

What Do Older Good and Poor Sleepers Do During Periods of Nocturnal Wakefulness? The Sleep Behaviors Scale: 60+

Eva Libman and Laura Creti
Concordia University and
Sir Mortimer B. Davis—Jewish General Hospital

Rhonda Amsel
McGill University

William Brender
Concordia University and
Sir Mortimer B. Davis—Jewish General Hospital

Catherine S. Fichten
Dawson College and
Sir Mortimer B. Davis—Jewish General Hospital

To determine whether older good and poor sleepers with and without insomnia complaints differ in the nature of activities they engage in during periods of nocturnal wakefulness, the authors developed and evaluated the Sleep Behaviors Scale: 60+. Good sleepers ($n = 163$), low-distress poor sleepers ($n = 49$), and high-distress poor sleepers ($n = 28$) were compared on this measure as well as on sleep parameters, personality, lifestyle, and cognitive-affective variables. Findings indicate good psychometric properties for the new measure, offer a rationale for examining the frequency of the nocturnal behaviors reflected by the measure's 4 subscales (Active Behaviors, Relaxation, Cognitive Arousal, and Medication), and suggest a possible role for these behaviors in the etiology and treatment of insomnia.

Older individuals may be disposed to view themselves as suffering from a sleep disorder because psychophysiological changes in sleep and wakefulness associated with normal aging are all in the direction of impaired sleep (Morin, 1993). Indeed, whereas the incidence of occasional insomnia has been estimated at 30–40% in the general population (American Psychiatric Association, 1994), it is between 50% and 60% among individuals age 60 and older (Chen & Foley, 1994; Monjan, 1994). Persistent and distressing difficulties in initiating or maintaining sleep have been estimated at between 10% and 35% of people over 65, with concomitant increased use of health care facilities and medication (Brabbins et al., 1993; Ford & Kamerow, 1989; Gallup Organization, 1991; Henderson et al., 1995; Mellinger, Balter, & Uhlenhuth, 1985; Tait, 1992).

Despite developmental psychophysiological changes in sleep patterns, however, not all older adults complain of impaired sleep (Dement, Miles, & Carskadon, 1982; Monjan, 1990). The general aims of our research program have been to understand sleep dissatisfaction and identify the factors that differentiate older individuals who complain of insomnia from those who do not. In the context of obtaining a better understanding of cognitive, affective, and behavioral aspects of the insomnia experience, our goal in the present investigation was to examine what older individuals do during periods of nocturnal wakefulness.

The Role of Cognitions

There is wide theoretical and empirical support for the central role of cognitive arousal (i.e., intrusive, uncontrollable cognitive activity; negative and worrying thoughts) in insomnia (e.g., Borkovec, Lane, & Van Oot, 1981; Coyle & Watts, 1991; Fichten & Libman, 1991; Kuisk, Bertelson, & Walsh, 1989; Lichstein & Fanning, 1990; Lichstein & Rosenthal, 1980; Morin, Kowatch, Barry, & Walton, 1993; Sanavio, Vidotto, Bettinardi, Rolletto, & Zorzi, 1990). Even though sleep researchers and clinicians have increasingly implicated distressing and intrusive thoughts in the etiology and maintenance of insomnia (Morin, 1993), until recently there had been no systematic investigation of thinking during nocturnal awake times.

In an earlier study in which we investigated the nature of thoughts experienced by older individuals during nocturnal wakefulness, we developed our revised cognitive model of insomnia (Figure 1). We proposed that negative cognitive activity—primarily negative, worrying, and anxious thoughts and self-statements during periods of nocturnal wakefulness—may be a key mediator of insomnia complaints (Fichten & Libman 1991; Fichten et al., 1997).

The model begins with the recognition that nocturnal awaken-

Eva Libman, Laura Creti, and William Brender, Psychology Department, Concordia University, Montreal, Quebec, Canada, and Behavior and Sex Therapy Service, Sir Mortimer B. Davis—Jewish General Hospital, Montreal, Quebec, Canada; Rhonda Amsel, Psychology Department, McGill University, Montreal, Quebec, Canada; Catherine S. Fichten, Psychology Department, Dawson College, Montreal, Quebec, Canada, and Behavior and Sex Therapy Service, Sir Mortimer B. Davis—Jewish General Hospital, Montreal, Quebec, Canada.

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Correspondence concerning this article should be addressed to Eva Libman, Sir Mortimer B. Davis—Jewish General Hospital, Behavior and Sex Therapy Service, 4333 Cote St. Catherine Road, Montreal, Quebec, Canada H3T 1E4.

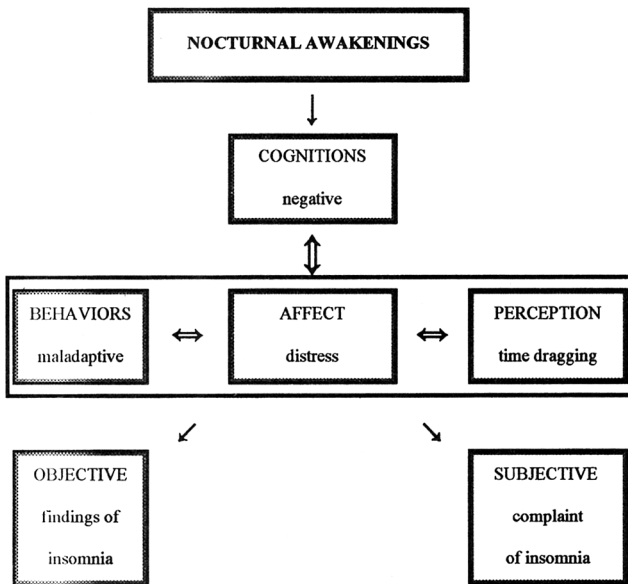


Figure 1. The revised cognitive model of insomnia.

ings are experienced by most older individuals. It then goes on to propose that whether people complain of insomnia is determined by the nature of their thoughts while they are awake during the night. For example, nocturnal awake times that are filled with negative cognitive activity, such as concerns about the day's events and worry about miscellaneous matters, including the consequences of not getting enough sleep, are expected to magnify the insomnia complaint. Consistent with the model's predictions, our data have demonstrated that poor sleepers who were distressed by their insomnia, compared with poor sleepers who were less concerned by their sleep problem, had higher frequencies of negative appraisals and thoughts and a poorer balance of positive to negative thinking (Fichten et al., 1995; Fichten et al., in press).

Personality, Psychological Adjustment, and Insomnia

The model also proposes that negative cognitive content leads to maladaptive affect. There is a vast literature on personality and psychological adjustment in younger and middle-aged individuals who experience sleep problems (e.g., Adam, Tomeny, & Oswald, 1986; Coursey, Buchsbaum, & Frankel, 1975; Hauri & Fisher, 1986; Kales et al., 1984; Paulsen & Shaver, 1991; Schneider-Helmert, 1987) as well as on the import of daytime stressors (e.g., Healey et al., 1981; Rubman et al., 1990; Waters, Adams, Binks, & Varnado, 1993; White & Nicassio, 1990). However, with several notable exceptions (Frisoni et al., 1993; Gourash-Bliwise, 1992; Monk, Reynolds, Machen, & Kupfer, 1992; Morgan, Dallosso, Ebrahim, Arie, & Fentem, 1988; Morgan, Healey, & Healey, 1989; Morin & Gramling, 1989; Van Egeren, Haynes, Franzen, & Hamilton, 1983), there has been little available information about the relationship between sleep parameters and psychological factors in older adults. Our own work (Fichten et al., 1995) indicates that psychological adjustment is poorer in older people with insomnia than in older people who sleep well; this is similar to results reported by others (e.g.,

Gourash-Bliwise, 1992; Morgan et al., 1989; Morin & Gramling, 1989). But we have also been able to identify substantial numbers of older individuals who, in spite of sleeping badly, are only minimally distressed by their poor sleep. This group of poor sleepers differs from highly distressed poor sleepers not in that they experience substantially less problematic sleep, but in that they manifest less poor psychological adjustment and negative affect—a finding recently corroborated by others (Lavador et al., 1996).

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 in many cases the amount of sleep deprivation experienced by insomnia complainers 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 are typically reported. For example, we found that although differences in sleep parameters between good sleepers and low-distress poor sleepers were very large, these two groups were similar on adjustment and cognitive-affective responses. Findings such as these suggest that minimally distressed poor sleepers represent a poorly documented but substantial segment of the aging population: those who are coping well with the psychophysiological changes in sleep architecture that disrupt sleep and typically accompany the aging process. This corroborates our initial impression that an understanding of low-distress poor sleepers is critical to understanding the complaint of insomnia in older individuals.

Lifestyle Factors

Daytime Activities

The ubiquity of chronic sleep complaints, even among well older persons, has prompted a variety of plausible but unsubstantiated causal explanations related to lifestyle factors: the 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 the death or illness of a loved one. Given the pervasiveness of such beliefs, there has been a surprising lack of confirmatory data. Our own work as well as studies by others demonstrates that as far as daytime activities and lifestyle are concerned, older individuals with no insomnia complaints lead neither more regular nor less stressful lives than do their age peers who sleep poorly (cf. Fichten et al., 1995). In fact, all of the participants in our study engaged in some activities they experienced as aversive. As was the case for cognitions, it was more specifically the favorable balance of positive and negative aspects of daily life that distinguished both the good sleepers and the minimally distressed poor sleepers from the insomnia sufferers.

Nocturnal Activities

Our cognitive model of insomnia proposes that negative cognitive content will lead to maladaptive sleep-related behaviors as well. Everyone experiences occasions of undesired wakefulness during the night, and the aging process generally increases the

frequency of this experience (Morin, 1993). The efficacy of changing behaviors to alleviate insomnia in both younger and older individuals is well documented (e.g., Bootzin & Engle-Friedman, 1987; Borkovec, 1982; Lichstein & Riedel, 1994; Morin, Culbert, & Schwartz, 1994; Murtagh & Greenwood, 1995; Spielman, Saskin, & Thorpy, 1987). For example, people are typically advised to practice good sleep hygiene in the daytime (e.g., no caffeine, alcohol, or exercise after dinner—e.g., Lacks & Rotert, 1986; Schocket, Bertelson, & Lacks, 1988). Insomnia treatment programs also instruct people to change their nighttime behaviors (e.g., to not stay in bed but to leave the bedroom and do something else when they are unable to fall asleep—cf. Bootzin, 1985). However, little can be found in the literature describing what people who are not in a treatment program do when they are unable to sleep.

Most activity diaries and self-monitoring measures start with "out of bed" and end with "go to bed" (e.g., Libman, 1988; Monk et al., 1992). One notable exception is an investigation by Kales et al. (1984), who found that a "mixed group" of sleep disorders clinic patients with primary insomnia were more likely than a control group to "try hard," read, turn on the light, get out of bed, go to the bathroom, eat, drink, and take medication. Thinking about personal problems and the next day's tasks was identified as characteristic of insomniacs by Lundh, Lundqvist, Broman, and Hetta (1991). Listening to the radio is, according to participants in our studies of sleep and aging, a fairly popular activity during periods of nocturnal wakefulness. In an investigation in which the goal was to explore the auditory input selected by people who have a visual impairment when they experience periods of nocturnal wakefulness (because these individuals are particularly well practiced in the use of auditory materials) we found that, contrary to popular belief, most people indicated a preference for verbal materials such as radio talk shows or dramatizations, rather than music (Libman, Fichten, Creti, Judd, & Weinstein, 1990).

Because there is ample evidence that therapeutic interventions directed at changing sleep lifestyle practices may alleviate sleep complaints (e.g., Bootzin, 1985; Edinger, Hoelscher, Marsh, Lipper, & Ionescu-Pioggia, 1992; Hoelscher & Edinger, 1988; Morin et al., 1993), such practices may play a perpetuating, though not causal, role in the insomnia complaint of an already predisposed individual (e.g., Bliwise, 1991; Spielman, Caruso, & Glovinsky, 1987).

The Present Investigation

Our first goal was to explore, in a systematic way, what behaviors older individuals characteristically engage in during nocturnal awake times. Because there was no existing instrument to carry out this task, we first needed to develop and evaluate a measure for this purpose. The final product, the Sleep Behaviors Scale: 60+, is a closed-ended, inventory measure of sleep behaviors enacted by older individuals while trying to fall asleep. The content of this measure was derived from an open-ended listing of sleep-related behaviors provided by participants in a previous investigation (Fichten et al., 1995). Because of well-known difficulties of open-ended listings (Amsel & Fichten, 1990; Clark, 1988), an inventory measure seemed indicated.

An important objective of the present investigation was to further our understanding of the insomnia complaint and to test

aspects of our cognitive model of insomnia that deal with the nature and role of nocturnal behaviors in the experience of insomnia. To this end, we examined nocturnal sleep-related behaviors in older individuals with and without insomnia-related distress. We also compared the sleep behaviors of good sleepers with those of poor sleepers who experienced either low or high levels of related distress. We expected that poor sleepers, in general, would engage in more nocturnal activities than good sleepers because they would be awake for longer periods.

Our revised cognitive model of insomnia proposes that the sleep behaviors engaged in by complaining poor sleepers are particularly maladaptive. We made the assumption that a high level of distress is closely related to the insomnia complaint. Therefore, we expected to demonstrate that more of the behaviors manifested by highly distressed poor sleepers would be maladaptive than those manifested by poor sleepers who were not upset by their sleep problem.

Method

Measures

Background Information Form

This modified version of a short questionnaire used in our previous studies on aging provides socioeconomic, personal, and demographic descriptors (e.g., age, sex, and marital status) (Fichten et al., 1995; Libman, Creti, Levy, Brender, & Fichten, in press; Libman et al., 1997).

Sleep-Related Measures

Sleep questionnaire. This brief, objective questionnaire is scored on an item-by-item basis. It inquires about typical sleep experiences, including time spent in bed, hours slept per night, duration and frequency of nocturnal arousals, and sleep medication use in a typical week, as well as about the frequency (0–7 days/week) with which the respondent has 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 allows (a) diagnosis of the presence or absence of a disorder of initiating or maintaining sleep according to conventional research criteria (i.e., 30 min of undesired nocturnal awake time at least three times per week for a minimum of 6 months); (b) ratings of respondents' subjective perceptions of the frequency of sleep problems (Sleep Difficulty: Occurrence of Sleep Problems, 1 = *very rarely* and 10 = *very often*) and the associated distress (Sleep Distress: Level, 1 = *not at all* and 10 = *very much*); and (c) computation of two derived frequency scores—Sleep Difficulty: Frequency of Problem Episodes and Sleep Distress: Frequency of Distress Episodes—each of which provides a single summary frequency score of 0–21, with higher scores indicating more frequent sleep problem/distress episodes experienced during the week.

We have found that scores based on this measure have acceptable psychometric properties for research use; test-retest correlations indicate reasonable temporal stability ($r_s = .58-.92$), and the pattern of correlations among scores based on this measure and scores on personality and lifestyle variables shows logical, highly significant relationships (Fichten et al., 1995). Our unpublished convergent validity data indicate significant and high correlations between corresponding scores on the Sleep Questionnaire and on 7 days of self-monitoring using a daily sleep diary (e.g., total sleep time, $r = .82, p < .001$; total wake time, $r = .72, p < .001$; and sleep efficiency, $r = .77, p < .001$). Unpublished discriminant validity data indicate that personality scores that are unrelated to scores on the daily sleep diary are also not related to scores on the Sleep Questionnaire (e.g., the correlation between Extraversion and

total sleep time is $-.15$ for the daily sleep diary and $-.17$ for the Sleep Questionnaire).

Sleep Behaviors Listing. In an open-ended manner, participants indicate their activities when experiencing trouble sleeping. Responses are scored by coders trained to a minimum of 70% interrater agreement in accordance with a manual (Creti, Fichten, Lennox, & Libman, 1994) into 20 behavior categories (e.g., have an alcoholic drink, pray, and read). Total scores reflect the number of different sleep behaviors noted. Our data show that poor sleepers indicated that they engaged in a greater variety of activities (i.e., they had higher scores) than did good sleepers (Fichten et al., 1995).

Sleep Behaviors Scale: 60+. This measure was developed in the present investigation. It is based on data from the open-ended Sleep Behaviors Listing obtained in a previous study (Fichten et al., 1995; Fichten et al., 1997). Using a 5-point scale from *never or hardly ever* (0) to *very often* (4), respondents rate how often they engage in each of 30 activities when having problems falling asleep or getting back to sleep at night.

Measures Eliciting Thoughts and Feelings During Nocturnal Awake Times

Presleep Arousal Scale. Sixteen 5-point rating scales assess the phenomenology of nocturnal awake times. Two scores are derived: Somatic (e.g., "a tight tense feeling in your muscles") and Cognitive (e.g., "thoughts keep running through your head"). Nicassio, Mendlowitz, Fussell, and Petras (1985) showed good psychometric properties for this scale. The subscales were shown to be internally consistent and stable over time. Means for insomniacs were significantly higher than those for normal sleepers on 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 individuals were more modest: For the Somatic Arousal subscale, $r = .36, p < .01$; for the Cognitive subscale, $r = .52, p < .01$. Higher scores indicate greater arousal.

Tension Thermometer. A single item developed by our team asks, "When you are lying in bed trying to fall asleep, on a scale of 0 to 100, how tense do you generally feel?" Responses are provided on an 11-point scale from 0 (*not at all tense*) to 100 (*very tense*), with ratings made at 10-point intervals. Our data indicate reasonable temporal stability for the measure, $r = .67, p < .001$, and the pattern of correlations between scores on this measure and relevant sleep variables shows logical, highly significant relationships (Fichten et al., 1995; Fichten et al., in press). Higher scores indicate greater tension.

Anxious Self-Statement Questionnaire (ASSQ). The frequency of anxious self-talk is evaluated by this 32-item self-report measure. Kendall and Hollon (1989) indicated that reliability for the questionnaire is acceptable (split-half reliability was .92, and 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 indicated acceptable temporal stability in this context, $r = .69, p < .001$.

Overall Thought Pleasantness Rating. 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, $r = .63, p < .001$, and validity data reported elsewhere (Fichten et al., 1995; Fichten et al., 1997) suggest acceptable psychometric properties for research.

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., in press). Using a 5-point scale from *never or hardly ever* (0) to *very often* (4), respondents indicate how often during periods of wakefulness they experience each of 17 positive thoughts (e.g., "enjoyable things I did during the past few

days") and 17 negative thoughts (e.g., "poor health of family members or friends"). Positive and Negative frequency scores are each summed. Scores are reported as valenced (Positive and Negative) thought frequencies and as Schwartz and Garamoni's (1986, 1989) States of Mind (SOM) Ratio: Positive/(Positive + Negative). Higher scores indicate more frequent positive or negative thoughts. Higher SOM scores indicate more adaptive thinking. Our findings show good psychometric properties for this test. Both subscales have high internal consistency ($\alpha = .90$) and reasonable temporal stability ($r_s = .76-.91$); they have also been shown to manifest good criterion, convergent, and discriminant validity and to distinguish good sleepers from high- and low-distress poor sleepers (Fichten et al., in press).

Psychological Adjustment Measures

Brief Symptom Inventory (BSI; Derogatis, Rickels, & Rock, 1976). A brief (53 items) self-report psychological symptom inventory, the BSI has subscales for nine symptom dimensions and three global indexes. It is a brief version of the Symptom Checklist-90 (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 older sample were provided by Hale, Cochran, and Hedgepeth (1984). In the present investigation, one symptom score (Depression) and one global score (Global Severity Index) were used. 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. Higher scores indicate greater neuroticism and extraversion.

Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990). On 16 items respondents indicate, using a 5-point scale, how well each statement describes them. Internal consistency evaluations obtained in the eight validation studies conducted by the questionnaire's authors yielded coefficient alpha scores ranging from .91 to .95. Test-retest reliability coefficients ranged from .74 to .92. Data provided by the scale's authors concerning concurrent and criterion group validity were acceptable. A recent validation study provides support for the use of this measure with older individuals (Beck, Stanley, & Zebb, 1995). Higher scores indicate a more worrying personality style.

Life Events Scale (Siegal, 1990). This is a 10-item checklist of potentially stressful major life events experienced by older individuals (e.g., retirement and the death of a close friend). Respondents indicate which of these events they experienced in the last 6 months. This measure has been used with an older sample where stress response was shown to vary with certain personal environmental factors (Siegal, 1990). Higher scores indicate a greater number of stressful life events. In the present investigation, a modified version was used that included 2 additional items: "personal major illness or injury" and "none of the above." The latter was included to confirm that participants had read the questionnaire and none of the items had applied to them. Scores on the measure were prorated (out of 10) to render them comparable with Siegal's (1990) data.

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

Poor sleepers were those who met the usual criteria used by insomnia researchers for the diagnosis of a disorder of initiating or maintaining sleep (30 min of undesired awake time at least three times per week for at least 6 months) and whose Sleep Questionnaire responses indicated both a relatively high Sleep Difficulty: Frequency of Problem

Episodes score (4 or higher) and a relatively high subjective rating on Sleep Difficulty: Occurrence of Sleep Problems (6 or higher). Data on seniors from an unpublished study conducted by our team in which a somewhat less stringent version of these criteria was used indicated that 82% of participants grouped as poor sleepers answered "yes" to the question "Do you have insomnia?"

High-distress poor sleepers were poor sleepers whose subjective Sleep Distress: Level of Distress score was 6 or higher (i.e., above the midpoint of the scale) and whose Sleep Distress: Frequency of Distress Episodes score was at least 9 (i.e., a minimum of 9 distress episodes per week out of a possible 21, indicating at least 3 very upsetting nights per week). Low-distress poor sleepers were poor sleepers whose scores on two items indicated relatively low distress: Their subjective Sleep Distress: Level of Distress score fell below the midpoint on the scale (5 or lower), and their Sleep Distress: Frequency of Distress Episodes score was 8 or lower (i.e., fewer than 3 upsetting nights per week).

Unpublished data from our laboratory indicate that in an unselected sample of older poor sleepers, low-distress participants typically took sleep medication an average of 1 day every 2 weeks, whereas high-distress poor sleepers took sleep medication twice a week, $t(150) = 3.94, p < .001$. In addition, whereas 77% of the low-distress poor sleepers took no sleep medication (and only 2% took sleep medication every day), among the high-distress poor sleepers 55% took no sleep medication and 17% took sleep medication daily. In addition, sleep medication was taken an average of .59 times per week by low-distress poor sleepers and 1.95 times per week by high-distress poor sleepers, $t(150) = 3.94, p < .001$.

Good sleepers were individuals who failed to meet the criteria for diagnosis of a disorder of initiating or maintaining sleep and who met the following requirements: They had a Sleep Difficulty: Frequency of Problem Episodes score of 3 or lower, a subjective Sleep Difficulty: Occurrence of Sleep Problems score below the midpoint of the scale, a Sleep Distress: Frequency of Distress Episodes score below 3, and a subjective Sleep Distress: Level score of 3 or lower. Data from an unpublished study in which a somewhat less stringent version of these criteria was used indicated that 94% of participants grouped as good sleepers answered "no" to the question "Do you have insomnia?"

Medium-quality sleepers had elements of both good and poor sleep. These criteria for classifying sleep status yielded very good and very poor sleepers in our contrast groups. Longitudinal data indicate that membership in these sleep status groups is reasonably stable over a 2-year period (Libman et al., 1997).

Participants and Procedure

Participants were 375 individuals (115 men and 260 women) with a mean age of 68 years (range = 55–89). They were participating in a larger investigation of sleep and aging and 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) volunteering to participate, (b) being 55 or older, (c) being a community resident, and (d) having sufficient intellectual and language skills to complete the measures. Approximately two thirds of the participants in all sleep status groups belonged to university or college seniors' groups, making this an unusually well-educated sample. Little information was available on the physical health status of most of the participants; a minority had been screened for major health problems as part of a larger ongoing investigation. Participants completed measures either in a seniors' group context or at home. They were instructed to provide answers concerning their usual practices and to base their responses on a typical week.

Polysomnography was not carried out for several reasons, including the expense as well as the burdensome nature of this type of evaluation for seniors. In addition, it has been shown that self-reports and objectively measured sleep parameters are generally highly correlated (e.g., Hoch et al., 1987; Kryger, Steljis, Pouliot, Neufeld, & Odynski, 1991).

Perhaps more important, however, insomnia is not a hidden disease entity that requires indirect tests for verification. It is the self-report of troubled sleep that is of primary interest in assessing and treating insomnia.

Participants completed measures that evaluated demographics, sleep and sleep-related characteristics, thoughts and feelings during nocturnal awake times, and psychological adjustment. All participants completed a test battery composed of the Sleep Behaviors Scale: 60+, the Background Information Form, the Sleep Questionnaire, the Tension Thermometer, the Overall Thought Pleasantness Rating, and the SST:60+. A series of subsamples completed additional measures that were determined primarily by the requirements of the larger investigation as well as by participants' availability. One hundred sixty-four of the participants completed the Sleep Behaviors Listing. Eighteen of the participants (7 men and 11 women, mean age = 66.60, range = 55–86), including both good and poor sleepers, completed the Sleep Behaviors Scale: 60+ at a second testing 4 weeks later. In addition, 143 of the participants completed the following measures in our laboratory at a different testing time: the Presleep Arousal Scale, the ASSQ, the BSI, the EPI, the Penn State Worry Questionnaire, and the Life Events Scale.

Of the 375 participants who completed the Sleep Behaviors Scale: 60+, 163 met the criteria for good sleeper status, and 104 met the criteria for poor sleeper status. The remaining 108 participants were designated medium-quality sleepers, because they had elements of both good and poor sleep. Forty-nine participants met the criteria for low-distress poor sleeper status, and 28 met the criteria for high-distress poor sleeper status; the remaining 29 poor sleepers had elements of both high and low distress. The sex ratio in all samples was approximately 2:1 women to men.

The three groups differed slightly, but significantly, on age, $F(2, 226) = 3.36, p < .05$. Tukey's honestly significant difference (HSD) test indicated that low-distress poor sleepers ($M = 69.62$) were significantly ($p < .05$) older than good sleepers ($M = 66.57$). High-distress poor sleepers ($M = 67.98$) did not differ significantly from either group. Poor sleepers had experienced insomnia for a mean of 14 years (range = 1–63); there was no significant difference between high- and low-distress poor sleepers on this variable.

The scores of the good sleepers and the low-distress and high-distress poor sleepers on the sleep parameters are presented in Table 1. These indicate that good sleepers experienced considerably better sleep than either group of poor sleepers; for example, they reported sleeping approximately 1¼ hr more than poor sleepers. The results of a multivariate analysis of variance (MANOVA) and a series of one-way analysis of variance comparisons (ANOVA) on these variables were all highly significant ($p < .001$). Tukey HSD test results, with alpha level set at .05, showed that on all three key variables related to time (total sleep time, total wake time, and sleep efficiency), the scores of poor sleepers—both high and low distress—were significantly different from those of good sleepers. The same was true for the incidence of sleep difficulty and for sleep distress. Although the worst scores on all variables were obtained by high-distress poor sleepers, differences between high- and low-distress poor sleepers, compared with good sleepers, were relatively small—except, of course, for the distress grouping variables.

Results

Sleep Behaviors

Table 2 provides information on the frequencies of various sleep behaviors identified on the Sleep Behaviors Scale: 60+. Responses of poor sleepers and good sleepers are reported separately. Means and rank order information indicate that good sleepers reported engaging in all behaviors less frequently than did poor sleepers, except for "Pray"—a relatively infrequent behavior—and that there was generally similar rank ordering of behaviors by good and poor sleepers. However, there were

Table 1
Sleep Parameters: Mean Scores of Good Sleepers and High- and Low-Distress Poor Sleepers

Variable	Poor sleepers			Tukey's HSD test
	Good sleepers	Low distress	High distress	
Time				
Total sleep time (hr)	7.13	5.58	5.17	High = low < good*
Total wake time (hr) ^a	0.25	2.62	4.06	High > low > good*
Sleep efficiency (%) ^b	92	69	64	High < low < good*
Sleep difficulty				
Frequency of problem episodes (0-21/week)	1.04	10.12	14.23	High > low > good*
Occurrence of sleep problems (1-10) ^c	1.68	7.69	8.54	High > low > good*
Sleep distress				
Frequency of distress episodes (0-21/week)	0.58	3.83	12.92	High > low > good*
Level of distress (1-10) ^d	1.31	2.86	8.04	High > low > good*

Note. All one-way analysis of variance (Group: good sleepers, low-distress poor sleepers, or high-distress poor sleepers) were significant at the .01 level or better. HSD = honestly significant difference.

^aTotal wake time was the result of summing three daily wake times (sleep onset latency, waking after sleep onset, and early-morning wakefulness). ^bSleep efficiency was calculated by dividing total sleep time by the sum of total sleep time and total wake time. ^c1 = very rarely; 10 = very often. ^d1 = not at all; 10 = very much.

* $p < .05$.

some interesting discrepancies between these two groups. First, good sleepers reported "Lie in bed quietly" and "Rest and relax" as their two most preferred activities during nocturnal wakefulness, whereas poor sleepers ranked "Go to the toilet" and "Toss and turn" as their two most frequent nocturnal behaviors. Second, although poor sleepers were substantially more likely to report "Worrying" than were good sleepers, the two groups were quite similar on "Think pleasant thoughts," suggesting that the balance between positive and negative thoughts is important in distinguishing poor from good sleepers.

Factor Structure

Because poor sleepers reported more frequent and diverse sleep behaviors than did good sleepers, the subscale structure for the Sleep Behaviors Scale: 60+ was determined by carrying out an exploratory principal-components analysis on the scores of the 104 poor sleepers. A three-factor solution with varimax rotation had factor loadings greater than .30 for 24 of the 30 items, and explained a cumulative 32.4% of the variability in scores. We set the cutoff at .30 rather than the more conventional .40 in order to include as many items as possible. Items were assigned to the factor where loading was highest. Factor 1 (11 items), which measured generalized Active Behaviors, explained 13.6% of the variability, Factor 2 (8 items)—Relaxation—explained an additional 11.1%, and Factor 3 (5 items), which assessed Cognitive Arousal, explained a further 7.7%. Table 3 presents information on items with a loading of .30 or greater on the three factors as well as a fourth subscale, Medication, which included 2 items that dealt with using medication to help with sleep.

Subscales

Scoring for each of the four subscales—Active Behaviors, Relaxation, Cognitive Arousal, and Medication—involved sum-

ming the scores on the items that belonged to the subscale. The total score was the sum of all 30 items; the minimum possible score was 0, and the maximum 120. Coefficients indicated that all subscale scores correlated substantially and significantly with total scores ($r_s = .28-.72$) and that low to modest positive correlations existed among subscales ($r_s = .03-.38$), suggesting that the factors were relatively independent. It is noteworthy that correlations between the four subscale scores and the single items "Go to toilet" and "Drink: noncaffeinated" were all significant ($r_s = .13-.29$).

Reliability

In order to determine internal consistency, Cronbach's alphas were computed for the subscales. In addition, correlations between the subscales and the total were computed for all participants. Results indicated reasonably good reliability: Active Behaviors, $\alpha = .74$; Relaxation, $\alpha = .72$; Cognitive Arousal, $\alpha = .68$; Medication item-total correlations were .85 and .68 (both $p_s < .01$). Cronbach's alpha for the whole scale was .80, and Subscale-Total correlations ($r = 373$) were all significant at the .01 level. Indeed, even correlations between the four single items and the total score were significant.

Temporal stability data show that test-retest scores obtained 1 month apart were all highly and significantly ($p < .01$) related. Pearson product-moment correlation coefficients were as follows: For the whole scale, $r = .85$; for Active Behaviors, $r = .83$; for Relaxation, $r = .76$; for Cognitive Arousal, $r = .94$; and for Medication, $r = .79$. These coefficients compare favorably with findings on the temporal stability of established measures in our population of older adults.

Validity

Construct validity estimates were obtained as follows. First, good sleepers' scores were compared with those of high- and

Table 2
Rank Ordering of Items on the Sleep Behaviors Scale: 60+

Sleep behavior (item no.)	Whole sample	Good sleepers		Poor sleepers		<i>t</i> (265)	<i>p</i> < ^b
		Rank	Mean score ^a	Rank	Mean score ^a		
Lie in bed quietly (21)	1	1	2.26	3	2.42	1.06	
Rest and relax (get comfortable) (16)	2	2	2.23	4	2.42	1.24	
Go to the toilet (19)	3	3	1.85	1	2.71	6.03	.000
Try to change thoughts (forget problems, try not to worry) (14)	4	7	1.61	5	2.22	3.98	.000
Think pleasant thoughts (13)	5	4	1.83	8	1.95	.89	
Lie very still (22)	6	6	1.61	9	1.89	1.70	
Read (23)	7	5	1.74	6	2.09	1.82	
Toss and turn (18)	8	8	1.25	2	2.53	9.06	.000
Worry (feel anxious, tense) (17)	9	10	.99	7	2.03	7.88	.000
Work on personal problems (12)	10	9	1.06	10	1.45	2.75	.006
Listen to music (26)	11	12	.85	12	1.24	2.42	.016
Actively try to relax (meditation, yoga, relaxation exercises, deep breathing, etc.) (30)	12	13	.72	14	1.11	2.61	.009
Listen to radio talk shows, interviews, or plays (25)	13	17	.57	11	1.30	4.46	.001
Pray (11)	14	11	.94	24	0.56	2.43	.016
Listen to radio (whatever happens to be on) (27)	15	20	.55	16	1.05	3.39	.001
Drink something noncaffeinated (water, 7-Up, herbal tea, etc.) (7)	16	14	.67	13	1.16	3.45	.001
Drink milk (5)	17	19	.59	17	1.01	3.08	.002
Watch TV (24)	18	16	.58	15	1.06	3.26	.001
Image a scene (beach, dark hole, etc.) (8)	19	18	.59	18	0.95	2.63	.009
Eat (3)	20	15	.64	20	0.82	1.45	
Do something monotonous or repetitive (repeat words, count, etc.) (9)	21	22	.38	21	0.75	3.10	.002
Do something active (work, bake, knit, clean, etc.) (15)	22	21	.53	19	0.84	2.35	.020
Take prescription medication to help with sleep (Ativan, Valium, painkillers with codeine, etc.) (1)	23	25	.21	22	0.72	4.64	.000
Take a hot bath (20)	24	26	.19	23	0.70	4.70	.000
Drink something caffeinated (coffee, cola, regular tea, etc.) (6)	25	23	.29	25	0.44	1.41	
Listen to relaxing sounds (sound of waves, etc.) (29)	26	24	.22	27	0.38	1.81	
Take nonprescription medication to help with sleep (Nytol, Sominex, Gravol, Contac-C, antihistamines, 222s, aspirin, etc.) (2)	27	28	.16	28	0.38	2.73	.007
Think about word puzzles or games (10)	28	27	.18	26	0.42	2.71	.007
Drink something alcoholic (4)	29	29	.14	29	0.28	1.93	
Listen to taped books, plays, etc. (28)	30	30	.09	30	0.11	.36	

Note. Boldface indicates notable findings.

^a On a 5-point scale from *never or hardly ever* (0) to *very often* (4). ^b After a Bonferroni correction to the alpha level, *t* values with *p* < .0017 remained significant.

low-distress poor sleepers. Next, scale scores were compared with scores on the open-ended Sleep Behaviors Listing. Finally, relationships between scale scores and sleep parameters, daytime psychological adjustment, and thoughts and feelings during nocturnal awake times were evaluated.

Table 4 shows that, with the exception of the Relaxation subscale, good sleepers had substantially and significantly lower scores than did high- and low-distress poor sleepers. There were large differences among groups, even on the four single items. High- and low-distress poor sleepers were not found to differ significantly, with the exception of performance on the Cognitive Activities subscale, on which the high-distress group had significantly higher scores than did the low-distress group.

Because of the possibility that differences between groups on the ANOVAs were due to differences in sleep problem severity, a series of analysis of covariance comparisons was made on

Sleep Behavior Scale: 60+ variables, using sleep efficiency (total sleep time/total bed time) as the covariate. The results remained essentially unchanged, although the significance levels were lower. The only notable difference found was that the good sleepers' mean score for "Drink alcohol" was significantly (*p* < .05) lower than that of the low-distress poor sleepers.

One hundred sixty-four of the participants, including 60 good sleepers and 61 poor sleepers, completed the open-ended Sleep Behaviors Listing. This task has numerous limitations, such as the fact that few behaviors are listed (e.g., the mean number of sleep behaviors listed was 1.41, with a minimum of 1 and a maximum of 4). Nevertheless, to provide comparative data and thereby further validate the Sleep Behaviors Scale: 60+, we carried out a one-way ANOVA (three groups) on Sleep Behaviors Listing total scores. As was the case for the Sleep Behaviors Scale: 60+ total score, good sleepers indicated significantly

Table 3
Factor Loadings and Subscales of the Sleep Behaviors Scale: 60+

Sleep behavior (item no.)	Active Behaviors (11 items)	Relaxation (8 items)	Cognitive Arousal (5 items)	Medication (2 items)
Listen to radio (whatever happens to be on) (27)	.72			
Listen to music (26)	.70			
Listen to radio talk shows, interviews, or plays (25)	.64			
Eat (3)	.59			
Watch TV (24)	.56			
Take a hot bath (20)	.53			
Drink something caffeinated (coffee, cola, regular tea, etc.) (6)	.46			
Listen to taped books, plays, etc. (28)	.44			
Read (23)	.40			
Do something active (work, bake, knit, clean, etc.) (15)	.40			
Drink milk (5)	.30			
Think pleasant thoughts (13)		.69		
Rest and relax (get comfortable) (16)		.68		
Lie very still (22)		.66		
Lie in bed quietly (21)		.64		
Actively try to relax (meditation, yoga, relaxation exercises, deep breathing, etc.) (30)		.63		
Imagine a scene (beach, dark hole, etc.) (8)		.56		
Listen to relaxing sounds (sound of waves, etc.) (29)		.39		
Do something monotonous or repetitive (repeat words, count, etc.) (9)		.34		
Worry (feel anxious, tense) (17)			.72	
Toss and turn (18)			.69	
Work on personal problems (12)			.58	
Try to change thoughts (forget problems, try not to worry) (14)			.55	
Pray (11)			.40	
Take prescription medication to help with sleep (Ativan, Valium, painkillers with codeine, etc.) (1)				×
Take nonprescription medication to help with sleep (Nytol, Sominex, Gravol, Contact-C, antihistamines, 222s, aspirin, etc.) (2)				×
Single items not part of subscales				
Go to the toilet (19)				
Drink something noncaffeinated (water, 7-Up, herbal tea, etc.) (7)				
Drink something alcoholic (4)				
Think about work puzzles or games (10)				

Note. Instructions for completing the measure were as follows: "When you have a problem falling asleep or getting back to sleep at night, HOW OFTEN DO YOU DO EACH OF THE FOLLOWING? Answer according to the scale below: 0 = *never or hardly ever*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*." Factor loadings of all items on all factors are available upon request.

fewer sleep behaviors ($M = 1.20$, $SD = .45$) than did either low-distress ($M = 1.53$, $SD = .82$) or high-distress ($M = 1.48$, $SD = .62$) poor sleepers, $F(2, 102) = 3.07$, $p < .05$. Low- and high-distress poor sleepers did not differ significantly.

We also correlated subscale scores based on the two measures. To do this, we made subscales for the Sleep Behaviors Listing that were similar to the subscales of the Sleep Behaviors Scale: 60+. Given the limitations of open-ended listings, this was done on a binary (yes/no) basis. For example, if participants reported engaging in any one of the behaviors that make up the Active Behaviors subscale, they were deemed to have engaged in active behaviors (otherwise, they were deemed not to have engaged in active behaviors). The same was done for the Relaxation, Cognitive Arousal, and Medication subscales, resulting in scores of 0 or 1 for each participant. Correlations between Sleep Behaviors Scale: 60+ and Sleep Behaviors Listing subscales indicated that the closest fit (i.e., highest positive correlation) in all cases existed between equivalent subscales on the two measures: For Active Behaviors, $r = .39$, $p < .001$;

for Relaxation, $r = .20$, $p < .05$; for Cognitive Arousal, $r = .21$, $p < .01$; and for Medication, $r = .13$, $p < .10$.

The relationship between scores on the Sleep Behaviors Scale: 60+ and scores on sleep parameters and measures of daytime psychological adjustment and nocturnal thoughts and feelings were evaluated for the whole sample. Results in Table 5 show that scores on all sleep parameters were modestly but significantly related to three of the four subscales—Active Behaviors, Cognitive Arousal, and Medication—as well as to the single item "Go to toilet" (other single items showed generally low, nonsignificant relationships). The strongest relationship was between sleep parameters and Cognitive Arousal, indicating that people with particularly problematic sleep were more likely to engage in the activities that form this subscale. As was the case with the ANOVA comparisons, findings on the Relaxation subscale were not as clear-cut.

Correlations with psychological adjustment and with nocturnal thoughts and feelings (Table 5) indicated that (a) scores on the Cognitive Arousal subscale were related significantly to

Table 4
Mean Scores of Good Sleepers and High- and Low-Distress Poor Sleepers on the Sleep Behaviors Scale: 60+

Variable	Poor sleepers			<i>F</i> (2, 237)	Tukey's HSD
	Good sleepers	Low distress	High distress		
Total					
<i>M</i>	25.40	37.00	37.12	25.26***	Good < low = high*
<i>SD</i>	11.48	12.21	12.92		
Subscale					
Active Behaviors					
<i>M</i>	6.63	11.40	10.21	13.76***	Good < low = high*
<i>SD</i>	5.36	7.23	7.90		
Relaxation					
<i>M</i>	9.72	11.65	10.75	2.62	
<i>SD</i>	4.98	5.22	6.14		
Cognitive Arousal					
<i>M</i>	5.88	8.13	10.45	21.52***	Good < low < high*
<i>SD</i>	3.76	3.36	4.22		
Medication					
<i>M</i>	.37	1.14	1.21	13.42***	Good < low = high*
<i>SD</i>	.90	1.41	1.55		
Items					
"Go to the toilet" (19)					
<i>M</i>	1.82	2.63	2.57	12.73***	Good < low = high*
<i>SD</i>	1.14	1.14	1.17		
"Drink something noncaffeinated" (7)					
<i>M</i>	.65	1.08	1.11	4.24*	Good < low = high*
<i>SD</i>	1.01	1.28	1.20		
"Drink alcohol" (4)					
<i>M</i>	.14	.23	.43	3.40*	Good < high*
<i>SD</i>	.44	.65	.88		
"Think about word puzzles or games" (10)					
<i>M</i>	.20	.48	.50	4.20*	Good < low = high*
<i>SD</i>	.60	.94	1.04		

Note. Total score varied from 0 to 120. For single item scores, the minimum was 0, and the maximum was 4. Boldface indicates notable findings. HSD = honestly significant difference.

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

scores on all measures of poor adaptation, both daytime and nocturnal; (b) Medication use was related primarily to measures of poor nocturnal adaptation; (c) engaging in Relaxation was related most closely to the frequency of positive thoughts (although the frequency of positive thinking was significantly and positively related to other Sleep Behaviors Scale: 60+ subscale scores as well); and (d) engaging in Relaxation was, generally, *not* related to poor adjustment. It is particularly noteworthy that (e) the frequency of positive thoughts was substantially more closely related to Relaxation than to Cognitive Arousal, while the opposite was true for negative thoughts and that (f) Cognitive Arousal, compared with Active Behaviors, was more closely related to the Cognitive subscale of the Pre-Sleep Arousal Scale, while Active Behaviors were more closely related to the Pre-Sleep Arousal Somatic subscale than was Cognitive Arousal.

None of the demographic or lifestyle variables evaluated—age, life events, bedtime, arising time, and nap frequency—was related significantly to any Sleep Behaviors Scale: 60+ score.

Correlations between scores on "Go to toilet" and sleep parameters, psychological adjustment, and nocturnal thoughts and feelings were also generally significant; the correlation with frequency of negative thoughts was the highest. To investigate the direction of mediation, we computed two series of partial correlations. In one series, the effects of negative thoughts were partialled out, and in the other the effects of "Go to toilet" were

partialled out. Results indicated that (a) when controlling for "Go to toilet," there were strong relationships between negative thoughts and sleep parameters, psychological adjustment, and nocturnal thoughts and feelings and (b) when negative thoughts were controlled for, there were generally significant but substantially lower correlations between "Go to toilet" scores and sleep parameters and nonsignificant relationships between "Go to toilet" and psychological and nocturnal adjustment.

Discussion

The goal of the present investigation was to identify behaviors enacted during periods of nocturnal wakefulness and to further our understanding of the role of nighttime activities in the experience of insomnia. To carry out this study, we developed the Sleep Behaviors Scale: 60+. The reliability of the scale compares favorably with that of established measures. Validity was demonstrated by the clear differences on subscale scores between good and poor sleepers and by the relationship of subscale items to sleep/insomnia parameters as well as to psychological adjustment and nocturnal thoughts and feelings. As a result of this necessary preliminary step, a measure that has both clinical and research applications has now been added to the sleep/insomnia literature.

The findings indicate that although good sleepers engage less

Table 5
Relationship Between Sleep Behaviors and Sleep Parameters, Psychological Adjustment, and Thoughts and Feelings During Nocturnal Wake Times

Variable	Subscale				
	Active Behaviors	Relaxation	Cognitive Arousal	Medication	"Go to the toilet"
Sleep parameter					
Time					
Total sleep time	-.24**	-.06	-.14**	-.14**	-.15**
Total wake time	.20**	.15*	.30**	.20**	.27**
Sleep efficiency	-.23**	-.16**	-.30**	-.21**	-.28*
Sleep difficulty					
Frequency	.22**	.09	.33**	.27**	.26**
Occurrence	.26**	.16**	.31**	.27**	.26**
Sleep distress					
Frequency	.13*	.09	.32**	.29*	.26**
Level	.12*	.14**	.35**	.27**	.24**
Psychological adjustment					
Overall psychopathology (BSI)	.14	.12	.33***	.06	.20*
Depression (BSI)	.06	.05	.27***	.12	.19*
Neuroticism (EPI)	.22*	.09	.36***	.17	.27**
Worry (Penn State Worry Questionnaire)	.16	.06	.43***	.24**	.30***
Thoughts and feelings during nocturnal awake times					
Anxious Self-Statements (ASSQ)	.12	.08	.31***	.20*	.15
Cognitive arousal (<i>Pre-Sleep Arousal Scale</i>)	.23**	.20*	.52***	.31***	.28***
Somatic arousal (<i>Pre-Sleep Arousal Scale</i>)	.35***	.05	.22**	.18*	.23**
Tension (Tension Thermometer)	.12*	.04	.46***	.27**	.25**
Thought Pleasantness (Overall Thought Pleasantness Rating)	-.08	.03	-.27***	-.17***	-.17***
Positive thought frequency (SST: 60+)	.26***	.40***	.28***	.06	.13*
Negative thought frequency (SST: 60+)	.29***	.20***	.62***	.30***	.33***
States of Mind ratio (SST: 60+)	-.05	.10	-.32***	-.17***	-.18***

Note. Boldface and italics indicate notable findings. Sample sizes varied from 115 to 375. BSI = Brief Symptom Inventory; EPI = Eysenck Personality Inventory; ASSQ = Anxious Self-Statement Questionnaire; SST: 60+ = Self-Statement Test: 60+.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

frequently in virtually all nocturnal behaviors than do poor sleepers—obviously, because they spend less time awake during the night—they still manifest a similar range of behaviors in a similar rank ordering of frequency. However, when they find themselves awake during the night, good sleepers are most likely to lie in bed quietly or rest and relax; whereas poor sleepers most frequently go to the toilet or toss and turn.

A consistent difference between good and poor sleepers, both in the present investigation and in other studies of sleep and aging, involves having to go to the toilet (e.g., Kales et al., 1984). Indeed, in the present study, scores on this single item were closely related to all variables, including sleep behaviors, sleep parameters, daytime psychological adjustment, and adaptation during nocturnal awakenings. Clearly, the role of going to the toilet in insomnia deserves further examination (Asplund & Aberg, 1992; Friedman, Bliwise, Tanke, Salom, & Yesavage, 1992). Although it is possible that once people awaken during the night, they choose to go to the toilet, it is also possible that the need to urinate wakes people up. Getting out of bed and going to the toilet may result in a more complete awakening. Those who have anxious, worrying personality styles may then be more likely to engage in those behaviors that form the Cognitive Arousal subscale (e.g., toss and turn, worry, and work on personal problems), thereby perpetuating the sleepless state.

Certainly, the findings on partial correlations suggest that once people are awake, it is the negative thinking that mediates the effects of having to go to the toilet on sleep parameters as well as on nocturnal thoughts and feelings.

It has often been suggested that people with insomnia engage in poor sleep hygiene practices, such as drinking too much coffee and alcohol. Our findings indicate no significant difference in either coffee or alcohol consumption between good and poor sleepers; this is similar to others' findings (e.g., Adam et al., 1986; Gourash-Bliwise, 1992; Morgan et al., 1989). Nevertheless, it is still possible that these substances are associated with perpetuating sleep problems in predisposed individuals.

When low- and high-distress poor sleepers and good sleepers were compared on Sleep Behaviors Scale: 60+ subscales and single items, the two groups of poor sleepers resembled each other on almost all variables, and both differed from good sleepers. An exception to this pattern was seen in the scores on the Cognitive Arousal subscale: Highly distressed poor sleepers clearly had substantially higher scores than did minimally distressed poor sleepers. Thus, the items that make up this subscale are associated with the distress related to insomnia, not merely with the presence of disrupted sleep. Scores on the Cognitive Arousal subscale were also related to poor daytime and nighttime adjustment. This is consistent with findings that show that

(a) minimally distressed poor sleepers manifest significantly less psychological maladjustment and negative affect than do highly distressed poor sleepers (Fichten et al., 1995; Lavidor et al., 1996) and (b) a higher frequency of cognitive activity, negative activity in particular, characterizes people who complain of insomnia (e.g., Fichten et al., 1997; Kales et al., 1984). Thus, the findings support our hypothesis that the low-distress poor sleepers are generally coping well with their substantial sleep disruption. The results also provide further support for our cognitive model of insomnia by demonstrating that distress about one's insomnia is related to maladaptive behaviors and affect and by showing that cognitive arousal and negative thinking are at the core of insomnia-related distress.

It is notable that although high scores on all Sleep Behavior Scale: 60+ subscales and items are related to poor sleep, high scores on the Relaxation subscale do not indicate insomnia-related distress, but rather more adaptive coping. Although poor sleepers in the present investigation were more likely to engage in all kinds of sleep behaviors, good and poor sleepers did not differ on the frequency of engaging in relaxing behaviors. Indeed, there was a nonsignificant tendency for poor sleepers who reported little distress to be more likely to relax than poor sleepers who reported high distress. In addition, whereas scores on the Relaxation subscale were most closely related to the frequency of positive thoughts experienced during the night, scores on the Cognitive Arousal subscale were most closely related to the frequency of negative thoughts.

Our model is concerned with the *complaint* of insomnia. Because we did not directly measure complaining, but measured "distress" instead, an anonymous reviewer asked what basis we had for assuming that highly distressed poor sleepers were more likely to complain than were their minimally distressed counterparts. Our findings suggest that medication use is specifically related to negative thoughts and feelings, especially during the night, and that highly distressed poor sleepers use medication significantly more frequently than do low-distress poor sleepers. If medication use implies physician visits, then an indirect argument for insomnia distress as equivalent to insomnia complaint can be made. Nevertheless, in future research the issue of complaint should be addressed more directly and a more representative sample of seniors should be recruited.

The present study provides a reliable and valid measure of sleep behaviors during nocturnal wakefulness in older individuals. Relative scores on this measure by good sleepers, poor sleepers who are highly distressed by their insomnia, and poor sleepers who are minimally distressed by their insomnia suggest specific, objectively based mechanisms by which insomnia intervention strategies may work. For example, although this study is correlational in nature and thus causation cannot be demonstrated, the findings do suggest that when dealing with patients complaining of insomnia, it might be useful to evaluate the frequency of nocturnal activities represented in the Cognitive Arousal subscale (e.g., worrying, tossing and turning, and working on personal problems). If the frequency of these activities is high, therapeutic efforts may be directed at diminishing them. Similarly, behaviors incorporated in the Relaxation subscale (e.g., active relaxation, imagery, and listening to relaxing sounds) should be examined. If the frequency of such activities is found to be low, promoting such activities may be considered. Some of the active behaviors engaged in by good sleepers (e.g.,

listening to the radio, watching television, reading, eating, drinking, and engaging in activities out of bed) are oft-used strategies in insomnia intervention programs and have demonstrated usefulness. Thus, both decreasing activities that lead to cognitive arousal and increasing those involved in relaxation and active behaviors may be necessary. The newly developed Sleep Behaviors Scale: 60+ may be used to assess the insomnia complaint. Examination of scores on the scale can suggest components to be included in the treatment, so that therapy may be tailored to the individual's specific needs.

Finally, we wish to stress that the relationship between cognitive arousal and psychological maladjustment implicates daytime contributors to insomnia, such as anxiety; tension; and an anxious, worrying style. Thus successful treatment for insomnia may require changes not only in maladaptive activities during the night and poor sleep hygiene practices during the day, but also in maladaptive daytime thoughts and feelings. In this way both predisposition as well as perpetuation of distressing insomnia in older persons may be addressed.

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