on demographic variables such as age, income, and education to assess between-group homogeneity. There were no significant differences.

Sex differences. Due to the small number of subjects per treatment condition, group by sex ANOVAs were not computed. However, t-test and chi-square comparisons were used to investigate sex differences on demographic variables at the Pre-Intervention testing. These failed to reveal any significant differences between males and females.

Baseline Functioning

Problem specific variables. The intervention groups were compared on three problem specific variables: duration of the insomnia problem, insomnia diagnosis and number of participants taking medication. The groups did not differ significantly on any of these variables.

Sleep - Wake parameters. The quantitative sleep - wake parameters, including SOL, WASO, TST and Sleep Efficiency, were assessed by two measures: (1) the Sleep Questionnaire, which provides a global picture of the individual's sleep, and (2) the Daily Sleep Diary, which provides a one week window of the sleep experience. Comparable scores on these measures were all significantly correlated ($p < .05$ or better): SOL, $r = .39$; WASO, $r = .66$; TST, $r = .82$; Sleep Efficiency, $r = .84$). The groups did not differ significantly on any of these variables.

The Sleep Questionnaire and Sleep Diary data yielded somewhat different results, with the Sleep Questionnaire generally providing a more pessimistic and the Daily Sleep Diary providing a more optimistic picture. For example, the Sleep Questionnaire indicated that the total sample had an average sleep onset latency of 42 minutes, an average WASO of 2 hours and 44 minutes, a mean TST of 4 hours and 57 minutes, and a mean Sleep Efficiency of 64%. The Sleep Diary data indicated a mean SOL of 43 minutes, an average WASO of 1 hour and 43 minutes, an average TST of 5 hours and 19 minutes, and a mean Sleep Efficiency of 67%.

Subjective Sleep variables. Five measures assess participants' general perceptions of their sleep. These include: (1) Distress Frequency: number of insomnia distress episodes, (2) Level of Insomnia Distress: rating on a 10-point scale, (3) Frequency of Insomnia, rating on a 10-point scale, (4) Sleep Quality as measured by the Sleep Diary (5-point scale) and (5) Sleep Self-Efficacy. Means and standard deviations for the whole sample are presented in Table T1, as 1-way ANOVAs failed to reveal any significant differences among groups on any of the variables. The results indicate that participants reported experiencing insomnia quite often (mean = 8.29 on a 10-point scale). Participants' ratings of sleep quality were midway between very poor and very good. The Level of Distress was just above the midpoint of the scale (mean=5.85) and the average Frequency of Distress Episodes per week was 8.2 out of a possible 21. Sleep Self-Efficacy was fairly low (mean = 24.95).

Table T1 here

Lifestyle Sleep variables. Four variables assess the usual sleep habits of participants. These include usual bedtime, arising time (time when out of bed), time in bed (time when out of bed minus time in bed), and the number of days when the individual napped per week. One-way ANOVAs failed to reveal differences among groups on any of these variables. Findings indicate that participants spent an average of 7.83 hours in bed (range = 5.5 to 10), the average usual bedtime was 11:17 P.M. (range = 10 P.M. to 3 A.M.), and the average arising time was 7:08 A.M. (range = 5 A.M. to 10 A.M.). The average number of days participants napped per week was 1.4. Approximately half of the participants [$n = 22$ (53.66%)] did not nap during the day. For the 19 who reported napping, the average number of days napped per week was 3 (range = 1-7). Means and standard deviations are reported in Table T1.

Daytime Functioning. Means and standard deviations for the four measures assessing Daytime Functioning are presented in Table T1. The three groups did not differ significantly on any of these measures. Results from the total sample indicate that insomniacs had an average

Daytime Sleepiness (SSS) score of 2.33, indicating a high level of functioning, although not at peak. Participants reported experiencing a relatively low frequency of Daytime Exhaustion due to lack of sleep (M = 2 days per week). The Sleep Diary revealed that insomniacs felt they were functioning fairly well (M = 3.68 on a 5-point scale) during the day and they felt fairly well rested in the morning (M=3.33).

Cognitive - Affective variables. Table T1 presents baseline means and standard deviations for the cognitive-affective variables as well. The groups did not differ significantly on any of these variables. The means show that average Physical Tension and Mental Activity scores (3.60 and 3.47, respectively) fall above the midpoint of the 5-point scale, indicating relatively low physical tension and mental activity. Insomniacs' anxious self-talk (ASSQ) appears to be lower than the available population norms - however, these norms were obtained for the daytime in college students (M = 64.12). Scores on the Cognitive Subscale of the Pre-Sleep Arousal Scale appear to be greater than the population norms for a younger sample of poor sleepers (M = 15.12; White, 1983). Somatic subscale scores appear to fall within the population norms of poor sleepers (M = 10.13; White, 1993).

Psychological variables. Table T1 presents the means and standard deviations for the various psychological measures. One-way ANOVAs failed to reveal any significant differences between groups. Overall, findings indicate reasonably good psychological adjustment, although the scores indicate slightly worse functioning than the population norms.

PRE TO POST-INTERVENTION CHANGES

Three Intervention Groups: Relaxation, Audiobook, Self-Monitoring Only (3X2)

Upon completion of post-intervention testing, data were available for 3 groups of subjects: the Self-Monitoring only group (n = 13), Countercontrol-Plus Audiobook group (n=14) and the Countercontrol-Plus Relaxation group (n = 14). The effects of the intervention on different parameters of functioning were examined using a 3X2 (Group X Time) mixed design multivariate analysis of variance (MANOVA) with time as a repeated measure. The grouping factor consisted of the three experimental conditions including Self-Monitoring Only, Countercontrol-Plus Audiobook, and Countercontrol-Plus Relaxation. Time included two levels, Pre- and Post-Intervention. MANOVA tests were chosen as the primary analyses because of the large number of dependent variables relative to the small number of subjects; ANOVA tests on each dependent variable would have led to alpha inflation. Table T2 provides Pre- and Post-Intervention means and standard deviations for the whole sample, because ***none*** of the tests showed either a significant Group main effect or a significant Group X Time interaction (Wilks' lambda criterion).

Table T2 here

Sleep - Wake parameters. The variables included in this analysis are: SOL, WASO, TST and Sleep Efficiency as measured by both the Sleep Questionnaire and the Daily Sleep Diary.

On the Sleep Questionnaire, the Hotellings T^2 criterion (which is equivalent to Wilks' Lambda in the case of a two level repeated measure) indicated a main effect for Time, F (4,32) = .71, p = .01, with significant improvements over time on WASO, F (1,37) = 17.62, p<.001, and on TST, F (1,38) = 7.72, p < .01. On the Sleep Diary, the Hotellings T^2 criterion indicated a main effect for Time F (4, 35) = .31, p < .05, with significant improvements in WASO, F (1, 38) = 6.08, p < .05; TST, F (1, 38) = 7.98, p < .01; and Sleep Efficiency, F (1, 38) = 8.80, p < .01.

Subjective Sleep variables. The variables included in this analysis consist of Insomnia Frequency, Sleep Quality, Frequency of Insomnia Distress, Level of Insomnia Distress, and Sleep Self-Efficacy. The Hotellings T^2 criterion indicated a main effect for Time, F (5, 30) = 1.42, p < .001, with significant improvements Pre- to Post-Intervention in Sleep Quality, F (1,38) = 6.22, p <.05; Insomnia Frequency, F (1, 38) = 31, p <.001, and Sleep Self-Efficacy, F (1, 38) = 12.4, p < .001.

Daytime Functioning. The variables included in this analysis include Daytime Functioning from the Sleep Diary, Exhaustion from the Sleep Questionnaire, and Daytime Sleepiness from the Stanford Sleepiness Scale. The Hotellings T^2 criterion failed to indicate a main effect for Time.

Cognitive-Affective variables. The variables included in this analysis are: the Somatic and Cognitive Subscales of the Pre-Sleep Arousal Scale, Physical Tension and Mental Activity from the Daily Sleep Diary, and the ASSQ. The Hotellings T^2 criterion failed to indicate a main effect for Time.

Summary (3X2). In summary, the MANOVAs and subsequent ANOVAs failed to reveal any main effects for Group or any significant Time by Group interactions. However, significant main effects for Time were found for sleep-wake parameters as well as for subjective sleep variables, indicating improvements Pre- to Post-Intervention on the following variables: WASO and TST as measured by both Questionnaire and Diary, Sleep Efficiency as measured by Sleep Diary, and Sleep Quality, Insomnia Frequency, and Sleep Self-Efficacy. No Pre- to Post-Intervention changes were found for Daytime Functioning variables or Cognitive-Affective variables. Table T2 presents Pre- and Post-Intervention means and standard deviations for the whole sample on all variables.

Relaxation and Audiobook Interventions (2X2)

Following the Post-Intervention evaluation, the Self-Monitoring Only subjects were randomly assigned to the two Countercontrol-Plus treatment conditions: 7 participants were assigned to the Audiobook condition and 5 to the Relaxation condition. Since there were no significant differences between groups and there were no significant interactions on the analyses using all 3 groups, Pre- and Post-Intervention data were reanalysed with the Self-Monitoring subjects included in the Relaxation and Audiobook groups. Upon completion of the Post-Intervention testing for all groups, data were available for 40 subjects (one participant from the Self-Monitoring group chose not to continue participating after completing the

Post-Intervention testing): Countercontrol-Plus Audiobook group (n = 19) and the Countercontrol-Plus Relaxation group (n = 21). The effects of the intervention on different parameters of functioning were examined using a 2X2 (Group X Time) mixed design multivariate analysis of variance (MANOVA) with time as a repeated measure. The grouping factor consisted of two conditions including Countercontrol-Plus Audiobook and Countercontrol-Plus Relaxation. Time included two levels, Pre- and Post-Intervention. Once again, MANOVA tests were chosen as the primary analyses. Table T3 provides Pre- and Post Intervention means and standard deviations for the whole sample, because ***none*** of the tests shared either a significant Group or a significant Group X Time interaction.

Table T3 here

Sleep - Wake parameters. On the Sleep Questionnaire, the Hotellings T^2 criterion indicated a main effect for Time, $F(4,32) = .89$, $p < .001$, with significant improvements over time on WASO, $F(1,38) = 22.22$, $p < .001$, and TST, $F(1,38) = 9.19$, $p < .01$. On the Sleep Diary, the Hotellings T^2 criterion indicated a main effect for Time, $F(4, 35) = .58$, $p < .01$, with significant improvements in SOL, $F(1,38) = 8.19$, $p < .01$; WASO, $F(1, 38) = 11.94$, $p < .01$; TST, $F(1, 38) = 13.57$, $p < .01$, and Sleep Efficiency, $F(1, 38) = 17.42$, $p < .001$.

Subjective Sleep variables. The Hotellings T^2 criterion failed to indicate a main effect for Time, although there were significant improvements Pre- to Post-Intervention in Sleep Quality, $F(1,38) = 6.70$, $p < .05$; Insomnia Frequency, $F(1, 38) = 26$, $p < .001$; Distress Frequency, $F(1,36) = 5.52$, $p < .05$, and Sleep Self-Efficacy, $F(1, 38) = 16.90$, $p < .001$.

Daytime Functioning. The variables included in this analysis include Daytime Functioning from the Sleep Diary, Exhaustion from the Sleep Questionnaire and Daytime Sleepiness from the Stanford Sleepiness Scale. There were no significant Time main effects found.

Cognitive-Affective variables. The variables included in this analysis are the Somatic and Cognitive Subscales of the Pre-Sleep Arousal Scale, Physical Tension and Mental Activity from the Daily Sleep Diary, and the ASSQ. The Hotellings T^2 criterion indicated a main effect for Time, $F(5, 34) = .39$, $p < .05$, with improvements Pre- to Post-Intervention on ASSQ, $F(1,38) = 11.23$, $p < .01$.

Summary (2X2). In summary, the MANOVAs and subsequent ANOVAs failed to reveal any main effects for Group or any significant Time by Group interactions. However, significant main effects for Time were found for sleep-wake parameters, subjective sleep variables, and cognitive-affective variables, indicating improvement Pre- to Post-Intervention on the following variables: WASO and TST as measured by both Questionnaire and Diary, SOL and Sleep Efficiency as measured by Sleep Diary and Sleep Quality, Insomnia Frequency, Distress Frequency, Sleep Self-Efficacy, and ASSQ. No significant Pre- to Post-Intervention changes were found for Daytime Functioning variables.

CHANGES ACROSS 3 TESTING TIMES: PRE-, POST-, FOLLOW-UP

Comparisons of the Audiobook and Relaxation Conditions (2X3)

33 subjects completed the two week Follow-Up Sleep Diary and 32 subjects completed the Follow-Up questionnaire battery. The subjects who declined to continue participating were approximately evenly distributed between the Relaxation and Audiobook conditions.

The effects of the intervention on different parameters of functioning were examined using a 2X3 (Group X Time) mixed design MANOVA, with Time as a repeated measure. The grouping factor consisted of two conditions, including Countercontrol-Plus Audiobook and Countercontrol-Plus Relaxation. Time included three levels, Pre- and Post-Intervention and Follow-Up. None of the analyses showed either a significant Group effect or a significant Group X Time interaction.

Sleep - Wake parameters. On the Sleep Questionnaire, there was a significant main effect for Time, F (8,106) = .68, $p < .01$, with significant improvement over time on WASO, F (2,60) = 8.77, $p < .001$, and TST, F (2,60) = 6.50, $p < .01$. On the Sleep Diary, the significant main effect for Time, F (8, 118) = .57, $p < .001$, shows significant improvements in SOL, F (2,62) = 5.08, $p < .01$; WASO, F (2,62) = 3.68, $p < .001$; TST, F (2,62) = 11.09, $p < .001$, and Sleep Efficiency, F (2,62) = 13.32, $p < .001$.

Subjective Sleep variables. Results indicate a main effect for Time, F (10,88) = .45, $p < .001$, with significant improvements in Sleep Quality, F (2,62) = 6.77, $p < .01$; Insomnia Frequency, F (2,60) = 16.57, $p < .001$; Distress Frequency, F (2,56) = 3.80, $p < .05$; and Sleep Self-Efficacy, F (2,56) = 16.49, $p < .001$.

Daytime Functioning. The variables included in this analysis are Daytime Functioning from the Sleep Diary, Exhaustion from the Sleep Questionnaire and Daytime Sleepiness from the Stanford Sleepiness Scale. There were no significant findings on this MANOVA.

Cognitive-Affective variables. Results indicate a main effect for Time, F (10,104) = .61, $p < .01$ with improvements over time on ASSQ, F (2,56) = 11.79, $p < .001$.

Summary (2X3). In summary, the MANOVAs and subsequent ANOVAs failed to reveal any main effects for Group or any significant Time by Group interactions. However, significant main effects for Time were found for sleep-wake parameters, subjective sleep variables and cognitive-affective variables, indicating improvements Pre- to Post-Intervention on the following: WASO and TST as measured by both Questionnaire and Diary, SOL and Sleep Efficiency as measured by Sleep Diary, Sleep Quality, Insomnia Frequency, Distress Frequency, Sleep Self-Efficacy and ASSQ. No Pre- to Post-Intervention changes were found for Daytime Functioning variables. As can be seen in Figures 1 to 9, participants improved Pre- to Post-Intervention, and either remained at this level or continued to improve by Follow-Up.

Figures 1 to 9 here

LONG-TERM FOLLOW-UP

Twenty-four participants (Relaxation: n=12, Audiobook: n=12) completed evaluations at four testing times, including Long-Term Follow-Up evaluation on the telephone; this consisted of a brief version of the Sleep Questionnaire.

The effects of the intervention on sleep-wake parameters, as measured by the Sleep Questionnaire, were examined using a 2X4 (Group X Time) mixed design MANOVA with Time as a repeated measure. The grouping factor consisted of two conditions including Countercontrol-Plus Audiobook and Countercontrol-Plus Relaxation. Time included four levels, Pre- and Post-Intervention, Follow-Up, and Long-Term Follow-Up. The Wilks' lambda criterion revealed neither a significant main effect for Group nor a significant Time by Group interaction. There was, however, a significant main effect for Time F, (12,143) = 16.68, $p < .05$, with significant improvement over time on WASO, F (3,60) = 4.37, $p < .01$. In addition, 2x4 ANOVAs indicated significant main effects for Time for the following variables: Insomnia Frequency, F (3,66) = 18.32, $p < .001$, Distress Frequency, F (3,63) = 8.09, $p < .001$, and Distress Level, F (3,57) =7.57, $p <.001$. As the means in Table T4, which presents means and standard deviations for participants completing all four testing times indicate, improvement was reasonably well maintained after 2 years at the Long-Term Follow-Up.

Table T4 here

OVERALL SUMMARY OF CHANGES WITH TIME FOR THE WHOLE SAMPLE

Table T5 summarizes the results of all the ANOVAs analyses for all testing times. As can be seen in this table, substantial and significant changes on Sleep Parameters were brought about by the intervention, and these changes have, by-and-large, been relatively well maintained. It should also be noted that results on Subjective Sleep Variables indicate a "sleeper" effect with participants continuing to improve over time. Daytime Functioning and Cognitive/Affective Variables failed to show substantial changes over time.

Table T5 here

High Distress Participants

It was surprising that the results showed substantial changes in sleep parameters without concomitant changes in sleep distress and related cognitive-affective variables. This prompted us to examine baseline distress scores. Because 15 of the participants experienced relatively low distress prior to the intervention, we eliminated them from the sample and performed analyses on the remaining relatively highly distressed poor sleepers.

PRE- TO POST-INTERVENTION CHANGES

Three Intervention Groups: Audiobook, Relaxation, Self-Monitoring Only (3X2)

Upon completion of Post-Intervention testing, data were available for 26 highly distressed subjects: 9 in the Self-Monitoring Only group, 8 in the Countercontrol-Plus Audiobook group, and 9 in the Countercontrol-Plus Relaxation group. Once again, the effects of the intervention on different parameters of functioning were examined using a 3X2 (Group X Time) mixed design MANOVA, with Time as a repeated measure. The grouping factor consisted of three conditions, including Self-Monitoring Only, Countercontrol-Plus Audiobook, and Countercontrol-Plus Relaxation. Time included two levels, Pre- and Post-Intervention. Again, there were no significant Group main effects or Group X Time interactions.

Sleep - Wake parameters. On the Sleep Questionnaire, the Hotellings T^2 criterion indicated a main effect for Time, F (4,19) = 1.39, $p < .01$, with significant improvement over time on WASO, F (1,22) = 17.30, $p < .001$, and TST, F (1,23) = 8.55, $p < .01$. On the Sleep Diary, the Hotellings T^2 criterion indicated a main effect for Time, F (4, 20) = .65, $p < .05$, with significant improvement in WASO, F (1, 23) = 5.49, $p < .05$; TST, F (1, 23) = 12.28, $p < .01$; and Sleep Efficiency, F (1, 23)=9.62, $p < .01$.

Subjective Sleep variables. The Hotellings T^2 criterion indicated a main effect for Time, F (5, 18) = 1.27, $p < .01$, with significant improvements Pre- to Post-Intervention in Sleep Quality, F (1,23) = 8.25, $p < .01$, Distress Frequency, F (1,22) = 4.81, $p < .05$, Insomnia Frequency, F (1, 23) = 18.05, $p < .001$; and Sleep Self-Efficacy, F (1, 23) = 13.99, $p < .001$.

Daytime Functioning. The variables included in this analysis include Daytime

Functioning from the Sleep Diary, Exhaustion from the Sleep Questionnaire and alertness from the Stanford Sleepiness Scale. The Hotellings T^2 criterion failed to indicate a main effect for Time.

Cognitive-Affective variables. There were no significant findings on cognitive-affective variables.

Summary (3X2). The MANOVAs and subsequent ANOVAs failed to reveal any main effects for Group or any significant Time by Group interactions. However, significant main effects for Time were found for sleep-wake parameters and subjective sleep variables, indicating improvement Pre- to Post-Intervention on the following variables: WASO and TST as measured by both Questionnaire and Diary, Sleep Efficiency as measured by Sleep Diary, and Sleep Quality, Insomnia Frequency, Distress Frequency, and Sleep Self-Efficacy. No Pre- to Post-Intervention changes were found for Daytime Functioning or for Cognitive-Affective variables. Table T6 includes a summary of the findings.

Table T6 here

Relaxation and Audiobook Interventions (2X2)

Once the Self-Monitoring Only subjects were randomly assigned to the two Countercontrol-Plus treatment conditions, the effects of the intervention on different parameters of functioning were examined using a 2X2 (Group X Time) mixed design MANOVA with Time as a repeated measure. The grouping factor consisted of two experimental conditions including Countercontrol-Plus Audiobook and Countercontrol-Plus Relaxation. Time included two levels, Pre- and Post-Intervention. There were no significant Group main effects or Group X Time interventions.

Sleep - Wake parameters. On the Sleep Questionnaire, the Hotellings T^2 criterion indicated a main effect for Time, F (4,20) = 2.00, $p < .001$, with significant improvement over time on SOL, F (1,23) = 4.53, $p < .05$; WASO, F (1,24) = 25.27, $p < .001$, and TST, F (1,24) = 11.20, $p < .01$. On the Sleep Diary, the Hotellings T^2 criterion indicated a main effect for Time, F (4, 21) = .92, $p < .01$, with significant improvement in SOL, F (1,24) = 7.68, $p < .05$; WASO, F (1, 24) = 10.70, $p < .01$; TST, F (1, 24) = 14.25, $p < .01$, and Sleep Efficiency, F (1, 24) = 17.80, $p < .001$.

Subjective Sleep variables. The Hotellings T^2 criterion indicated a main effect for Time, F (5, 19) = 1.28, $p < .01$, with significant improvements Pre- to Post- Intervention in Sleep Quality, F (1,24) = 10.16, $p < .01$, Insomnia Frequency, F (1, 24) = 19.52, $p < .001$; Distress Frequency, F (1,23) = 9.52, $p < .01$; and Sleep Self-Efficacy, F (1, 24) = 16.59, $p < .001$.

Daytime Functioning. There were no significant findings on daytime functioning measures.

Cognitive-Affective variables. The Hotellings T^2 criterion indicated a main effect for

Time, F (5, 20) = 1.11, p < .01, with improvements Pre- to Post-Intervention on ASSQ, F (1,24) = 9.02, p < .01; Somatic Subscale, F (1,24) = 4.44, p < .05; Cognitive Subscale, F (1,24) = 8.78, p < .01, and Mental Activity, F (1,24) = 4.71, p < .05.

Summary (2X2). In summary, the MANOVAs and subsequent ANOVAs failed to reveal any main effects for Group or any significant Time by Group interactions. However, significant main effects for Time were found for all of the Sleep-Wake variables, Subjective Sleep variables and Cognitive-Affective variables except for: Sleep Efficiency as measured by the Sleep Questionnaire, Distress Level, and Physical Tension. Once again, no Pre- to Post-Intervention changes were found for Daytime Functioning variables. Table T6 summarizes the findings.

CHANGES ACROSS THREE TESTING TIMES: PRE- POST-, FOLLOW-UP

Comparisons of the Two Intervention Conditions (2x3)

Upon completion of the follow-up testing, data were available for 21 subjects. The effects of the intervention on different parameters of functioning were examined using a 2X3 (Group X Time) mixed design MANOVA with Time as a repeated measure. The grouping factor consisted of two conditions including Countercontrol-Plus Audiobook and Countercontrol-Plus Relaxation. Time included three levels, Pre- and Post-Intervention and Follow-Up. Sample sizes were too low for meaningful analyses at the Long Term Follow-Up. Again, there were no significant Group main effects or Group X Time interactions.

Sleep - Wake parameters. On the Sleep Questionnaire, a main effect for Time, F (10,64) = .45, p < .01, indicates significant improvement over time on WASO, F (2,36) = 9.91, p < .001, and TST, F (2,36) = 7.87, p < .001. On the Sleep Diary, a main effect for Time, F (8,66) = .48, p < .01, indicates significant improvement in SOL, F (2,38) = 4.41, p < .05; WASO, F (2,38) = 18.42, p < .001; TST, F (2,38) = 12.83, p < .001; and Sleep Efficiency, F (2,38) = 11.26, p < .001.

Subjective Sleep variables. Results indicate a main effect for Time, F (10,56) = .42, p < .01, with significant improvement Pre- to Post-Intervention in Sleep Quality, F (2,38) = 8.84, p < .01, Distress Frequency, F (2,34) = 6.60, p < .01; Insomnia Frequency, F (2,36) = 10.20, p < .001, and Sleep Self-Efficacy, F (2,36) = 13.71, p < .001.

Daytime Functioning. There were no significant findings on Daytime Functioning variables.

Cognitive-Affective variables. Results indicate a main effect for Time, F (10,64) = 8.41, $p < .01$, with improvements over time on ASSQ, F (2,36) = 12.30, $p < .001$; Somatic Subscale, F (2,36) = 4.93, $p < .05$; Cognitive Subscale, F (2,36) = 8.36, $p < .01$; and Mental Activity, F (2,38) = 3.72, $p < .05$.

Summary (2X3). The MANOVAs and subsequent ANOVAs failed to reveal any main effects for Group or any significant Time by Group interactions. However, significant main effects for Time were found for all the Sleep-Wake variables, Subjective Sleep variables and cognitive-affective variables, except SOL and Sleep Efficiency as measured by the Sleep Questionnaire, Distress Level, and Physical Tension. Once again, no Pre- to Post-Intervention changes were found for Daytime Functioning variables. Table T6 summarizes the findings.

LONG-TERM FOLLOW-UP

Only 14 participants completed the Long-Term Follow-Up evaluation on the telephone. Due to the small number of participants the data could not be adequately analysed.

OVERALL SUMMARY OF FINDINGS ON HIGH DISTRESS PARTICIPANTS

Results in Table T6 indicate that highly distressed participants were more likely to improve than less distressed individuals on Sleep-Wake parameters and on Subjective Sleep variables. Analyses which were not significant or only marginally significant for the whole sample were significant on the smaller group of highly distressed subjects. Also, most of the non-significant comparisons on cognitive-affective variables for the whole sample became significant when only high distress subjects were evaluated.

DISCUSSION

The results of this study corroborated our previous findings (from a less extensive evaluation) and showed that, in the short term, our psychological interventions - audiobook and relaxation instructions via pillow speaker - improved behavioral and subjective aspects of sleep quality in older individuals complaining of insomnia. This was also true for insomniacs who only self-monitored their sleep experience during the initial 4 week testing period. Thus, it would appear that, as in other problem areas (e.g., sexual dysfunction, eating disorders), daily self-monitoring is a fairly powerful technique for initiating behavioral change, a least in the short term (Fichten, Libman, Amsel, Creti, Weinstein, Rothenberg, Liederman, & Brender, 1991; Mahoney, 1977, Nelson, 1977).

Differences between retrospective questionnaires and on-going sleep diary evaluations suggest that self-monitoring may provide a "reality check" on the variability of the sleep experience. People learn that there are, in fact, some better nights; sleep quality is not uniformly impaired. Completing a daily evaluation also encourages individuals to monitor the actual sleep parameters more accurately; this prevents global pessimistic subjective assessments of the sleep experience.

In addition to showing short term benefits, the findings indicate that participants who

were exposed to self-monitoring and to either the Audiobook or the Relaxation intervention maintained their gains or even improved slightly after a two year period (the design of the study did not permit us to evaluate the long-term effects of self-monitoring alone). While many comparisons at the long-term follow-up were no longer significant - in part due to sample sizes - the means indicate that gains at post-testing were quite well maintained. Moreover, as can be seen in Study 2, none of the participants in our treatment deteriorated at the 2-year follow-up.

It is notable that the daytime fatigue and sleepiness, which participants attributed to poor sleep quality, showed no concomitant improvement with sleep-wake parameters nor with improvements in the more subjective aspects of the sleep experience. This suggests that experienced quality of daytime functioning is unrelated to the nighttime sleep experience.

Although impaired daytime functioning is a typical aspect of the insomnia complaint, it does not appear to respond to the interventions which are effective for alleviating nighttime sleep difficulties. Therefore, it would be important to explore the relationship of daytime functioning to other psychological and lifestyle variables in order to understand this symptom more completely and to treat it more effectively.

It should also be noted that our participants manifested different initial distress levels related to their insomnia. Therefore, it was encouraging to find that highly distressed individuals showed more extensive improvement than their less distressed counterparts. This suggests that the impact of levels of distress should be explored more intensively as well. Clearly, insomnia is not a unitary phenomenon. For any particular individual, the symptoms may be variably located on the physiological, behavioral, cognitive and affective dimensions of the experience.

We have demonstrated in this study how the dimensions of the insomnia experience may be conceptualized and measured. Various aspects of the insomnia experience may respond differentially to different psychological treatment components. To some extent our finding have suggested for whom self-monitoring and cognitive refocusing interventions are effective (e.g., most effective for individuals who are highly distressed about their sleep problem, not effective for those complaining predominantly of daytime fatigue). More extensive investigation needs to be carried out in order to define the predominant symptom and to more accurately select the most effective treatment strategy for specific target problems.

SOCIAL IMPLICATIONS

Consistent with the policy of prevention and the development of successful aging strategies, our research has identified specific characteristics and predictors of "invulnerability"in aging individuals who are developmentally susceptible to sleep disorder.

We have demonstrated that almost half of our sample of active older community dwelling individuals neither experienced nor were troubled by poor sleep. These individuals were also conspicuously free of psychological maladjustment. The other half of the sample did manifest considerable sleep disruption. However, a substantial segment of these poor sleepers

experienced minimal distress over their sleep problem. These "low distress" poor sleepers, in comparison with their highly distressed counterparts, were characterized by low levels of anxiety and by an absence of psychological maladjustment; in this respect, they were similar to good sleepers. Therefore, such minimally distressed poor sleepers represent the prototype of individuals who are coping well with the physiological changes in sleep architecture which accompany the aging process. Describing the characteristics of this group is particularly important to understanding the ***complaint*** of insomnia - rather than the mere presence of sleep disruption - in older individuals.

Our findings indicate that: (1) state and trait aspects of anxiety are closely related to the insomnia complaint, suggesting that anxiety management needs to be an important aspect of insomnia treatment for highly distressed individuals, and (2) daytime fatigue appears not to be related to sleep parameters or to distress, suggesting that other means are needed to address complaints in those individuals whose presenting insomnia problems relate mainly to daytime "sequelae." (3) Although lifestyle and demographic factors are similar for good sleepers and poor sleepers, cognitive-affective evaluations of their experiences are dramatically different; our findings suggest that insomnia interventions should encourage more positive ***perceptions*** of one's experiences rather than attempting to modify the activities themselves. (4) Predictors of long term improvement in sleep quality appear to be younger age, lower level of psychological maladjustment, and the absence of a high level of intrusive cognitive activity during the presleep period. Intrusive thoughts have long been known to constitute an important aspect of the insomnia complaint. Our findings establish the rationale and confirm the importance of addressing this feature in insomnia treatment programs.

With respect to the treatment of older individuals complaining of insomnia, we have shown that: (1) our Countercontrol - Plus Audiobook and Relaxation techniques, in conjunction with self-monitoring of sleep experiences, effects improvement in most aspects of sleep, both in the short term and in the long term. We can hypothesize that different aspects of our intervention program target different components of the insomnia complaint. For example, daily self-monitoring may result in more realistic and, possibly, more positive re-evaluations of the sleep experience. Relaxation instructions may reduce anxiety levels, while listening to an audiobook may disrupt intrusive cognitive activity directly. This forms a basis for selecting the most appropriate technique to target the predominant insomnia symptom.

Our investigation has also made an important contribution to understanding the multidimensional nature of the insomnia experience. In suggesting a basis for selecting the most appropriate techniques to deal with insomnia complaints characterized by different symptomatology, the findings provide a basis for developing effective intervention packages for managing insomnia. Despite the known developmental changes in sleep in older people, their ***complaint*** of insomnia is related more to their cognitive style and affective responses during periods of wakefulness - whether these occur during the day or the night.

DISSEMINATION OF FINDINGS

To assist with this activity, our research team is currently preparing to disseminate the findings of this investigation. We have recently obtained a "Diffusion des résultats" grant from CQRS (1995-96) to help with this activity.

Our work is directed at limiting the serious social, human and financial costs associated with medical treatment for elderly insomniacs, and is designed to help older individuals see themselves as people who can cope with their sleep disturbances rather than be the victims of it. Therefore, to disseminate our findings (1) we are developing a booklet, provisionally titled, ***Insomnia In Older Adults: Prevention and Treatment*** in two versions. One version is intended for healthcare professionals, the second will be a self-help version intended for use by senior citizens. French and English versions of both booklets will be prepared. (2) The newly developed information booklets will be distributed to CLSCs, medical geriatric services and social service agencies throughout Québec. (3) Presentations will be made by members of our team to English and French seniors' community groups throughout Montréal in the form of lecture/workshops, where the newly developed booklet will be made available to participants free of charge, for home use. (4) We will explore more widespread dissemination of the booklet in preventative health and well-being programs for aging individuals at the government level. (5) Over the years we have presented aspects of our findings at psychological and sleep disorders conferences. We will continue to do this as well as to publish in scholarly journals. As can be seen from the following listing, we have already taken numerous steps to disseminate our findings.

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Fichten, C.S., Creti, L., Amsel, R., Brender, W., Weinstein, N., & Libman, E. (1995a). Poor sleepers who do not complain of insomnia: Myths and realities about psychological and lifestyle characteristics of older good and poor sleepers. **Journal of Behavioral Medicine, 18**(2), 189-223.

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MANUSCRIPTS SUBMITTED FOR PUBLICATION

Libman, E., Creti, L., Levy, R.D., Brender, W. & Fichten, C.S. (1995b). **A comparison of reported and recorded sleep in older poor sleepers.** Manuscript submitted for publication.

MANUSCRIPTS IN PREPARATION

Libman, E., Creti, L., Amsel, R., Brender, W., & Fichten, C.S. (1995a). **Behaviors during awake times in older good and poor sleepers: The Sleep Behaviors Scale - 60+**. Manuscript in preparation.

Creti, L., Libman, E., & Fichten, C.S. (1995). **Brief cognitive-behavioral interventions for insomnia in older individuals.** Manuscript in preparation.

Fichten, C.S., Libman, E., Creti, L., Amsel, R., Tagalakis, V., & Brender, W. (1995b). **Thoughts during awake times in older good and poor sleepers - The Self-Statement Test:60+** Manuscript in preparation.

Libman, E., Fichten, C.S., Creti, L., Amsel, R., & Brender, W. (1995). **Who will get better, who will get worse - Predictors of sleep status 2 years later.** Manuscript in preparation.

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Amsel, R. & Fichten, C.S. (1995). **Use 0-4 rather than 1-5 as scale end points on self-statement measures: Influence of rating scale end points on States-of-Mind (SOM) ratios.** Manuscript in preparation.

CONFERENCE PRESENTATIONS AND ABSTRACTS

Libman, E., Fichten, C.S., Amsel, R., Brender, W. Creti, L. (1995). **Negative thoughts during nocturnal wakefulness are related to poorer psychological adjustment and the complaint of insomnia in older individuals** Accepted for presentation at the Association for Advancement of Behavior Therapy, Washington, D.C.

Fichten, C.S., Creti, L., Weinstein, N., Tagalakis, V., Amsel, R., Brender, W. & Libman, E. (1995, June). **Assumptions about older good and poor sleepers: Myths and realities.** Presentation at the Association of Professional Sleep Societies annual convention, Nashville, Tenn.

Libman, E., Creti, L., Weinstein, N., Tagalakis, V., Amsel, R., Brender, W. & Fichten, C.S. (1995, June). **The three faces of insomnia in older people: Sleep disruption, distress and daytime fatigue.** Presentation at the Association of Professional Sleep Societies annual convention, Nashville, Tenn.

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Amsel, R., Wright, J., & Fichten, C.S. (1993, Nov.). Cognitive assessment: Effects of scale values (0 - 4 versus 1 - 5) on States-of-Mind (SOM) Ratios. Presentation in E. Libman (Chair), **Cognitive behavioral assessment and treatment of insomnia in older individuals,** symposium at the Association for Advancement of Behavior Therapy annual convention, Atlanta.

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COMMUNITY TALKS, INTERVIEWS, AND INVITED ADDRESSES BY RESEARCH TEAM MEMBERS ON VARIOUS ASPECTS OF AGING

Creti, L. (1995). **Sleep and aging.** Presentation to the Leisure Group, Shaar Hashomayim Synagogue, June, Montréal.

Weinstein, N. (1994). **Problems of sleep in older people**. Presentation at the Harbour House Group, December, Palm Beach, Florida.

Libman, E. (1994). **Sleep disorders.** Interview on CIQC radio phone-in show: Today with Mike Stevens, March, Montréal.

Fichten, C.S. (1994). **Insomnia and phobias in an older man: Sequential cognitive-behavioral therapies.** Presentation at Clinical Conferences: Diagnostics and/or Drugs, Department of Psychiatry, Sir Mortimer B. Davis - Jewish General Hospital, April, Montréal.

Libman, E. (1993). **Sexuality and aging II.** Invited panel member at Nursing Grand Rounds, Sir Mortimer B. Davis - Jewish General Hospital, Sept., Montréal.

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Libman, E. (1993). **Basic concepts in cognitive behavioral therapy.** Invited workshop, Occupational Therapists Educational Program, Sir Mortimer B. Davis - Jewish General Hospital, May, Montréal.

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FINANCIAL ASPECTS

$ 90,555 was allocated for the budget years 1993-95. As indicated on the "Rapport Financier Annuel" forms, for 1993-94 and 1994-95, by the end of the 1995 budget year the full amount allocated was spent. In general, budgetary matters proceeded in an orderly manner in accordance with initial projections.

Depenses	1993-95
Traitements du personnel	67109.
Avantages sociaux	7029.
Frais de déplacement	5259.
Matériel	1810.
Fournitures et services	9348.
Total	90555.

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