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Long Sleepers Sleep More and Short Sleepers Sleep Less: A Comparison of Older Adults Who Sleep Well

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To determine some of the risks and benefits of being a long or short sleeper, psychological adjustment, lifestyle, and sleep parameters were investigated in 239 older adults. Responses of people who slept well and who were either long or short sleep-

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ers were studied on 48 variables investigating sleep parameters and sleep-related affect and beliefs; daytime fatigue and sleepiness; demographic factors, including age, sex, and income satisfaction; sleep lifestyle factors, including naps, bedtimes, arising times, and the regularity of these; general lifestyle factors, including regularity of mealtimes, overall daytime pleasantness, perceived busyness, diversity and valence of daily activities, and potentially stressful major life events. In addition, 14 variables evaluated aspects of psychological adjustment, including cognitive and somatic arousal, nocturnal tension, anxious, negative, unpleasant and worrying self-talk, depression, anxiety, overall psychopathology, neuroticism, and life satisfaction. Overall, the results indicate that short sleepers get up earlier, spend less time in bed, and have lower sleep efficiencies than their long sleeper counterparts. They eat breakfast earlier, and of course, they sleep less. Only one of the 14 psychological adjustment variables was significant. In view of the many differences between short and long sleepers described in prior research, the lack of differences observed between long and short sleepers is noteworthy.

"Society expects their heroes to be resilient and tough. This includes the expectation that great figures will be able to get along with less than the amount of sleep normal people need" (Coren, 1996). Is it better to be a short or a long sleeper? Are we living in a period of detrimental "sleep famine," as was declaimed in a recent popular television special (ABCNEWS.com, 2002)? Or is it really unnecessary to sleep more than a certain minimum? Do "the early birds get the worm," and are people who feel they need more than 8 hr of sleep simply slothful individuals whose sleep habits cause poor health, depression, and fatigue? Should we be suggesting to people that they get more or less sleep?

The older literature over the past 30 years has attributed conflicting risks and benefits to long and short sleepers. For example, short sleepers have been shown to be more energetic (e.g., Hartmann, Baekeland, Zwilling, & Hoy, 1971) as well as more fatigued (e.g., Sexton-Radek, 1998a). Long sleepers have been shown to be less anxious and neurotic (e.g., Kumar & Vaidya, 1984; Sexton-Radek, 1998a, 1998b), more neurotic (e.g., Hartmann, 1973; Skinner, 1983), or not significantly different (Rivera, Sanchez, Vera-Villarroel, & Buela-Casal, 2001) from long sleepers. Also, there are data showing that short sleepers are more likely to report anorexic-like eating patterns (e.g., Hicks & Rozette, 1986) as well as being overweight (e.g., Hicks & Gaus, 1983). In addition, long sleepers have been shown to be more maladjusted (e.g., Hartmann et al., 1971) as well as less so (e.g., Kumar & Vaidya, 1982).

The older literature typically deals with personality and psychological adjustment characteristics. More recently, the focus has been on mortality risks. Here again, both short sleepers (less than 6 hr) and long sleepers (more than 8 or 8½ hr) appear to be at increased mortality risk (Gottlieb, Schulman, Nam, Dagostino, & Kannal, 2002; Kripke, Garfinkel, Wingard, Klauber, & Marler, 2002). Based on

such conflicting results, it is difficult to decide whether it is better to be a short or a long sleeper. Furthermore, it is unclear from the literature whether one is dealing with individual differences in sleep duration alone or with some combination of duration and sleep deprivation, psychological adjustment, or sleep phase such as "morningness" or "eveningness."

To try to answer the question for the populations we typically deal with—older adults—we felt we had to conduct our own investigation. Relying on the literature was not helpful because the findings are inconsistent, because most studies were conducted on small samples of younger and middle-aged individuals, because the very large epidemiological studies did not take into account coexisting medical conditions or voluntary sleep restriction, and because much of the research has confounded short sleep and insomnia (i.e., people complaining of insomnia were not excluded from short sleeper samples). Therefore, in this investigation we made an extensive study of the correlates of long and short sleep in a substantial sample of community-dwelling older adults who reported sleeping well.

METHOD

Procedure

The 239 participants for this investigation were selected from a larger sample of 724 individuals that included both good and poor sleepers recruited through media publicity consisting of press releases, presentations and mailings to seniors' groups, and notices in community clinics and residences for older adults. Selection criteria were (a) age 55 and over, (b) community resident, and (c) sufficient language skills to complete questionnaires. Participants completed measures in a seniors' group context, at home, or at our laboratory. Only a subsample of 62 individuals was screened for physical or psychological status or for sleep medication use.

This investigation combines data from two samples. An extensive evaluation was made on a sample of 111 individuals (Sample 1) who participated in one of our larger studies of sleep and aging (Fichten et al., 1995; Libman, Creti, Levy, Brender, & Fichten, 1997). The 111 participants completed all of the demographic measures, sleep parameters, and measures of sleep lifestyle. A subset of 62 of these participants completed all of the measures evaluating daytime functioning, lifestyle, and psychological adaptation as well. None of the 128 participants who comprised Sample 2 (recruited in a similar way; Fichten et al., 1998; Libman, Creti, Amsel, Brender, & Fichten, 1997) completed all of the demographic, sleep parameters, and lifestyle measures. They did, however, complete most of these. In addition they completed a set of psychological adaptation measures that were not completed by Sample 1 participants. Of relevance to this investigation are the following 48 variables:

- Four-measures of demographic factors, including age, sex, education, and income satisfaction (Background Information Form: Fichten et al., 1998; Libman et al., 1997).
- Seven-measures of sleep parameters and sleep-related affect and beliefs (Sleep Questionnaire: Libman et al., 1997).
- Two-measures of daytime functioning: fatigue attributed to sleep problems (Sleep Questionnaire: Fichten et al., 1998; Libman et al., 1997) and sleepiness (Stanford Sleepiness Scale: Hoddes, Zarcone, Smythe, Phillips, & Dement, 1973).
- Ten-measures of sleep lifestyle factors, including naps, bedtimes, arising times, and the regularity of these (Sleep Questionnaire: Fichten et al., 1998; Libman et al., 1997).
- Eleven-measures of lifestyle factors, including regularity of mealtimes, overall daytime pleasantness (Daytime Activity Record Form; Fichten et al., 1995), perceived busyness, diversity of daily activities, pleasant and unpleasant daily activities (Activities Questionnaire: Creti et al., 1992), and potentially stressful major life events (Life Events Scale: Siegal, 1990).
- Fourteen-measures of aspects of psychological adjustment, including cognitive and somatic arousal (Pre-Sleep Arousal Scale: Nicassio, Mendlowitz, Fussel, & Petras, 1985), nocturnal tension (Tension Thermometer: Fichten et al., 1998), anxious, negative, unpleasant and worrying self-talk during nocturnal awake times (Anxious Self-Statement Questionnaire: Kendall & Hollon, 1989; Penn State Worry Questionnaire: Meyer, Miller, Metzger, & Borkovec, 1990; Self-Statement Test: 60+: Fichten et al., 1998), depression, anxiety and overall psychopathology (Brief Symptom Inventory: Derogatis, Rickels, & Rock, 1976), neuroticism (Eysenck Personality Inventory: Eysenck & Eysenck, 1968), and life satisfaction (Satisfaction with Life Scale: Diener, Emmons, Larsen, & Griffen, 1985).

Participants

Two hundred thirty-nine of the 724 older adults who volunteered to participate in our larger study of sleep and aging were designated good sleepers based on their responses to the Sleep Questionnaire. The remaining 485 individuals in our larger sample were either poor sleepers or "medium quality" sleepers who slept neither well nor poorly, but somewhere in between. Good sleepers were individuals who not only failed to meet the criteria for a diagnosis of difficulty initiating or maintaining sleep (DIMS) but who also met a variety of additional requirements that assured these individuals were not poor sleepers but had, in fact, reported sleeping particularly well (cf. Fichten et al., 1998).

Specifically, good sleepers (a) failed to meet the criteria for diagnosis of DIMS (difficulty initiating or maintaining sleep—i.e., 30 min of undesired awake time at least three times per week; problem duration at least 6 months; American Sleep

Disorders Association [ASDA], 1990), and met the following requirements: (b) sleep problem occurrence score 3 or lower (0–21: higher scores indicate more frequent sleep problem episodes experienced during the week); (c) sleep problem frequency score below the midpoint of the scale (on a 10-point scale, with 1 being *very rarely* and 10 being *very often*); (d) sleep-related distress frequency score 3 or lower (0–21: higher scores indicate more frequent sleep-related distress episodes experienced during the week); and (e) sleep-related distress level score 3 or lower (on a 10-point scale, with 1 being *not at all* and 10 being *very much*).

Demographic data indicate that, overall, the 239 good sleeper participants (80 men and 159 women) were generally middle class and reasonably well educated. Mean age of participants was = 67 (*SD* = 7, range = 55–87). They slept an average of 7.12 hr (*SD* = 1.00, median = 7, range = 4– 9.50). For additional details concerning the participants, see Fichten et al. (1998, 2001).

We made three types of categorizations of long and short sleepers. One is based on values used in the literature (e.g., Hicks & Gaus, 1983; Hicks & Rozette, 1986) and defines long sleep as 8 hr or more and short sleep as 6 hr or less. This, of course, accentuates the difference between the two groups but reduces sample size. The other two categorizations were based on properties of our sample of good sleepers: One split was based on the mean and the other on the median. These allowed us to use the full sample of 239 individuals as well as cutoffs based on older adults who sleep well.

We compared long and short sleepers on the 48 variables using a series of 47 independent *t* tests and one chi-square test (to evaluate sex differences). We did this three times using the three different ways of grouping the participants into short and long sleepers for a total of 144 tests. With alpha level set at .05, we are likely to find at least seven significant differences by chance alone. Thus, if there are any differences to find, this very "liberal" form of data analysis is highly likely to identify these.

Split on predetermined times. To accentuate differences between short and long sleepers we eliminated the 115 participants in the "middle group"; this left a sample of 124 good sleepers. Consistent with the literature, short sleepers were those 49 individuals who slept 6 or fewer hours per night (28 women and 21 men), and long sleepers were those 75 who slept 8 hr or more (59 women and 16 men). Mean age of the 124 participants was 67 (*SD* = 7, range = 55–85). Mean sleep duration of long sleepers was 8.24 hr (*SD* = .40, median = 8.00, range = 8.00–9.50), and mean sleep duration for short sleepers was 5.62 hr (*SD* = .46, median = 6.00, range = 4.00–6.00), $t(122) = 33.50$, $p < .001$.

Split on the mean. Dividing the sample of 239 good sleepers into short and long sleeper groups based on the mean sleep duration of 7.12 hr resulted in 99 long sleepers (26 men and 73 women) and 140 short sleepers (54 men and 86 women).

Mean sleep duration for long and short sleepers was 8.06 hr and 6.46 hr, respectively, $t(237) = 21.19$, $p < .001$, (long: $SD = .48$, median = 8.00, range = 7.25–9.50; short: $SD = .69$, median = 7.00, range = 4.00–7.00).

Split on the median. Dividing the sample of 239 good sleepers into short and long sleeper groups based on the median of 7.00 hr resulted in 164 participants. We had to drop the 75 participants who had had the median score of 7. This resulted in 99 long sleepers (26 men and 73 women) and 65 short sleepers (29 men and 35 women; 1 participant's sex was not recorded). Mean sleep duration for long and short sleepers was 8.06 hr and 5.83 hr, respectively, $t(162) = 27.53$, $p < .001$, (long: $SD = .48$, median = 8.00, range = 7.25–9.50; short: $SD = .55$, median = 6.00, range = 4–6.50).

As noted earlier, not all participants completed all of the measures. Minimum sample size for the comparison with the fewest participants was 25 when the classification was based on 6 and 8 hr, 39 when the tests were based on the median, and 56 when they were based on the mean.

RESULTS

A series of 47 *t* tests and 1 chi-square test were performed on scores based on the three categorizations. These are detailed in Tables 1 through 3, where it can be seen that categorization based on the mean split resulted in 12 significant comparisons. When the median split was used, 14 comparisons were significant. When the smaller but more divergent groups that were split based on predetermined times were examined, 13 comparisons were significant.

It is noteworthy that although the number of significant comparisons in the three categorizations is similar, significance was not always found on the same variables. To ascertain which variables truly distinguished between long and short sleepers, we adopted the criterion that the difference had to be significant on all three categorizations.

It can be seen in Tables 1 through 3 that only 8 variables met this criterion. Table 1 shows that only 2 of the 7 variables measuring sleep parameters—total sleep time and sleep efficiency (percentage of bedtime spent asleep)—and only 4 of the 10 variables measuring sleep lifestyle met this criterion: total hours spent in bed, and the usual earliest and latest time that individuals report that they get up in the morning during a typical week.

It can be seen in Table 2 that none of the 4 demographic variables met this criterion and that only 1 of the 11 lifestyle variables did so: time of breakfast. Only 1 of the 14 psychological adjustment variables met the criterion: short sleepers reported more positive self-statements during the night.

TABLE 1
Comparisons on Sleep-Related Variables of Short and Long Sleepers: Means, Standard Deviations, and Test Results

	Sleep Times			*Median Split*			*Mean Split*		
Variables	*Long Sleeper (> = 8)*	*Short Sleeper (< = 6)*	*Test*	*Long Sleeper (> 7.00)*	*Short Sleeper (< 7.00)*	*Test*	*Long Sleeper (> = 7.12)*	*Short Sleeper (< 7.12)*	*Test*
Grouping variable									
Total sleep time			$t(122) = 33.50$***			$t(162) = 27.53$***			$t(237) = 21.19$***
M	8.24	5.62		8.06	5.83		8.06	6.46	
SD	0.40	0.46		0.48	0.55		0.48	0.69	
N	75	49		99	65		99	140	
Sleep parameters and sleep-related affect variables									
Sleep efficiency (%)			$t(56) = 5.67$***			$t(76) = 5.18$***			$t(111) = 4.89$***
M	95.00	76.00		93.00	79.00		93.00	84.00	
SD	8.00	14.00		8.00	14.00		8.00	13.00	
N	34	24		46	32		46	67	
Sleep problem frequency (1–10)			$t(121) = 2.16$*			$t(161) = 2.42$*			$t(233) = 3.26$***
M	1.40	1.81		1.40	1.80		1.40	1.78	
SD	0.70	1.20		0.70	1.17		0.70	1.08	
N	75	48		99	64		99	136	
Sleep onset latency (hour)			$t(117) = 2.41$*			$t(157) = 2.17$*			$t(231) = 1.70$
M	0.16	0.25		0.18	0.25		0.18	0.22	
SD	0.16	0.27		0.16	0.25		0.16	0.22	
N	72	47		96	63		96	137	
Sleep problem occurrence (0–21)			$t(117) = 0.50$			$t(157) = 0.15$			$t(226) = 0.59$
M	0.92	1.02		0.93	0.95		0.93	1.02	
SD	1.09	1.16		1.06	1.12		1.06	1.19	
N	71	48		95	64		95	133	

Wake time after sleep onset (hour)			$t(103) = 0.77$			$t(137) = 0.38$			$t(200) = 0.76$
M	0.05	0.07		0.06	0.06		0.06	0.07	
SD	0.11	0.12		0.11	0.12		0.11	0.12	
N	64	41		83	56		83	119	
Sleep related distress level (1–10)			$t(105) = 0.34$			$t(143) = 0.32$			$t(209) = 0.59$
M	1.27	1.33		1.25	1.28		1.25	1.30	
SD	0.61	0.93		0.55	0.83		0.55	0.72	
N	62	45		85	60		85	126	
Sleep related distress frequency (0–21)			$t(119) = 0.84$			$t(159) = 0.45$			$t(233) = 0.37$
M	0.39	0.28		0.34	0.29		0.34	0.37	
SD	0.76	0.71		0.70	0.71		0.70	0.75	
N	74	47		98	63		98	137	
Sleep lifestyle variables									
Hours spent in bed			$t(56) = 4.49$***			$t(76) = 4.90$***			$t(111) = 4.61$***
M	8.75	7.55		8.66	7.56		8.66	7.81	
SD	0.76	1.26		0.76	1.22		0.76	1.07	
N	34	24		46	32		46	67	
Usual time up (a.m.)			$t(56) = 4.67$***			$t(76) = 4.96$***			$t(111) = 4.26$***
M	7.90	6.68		7.77	6.63		7.77	6.96	
SD	0.74	1.23		0.91	1.12		0.91	1.05	
N	33	25		45	33		45	68	
Earliest time up (a.m.)			$t(55) = 3.32$**			$t(73) = 4.17$***			$t(108) = 3.21$**
M	7.10	6.16		7.07	6.06		7.07	6.40	
SD	0.97	1.17		0.99	1.11		0.99	1.13	
N	33	24		44	31		44	66	

(*continued*)

TABLE 1 (Continued)

	Sleep Times			*Median Split*			*Mean Split*		
Variables	*Long Sleeper (> = 8)*	*Short Sleeper (< = 6)*	*Test*	*Long Sleeper (> 7.00)*	*Short Sleeper (< 7.00)*	*Test*	*Long Sleeper (> = 7.12)*	*Short Sleeper (< 7.12)*	*Test*
Latest time up (a.m.)			$t(54) = 3.73$***			$t(72) = 4.46$***			$t(107) = 3.79$***
M	8.66	7.64		8.62	7.56		8.62	7.82	
SD	0.81	1.24		0.90	1.15		0.90	1.17	
N	32	24		43	31		43	66	
Naps (days per week)			$t(47) = 1.18$			$t(64) = 2.17$*			$t(94) = 2.24$*
M	1.76	2.52		1.36	2.57		1.36	2.47	
SD	2.28	2.24		2.07	2.43		2.07	2.53	
N	27	22		37	29		37	59	
Variability in arising times (hour)			$t(54) = 0.39$			$t(72) = 0.26$			$t(107) = 0.70$
M	1.57	1.48		1.55	1.50		1.55	1.42	
SD	0.94	0.78		0.93	0.71		0.93	0.98	
N	32	24		43	31		43	66	

Earliest bed time (p.m.)			$t(54) = 0.49$			$t(72) = 0.41$			$t(106) = 0.57$
M	10.35	10.51		10.39	10.50		10.39	10.52	
SD	1.20	1.27		1.16	1.21		1.16	1.15	
N	33	23		44	30		44	64	
Latest bed time (a.m.)			$t(53) = 0.65$			$t(71) = 0.43$			$t(106) = 0.79$
M	12.10	12.31		12.14	12.26		12.14	12.33	
SD	1.08	1.30		1.04	1.24		1.04	1.29	
N	33	22		44	29		44	64	
Usual bed time (p.m.)			$t(55) = 0.35$			$t(75) = 0.16$			$t(109) = 0.30$
M	11.15	11.24		11.12	11.15		11.12	11.17	
SD	0.89	1.02		0.88	1.04		0.88	1.00	
N	34	23		46	31		46	65	
Variability in bed times (hour)			$t(53) = 0.24$			$t(71) = 0.08$			$t(105) = 0.17$
M	1.75	1.82		1.76	1.78		1.76	1.80	
SD	1.08	1.00		1.17	0.96		1.17	1.29	
N	33	22		44	29		44	63	

Note. Italicized variables denote consistently significant differences between short and long sleepers. Larger numbers indicate more or greater differences.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

TABLE 2
Comparisons on Demographic, Daytime, and Lifestyle Variables of Short and Long Sleepers: Means, Standard Deviations, and Test Results

	Sleep Times			*Median Split*			*Mean Split*		
Variables	*Long Sleeper (> = 8)*	*Short Sleeper (< = 6)*	*Test*	*Long Sleeper (> 7.00)*	*Short Sleeper (< 7.00)*	*Test*	*Long Sleeper (> = 7.12)*	*Short Sleeper (< 7.12)*	*Test*
Demographic variables									
Sex			$\chi^2(1) = 5.85$*			$\chi^2(1) = 6.31$**			$\chi^2(1) = 3.67$
Number of women	59	28		73	35		73	86	
Number of men	16	20		26	29		26	53	
Income satisfaction (1–9)			$t(57) = 1.71$			$t(77) = 2.40$*			$t(112) = 1.61$
M	5.82	5.08		5.87	5.03		5.87	5.35	
SD	1.83	1.35		1.85	1.26		1.85	1.55	
N	34	25		46	33		46	68	
Age			$t(116) = 1.27$			$t(156) = 0.90$			$t(228) = .1.31$
M	65.79	67.47		66.07	67.10		66.07	67.29	
SD	6.91	7.20		6.88	7.21		6.88	6.97	
N	71	47		95	63		95	135	
Education (1–3)			$t(119) = 1.28$			$t(159) = 0.67$			$t(232) = 0.56$
M	2.47	2.39		2.47	2.43		2.47	2.44	
SD	0.38	0.35		0.37	0.35		0.37	0.37	
N	73	48		97	64		97	137	
Daytime functioning variables									
Fatigue attributed to sleep problems (days per week)			$t(56) = 0.86$			$t(76) = 1.28$			$t(110) = 0.97$
M	0.48	0.88		0.44	0.94		0.44	0.73	
SD	1.70	1.79		1.49	1.92		1.49	1.56	
N	33	25		45	33		45	67	
Sleepiness (1–7)			$t(37) = 0.40$			$t(52) = 0.44$			$t(76) = 0.16$
M	2.00	2.21		1.87	2.04		1.87	1.92	
SD	1.75	1.55		1.50	1.43		1.50	1.30	
N	20	19		30	24		30	48	

Lifestyle variables									
Time of breakfast (a.m.)			$t(23) = 2.30^{*}$			$t(37) = 4.37^{***}$			$t(54) = 3.10^{**}$
M	8.46	7.74		8.69	7.62		8.69	7.92	
SD	0.94	0.62		0.86	0.66		0.86	0.88	
N	11	14		19	20		20	36	
Time of lunch (p.m.)			$t(23) = 1.06$			$t(37) = 2.99^{**}$			$t(54) = 2.59^{*}$
M	12.56	12.38		12.85	12.41		12.85	12.48	
SD	0.34	0.48		0.45	0.47		0.45	0.52	
N	11	14		19	20		20	36	
Time of supper (p.m.)			$t(23) = 0.56$			$t(37) = 0.78$			$t(54) = 0.29$
M	6.28	6.40		6.52	6.38		6.52	6.46	
SD	0.35	0.61		0.51	0.57		0.51	0.76	
N	11	14		19	20		20	36	
Mean meal irregularity (hour)			$t(23) = 0.47$			$t(37) = 0.20$			$t(54) = 0.27$
M	0.41	0.44		0.45	0.44		0.45	0.46	
SD	0.20	0.19		0.19	0.18		0.19	0.23	
N	11	14		19	20		20	36	
Overall daytime pleasantness (1–5)			$t(23) = 0.64$			$t(37) = 1.06$			$t(54) = 1.74$
M	4.29	4.13		4.29	4.09		4.29	3.98	
SD	0.50	0.66		0.51	0.67		0.51	0.67	
N	11	14		19	20		20	36	
Perceived busyness (1–10)			$t(51) = 0.97$			$t(69) = 0.43$			$t(102) = 1.02$
M	6.34	6.95		6.56	6.79		6.56	6.99	
SD	2.28	2.18		2.17	2.23		2.17	2.12	
N	32	21		43	28		43	61	
Diversity of daily activities			$t(37) = 1.56$			$t(52) = 1.84$			$t(77) = 1.77$
M	12.35	10.63		12.21	10.60		12.21	11.00	
SD	3.05	3.79		2.76	3.66		2.76	3.01	
N	20	19		29	25		29	50	
Pleasant daily activities			$t(37) = 0.53$			$t(52) = 0.20$			$t(77) = 0.25$
M	44.10	46.47		44.31	45.04		44.31	45.05	
SD	10.26	17.11		10.79	16.33		10.79	13.65	
N	20	19		29	25		29	50	

(*continued*)

TABLE 2 (Continued)

Variables	*Sleep Times*			*Median Split*			*Mean Split*		
	Long Sleeper (> = 8)	*Short Sleeper (< = 6)*	*Test*	*Long Sleeper (> 7.00)*	*Short Sleeper (< 7.00)*	*Test*	*Long Sleeper (> = 7.12)*	*Short Sleeper (< 7.12)*	*Test*
Unpleasant daily activities			$t(37) = 0.06$			$t(52) = 0.09$			$t(77) = 0.72$
M	6.45	6.32		6.31	6.16		6.31	5.31	
SD	5.31	7.75		5.49	6.91		5.49	6.23	
N	20	19		29	25		29	50	
Total daily activities			$t(37) = 1.03$			$t(52) = 0.63$			$t(77) = 0.46$
M	48.20	52.95		49.00	51.32		49.00	50.36	
SD	13.29	15.51		12.39	14.90		12.39	12.76	
N	20	19		29	25		29	50	
Potentially stressful major life events			$t(46) = 0.67$			$t(63) = 0.34$			$t(92) = 0.34$
M	0.44	0.56		0.49	0.55		0.49	0.45	
SD	0.59	0.67		0.70	0.67		0.70	0.60	
N	27	21		37	28		37	57	

Note. Italicized variables denote consistently significant differences between short and long sleepers. Larger numbers indicate more or greater differences.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

TABLE 3
Comparisons on 14 Psychological Adjustment Variables of Short and Long Sleepers: Means, Standard Deviations, and Test Results

	Sleep Times			*Median Split*			*Mean Split*		
Variables	*Long Sleeper (> = 8)*	*Short Sleeper (< = 6)*	*Test*	*Long Sleeper (> 7.00)*	*Short Sleeper (< 7.00)*	*Test*	*Long Sleeper (> = 7.12)*	*Short Sleeper (< 7.12)*	*Test*
Positive self-statements at night (0–68)			$t(62) = 2.45$*			$t(83) = 2.57$*			$t(122) = 3.61$***
M	22.78	29.91		22.87	29.26		22.87	30.23	
SD	11.52	10.51		11.15	10.81		11.15	11.36	
N	41	23		54	31		54	70	
Negative self-statements at night (0–68)			$t(62) = 2.14$*			$t(83) = 1.80$			$t(122) = 2.33$*
M	14.32	20.22		14.57	18.68		14.57	18.67	
SD	10.40	10.91		9.98	10.30		9.98	9.51	
N	41	23		54	31		54	70	
Balance between positive and negative self-statements (0–1)			$t(62) = 0.31$			$t(83) = 0.08$			$t(122) = 0.01$
M	0.63	0.61		0.63	0.63		0.63	0.63	
SD	0.19	0.16		0.18	0.15		0.18	0.14	
N	41	23		54	31		54	70	
Nocturnal tension (0–100)			$t(62) = 0.26$			$t(84) = 0.33$			$t(123) = 0.14$
M	15.00	13.48		15.46	13.75		15.46	16.06	
SD	22.14	23.08		22.53	24.33		22.53	24.29	
N	41	23		54	32		54	71	
Overall nocturnal thought pleasantness (1–10)			$t(60) = 1.10$			$t(81) = 0.43$			$t(120) = 0.62$
M	7.20	6.50		7.19	6.97		7.19	6.93	
SD	2.32	2.54		2.18	2.39		2.18	2.41	
N	40	22		53	30		53	69	

(*continued*)

TABLE 3 (Continued)

	Sleep Times			*Median Split*			*Mean Split*		
Variables	*Long Sleeper (> = 8)*	*Short Sleeper (< = 6)*	*Test*	*Long Sleeper (> 7.00)*	*Short Sleeper (< 7.00)*	*Test*	*Long Sleeper (> = 7.12)*	*Short Sleeper (< 7.12)*	*Test*
Worry tendency			$t(24) = 1.15$			$t(39) = 0.22$			$t(54) = 0.62$
M	39.09	34.07		36.50	35.67		36.50	37.03	
SD	10.79	11.12		10.12	13.50		10.12	13.82	
N	11	15		20	21		20	36	
Cognitive arousal			$t(26) = 0.59$			$t(41) = 0.56$			$t(60) = 0.73$
M	8.67	9.06		8.52	8.77		8.52	8.79	
SD	2.02	1.53		1.54	1.38		1.54	1.28	
N	12	16		21	22		21	41	
Somatic arousal			$t(26) = 0.34$			$t(41) = 0.43$			$t(60) = 0.12$
M	11.25	11.81		10.57	11.09		10.57	10.68	
SD	3.86	4.56		3.56	4.28		3.56	3.53	
N	12	16		21	22		21	41	
Anxiety			$t(26) = 0.52$			$t(41) = 0.88$			$t(60) = 0.63$
M	0.33	0.44		0.30	0.42		0.30	0.38	
SD	0.31	0.67		0.29	0.59		0.29	0.56	
N	12	16		21	22		21	41	

Depression			$t(26) = 0.41$			$t(41) = 0.74$			$t(60) = 0.57$
M	0.39	0.32		0.43	0.32		0.43	0.36	
SD	0.52	0.32		0.58	0.39		0.58	0.47	
N	12	16		21	22		21	41	
Nocturnal anxious self-talk			$t(52) = 0.82$			$t(40) = 0.60$			$t(56) = 0.16$
M	49.36	44.00		46.25	43.36		46.25	45.47	
SD	16.85	16.65		16.41	14.89		16.41	17.66	
N	11	16		20	22		20	38	
Psychopathology			$t(26) = 1.14$			$t(41) = 1.39$			$t(60) = 1.23$
M	0.32	0.47		0.32	0.45		0.32	0.45	
SD	0.29	0.38		0.28	0.35		0.28	0.44	
N	12	16		21	22		21	41	
Neuroticism			$t(24) = 0.37$			$t(39) = 0.41$			$t(56) = 0.51$
M	6.36	5.80		5.75	6.29		5.75	6.37	
SD	3.61	3.95		3.57	4.66		3.57	4.77	
N	11	15		20	21		20	38	
Overall life satisfaction			$t(41) = 0.34$			$t(58) = 0.12$			$t(83) = 0.01$
M	23.64	24.33		23.81	23.61		23.81	23.80	
SD	8.16	4.79		7.58	5.14		7.58	5.81	
N	22	21		32	28		32	53	

Note. Italicized variables denote consistently significant differences between short and long sleepers. Larger numbers indicate more or greater differences. *$p < .05$. **$p < .01$. ***$p < .001$.

There were no other consistent differences between short and long sleepers. They were not found to differ significantly on demographic factors (e.g., age, education, income satisfaction), on the variables measuring daytime functioning (fatigue, sleepiness), on most aspects of lifestyle (e.g., regularity, number, and pleasantness of daily activities, bedtimes, naps), or on the myriad measures that evaluated psychological adjustment (e.g., measures of anxiety, arousal, worry, depression, neuroticism, psychopathology, life satisfaction).

Variables associated with sleep status were also assessed with a series of stepwise multiple regression analyses. These were divided into categories, because entering all 48 variables into a single regression equation would have required a minimum of 480 participants. In addition, to conduct regression analyses it is necessary for all participants to complete all predictor measures. Because participants in this investigation represented two samples, regression analyses were conducted only for those participants who completed all of the predictor variables in each grouping. Where individual participants had missing data, mean substitution was used provided that this affected less than 10% of scores.

It can be seen in Table 4 that 111 participants completed all 4 demographic predictor variables, all 7 predictor variables that evaluated sleep parameters and sleep-related affect, both predictor variables that evaluated daytime functioning, and all 10 predictor variables measuring sleep lifestyle factors. Only 62 participants completed all of the 11 predictor variables measuring lifestyle factors. These 62 participants also completed 9 of the 14 predictor variables that measured aspects of psychological adjustment. One hundred twenty-eight participants completed the remaining 5 aspects of psychological adjustment predictor variables.

It can be seen in Table 4 that the results of the regression analyses mirror those obtained using *t* tests. None of the demographic or daytime functioning variables predicted total sleep time significantly. Only 1 of the 7 sleep parameters significantly predicted total sleep time: sleep efficiency. Similarly, only 1 of the 11 lifestyle variables did so: time of breakfast. This was also true of the 14 psychological adjustment variables, where only the frequency of positive self-statements at night was a significant predictor. When it came to sleep lifestyle, 2 variables predicted total sleep time significantly: usual time of arising and hours spent in bed.

DISCUSSION

It needs to be stated at the outset that in our comparison of long and short sleepers we examined correlates of differences in sleep duration that are not confounded by sleep phase or insomnia problems. We did not set out to investigate medical conditions or longevity. Thus, we have no illness-related predictor variables and only a subset of the participants, 62 individuals, were screened for medical conditions

TABLE 4
Predicting Total Sleep Time

Variables	*M*	*SD*	*Predictor Variable Entered*	β	*t*	*p* <
Four demographic variables (n = 111)						
See Table 2			None			
Seven sleep parameters and sleep-related affect variables (n = 111)						
Sleep efficiency (%)	88.00	12.00	Sleep efficiency (%)	.581	7.46	.000
Sleep problem frequency (1–10)	1.55	0.92				
Sleep onset latency (hour)	0.21	0.21	R^2=.34; adjusted R^2=.33; $F(1, 109)$ = 55.64, p << .001			
Sleep problem occurrence (0–21)	0.91	1.11				
Sleep-related distress level (1–10)	1.27	0.65				
Sleep-related distress frequency (0–21)	0.26	0.60				
Wake time after sleep onset (hour)	0.06	0.11				
Two daytime functioning variables (n = 111)						
See Table 2			None			
Ten sleep lifestyle variables (n = 111)						
Hours spent in bed	8.16	1.04	Usual time up (a.m.)	.300	3.04	.003
Usual time up (a.m.)	7.28	1.01	Hours spent in bed	.269	2.73	.007
Latest time up (a.m.)	8.14	1.12				
Earliest time up (a.m.)	6.67	1.12	R^2 =.25; adjusted R^2=.24; $F(2, 108)$ = 17.89, p < .000			
Naps (days per week)	2.05	2.25				
Variability in arising times (hour)	1.47	0.95				
Variability in bed times (hour)	1.78	1.22				
Usual bed time (p.m.)	11.20	0.88				
Latest bed time (a.m.)	12.25	1.20				
Earliest bed time (p.m.)	10.46	1.15				
Eleven lifestyle variables (n = 62)						
Time of breakfast (a.m.)	8.20	0.86	Time of breakfast	.320	2.62	.050
Time of lunch (p.m.)	12.61	0.48	R^2 = .10; adjusted R^2 = .09; $F(1, 60)$ = 6.84, p < .05			
Time of supper (p.m.)	6.48	0.62				
Mean meal regularity (hour)	0.46	0.20				
Overall daytime pleasantness (1–5)	4.09	0.57				
Perceived busyness (1–10)	6.93	1.86				
Diversity of daily activities	11.40	2.43				
Pleasant daily activities	45.05	12.36				
Unpleasant daily activities	5.85	5.75				
Total daily activities	50.86	10.96				

(*continued*)

TABLE 4 (Continued)

Variables	*M*	*SD*	*Predictor Variable Entered*	*β*	*t*	*p* <
Potentially stressful major life events	0.52	0.69				
Fourteen psychological adjustment variables						
Five variables tested in $n = 128$						
Positive self-statements at night	27.02	11.62	Positive self-statements at night	–.200	2.29	.050
Negative self-statements at night	16.89	9.73	$R^2 = .04$; adjusted R^2=.03; $F(1, 126) = 5.23$, $p < .05$			
Balance between positive and negative self-statements	0.63	0.16				
Nocturnal tension	15.80	23.18				
Overall nocturnal thought pleasantness	7.04	2.25				
Nine variables tested in $n = 62$						
Worry tendency	36.84	11.90				
Cognitive arousal	8.70	1.37	None			
Somatic arousal	10.65	3.51				
Anxiety	45.74	16.53				
Depression	0.38	0.51				
Nocturnal anxious self-talk	0.35	0.49				
Psychopathology	0.41	0.39				
Neuroticism	6.16	4.22				
Overall life satisfaction	23.24	6.61				

and medications that may affect sleep. In addition, our data are based on self-report rather than objective measures, such as polysomnography.

That having been said, our findings are remarkably consistent and robust. The pattern of significant—and nonsignificant—findings are all in the same direction, the relations hold for multiple measures of the same constructs, and the findings are replicated across two types of analyses: regressions and comparisons of means.

Overall, the findings show that although their bedtimes are similar, short sleepers get up earlier, spend less time in bed, and have lower sleep efficiencies (i.e., spend a smaller proportion of their bedtime asleep) than their long sleeper peers. Consistent with this pattern, they eat breakfast earlier and, of course, sleep less.

Only one of the 14 psychological adjustment variables was significant. This shows that short sleepers had more positive self-statements during the night than long sleepers. According to the scale's authors, increased frequency of positive thoughts, in the absence of an interaction with the frequency of negative thoughts,

simply reflects the fact that people who spend more nocturnal time awake have more thoughts than those who spend less time awake (cf. Fichten et al., 1998). The tendency for short sleepers in this study to also have more negative thoughts is consistent with this interpretation.

Given the variety of differences reported in previous research, more interesting than the differences are the myriad lack of significant differences observed in this relatively large sample of long and short sleepers. The consistently negative findings on the various aspects of psychological adjustment evaluated as well as on the numerous lifestyle and demographic factors show that the two groups of older individuals closely resembled each other on virtually all aspects of personality and lifestyle. For example, there were no differences between the two groups on neuroticism, psychopathology, anxiety, depression, arousal, tension, or life satisfaction. Similarly 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 two groups differ significantly on education or income adequacy, thereby failing to support the "early bird gets the worm" view; this is consistent with Gale and Martyn's (1998) findings.

Although negative findings can never be conclusive, the pervasiveness of our results on a reasonably large sample of older adults who slept well adds to the growing body of evidence (e.g., Buela-Casal, Sierra, & Caballo, 1992; Gale & Martyn, 1998; Rivera et al., 2001) highlighting the absence of differences between long and short sleepers. It appears that sleep duration in older good sleepers is neither good nor bad, but is merely a reflection of naturally occurring variability among people.

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REFERENCES

ABCNEWS.com. (2002, January 28). *Suffering from sleep debt? The dangers of chronic sleep deprivation*. Retrieved July 28, 2002 from http://abcnews.go.com/sections/community/2020/chat_sleepdeprivation0404.html

American Sleep Disorders Association. Diagnostic Classification Steering Committee. (1990). T*he international classification of sleep disorders: Diagnostic and coding manual.* Rochester, MN: Author.

Buela-Casal, G., Sierra, J. C., & Caballo, V. E. (1992). Personality differences between short and long sleepers. *Personality & Individual Differences, 13,* 115–117.

Coren, S. (1996). *Sleep thieves.* New York: Simon & Schuster.

Creti, L., Libman, E., Weinstein, N., Lennox, H., Gay, A., Bailes, S., et al. (1992, June). How do older insomniacs and good sleepers differ? Paper presented at the annual convention of the Canadian Psychological Association, Québec City, Québec [Abstract]. *Canadian Psychology, 33,* 334.

Derogatis, L. R., Rickels, K., & Rock, A. F. (1976). The SCL-90 and the MMPI: A step in the validation of a new self-report scale. *British Journal of Psychiatry, 128,* 280–289.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffen, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49,* 71–75.

Eysenck, H. J., & Eysenck, S. B. G. (1968). *Manual: Eysenck Personality Inventory.* San Diego, CA: Educational and Industrial Testing Service.

Fichten, C. S., Creti, L., Amsel, R., Brender, W., Weinstein, N., & Libman, E. (1995). 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,* 189–223.

Fichten, C. S., Libman, E., Creti, L., Amsel, R., Sabourin, S., Brender, W., et al. (2001). Role of thoughts during nocturnal awake times in the insomnia experiences of older adults. *Cognitive Therapy and Research, 25,* 665–692.

Fichten, C. S., Libman, E., Creti, L., Amsel, R., Tagalakis, V., & Brender, W. (1998). Thoughts during awake times in older good and poor sleepers—The Self-Statement Test: 60+. *Cognitive Therapy and Research, 22,* 1–20.

Gale, C., & Martyn, C. (1998). Larks and owls and health, wealth and wisdom. *British Medical Journal (Clinical Research Ed.), 317,* 1675–1677.

Gottlieb, D. J., Schulman D. A., Nam, B. H., Dagostino, R. A., & Kannal, W. A. (2002) Sleep duration predicts mortality: The Framingham study. *Sleep, 25,* A108.

Hartmann, E. (1973). Sleep requirement: Long sleepers, short sleepers, variable sleepers, and insomniacs. *Psychosomatics, 14*(2), 95–103.

Hartmann, E., Baekeland, F., Zwilling, G., & Hoy, P. (1971). Sleep need: How much sleep and what kind? *American Journal of Psychiatry, 127,* 1001–1008.

Hicks, R. A., & Gaus, W. (1983). Self-reported excess body weight in short- and long-sleeping college students. *Psychological Reports, 52,* 930.

Hicks, R. A., & Rozette, E. (1986). Habitual sleep duration and eating disorders in college students. *Perceptual & Motor Skills, 62,* 209–210.

Hoddes, E., Zarcone, V., Smythe, H., Phillips, R., & Dement, W. C. (1973). Quantification of sleepiness: A new approach. *Psychophysiology, 10,* 431–437.

Kendall, P. C., & Hollon, S. D. (1989). Anxious self-talk: Development of the Anxious Self-Statements Questionnaire (ASSQ). *Cognitive Therapy and Research, 13,* 81–93.

Kripke, D. F., Garfinkel, L., Wingard, D. L., Klauber, M. R., & Marler, M. R. (2002). Mortality associated with sleep duration and insomnia. *Archives of General Psychiatry, 59*(2), 131–136.

Kumar, A., & Vaidya, A. K. (1982). Neuroticism in short and long sleepers. *Perceptual & Motor Skills, 54,* 962.

Kumar, A., & Vaidya, A. K. (1984). Anxiety as a personality dimension of short and long sleepers. *Journal of Clinical Psychology, 40,* 197–198.

Libman, E., Creti, L., Amsel, R., Brender, W., & Fichten, C. S. (1997). What do older good and poor sleepers do during periods of nocturnal wakefulness? The Sleep Behaviors Scale: 60+. *Psychology and Aging, 12,* 170–182.

Libman, E., Creti, L., Levy, R. D., Brender, W., & Fichten, C. S. (1997). A comparison of reported and recorded sleep in older poor sleepers. *Journal of Clinical Geropsychology, 3,* 199–211.

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behavior Research and Therapy, 4,* 487–495.

Nicassio, P. M., Mendlowitz, D. R., Fussel, G. G., & Petras, L. O. (1985). The phenomenology of the pre-sleep state: The development of the Pre-Sleep Arousal Scale. *Behaviour Research and Therapy, 23,* 263–271.

Rivera, I., Sanchez, A. I., Vera-Villarroel, P. E., & Buela-Casal., G. (2001). Sleep patterns and their relation to psychological traits in women. *Revista Ecuatoriana de Neurologia, 10*(3). Retrieved October 22, 2002, from http://www.medicosecuador.com/revecuatneurol/v0110_n3_2001/sleep_patterns_and_their_relat.htm

Sexton-Radek, K. (1998a). Clinical aspects associated with adjustment in unusual sleepers. *Perceptual & Motor Skills, 87,* 261–262.

Sexton-Radek, K. (1998b). Presleep autonomic arousal as a distinguishing factor in *type* of sleep pattern. *Perceptual & Motor Skills, 87,* 433–434.

Siegal, J. M. (1990). Stressful life events and use of physician services among the elderly: The moderating role of pet ownership. *Journal of Personality and Social Psychology, 58,* 1081–1086.

Skinner, N. F. (1983), Neuroticism, extraversion and sex differences in short and long sleepers. *Psychological Reports, 53,* 669–670.