

# Evidence-Based Psychological Treatments for Insomnia in Older Adults

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The review describes evidence-based psychological treatments (EBTs) for insomnia in older adults. Following coding procedures developed by the American Psychological Association's Committee on Science and Practice of the Society for Clinical Psychology, two treatments were found to meet EBT criteria: sleep restriction–sleep compression therapy and multicomponent cognitive–behavioral therapy. One additional treatment (stimulus control therapy) partially met criteria, but further corroborating studies are needed. At the present time, there is insufficient evidence to consider other psychological treatments, including cognitive therapy, relaxation, and sleep hygiene education, as stand-alone interventions beneficial for treating insomnia in older adults. Additional research is also needed to examine the efficacy of alternative–complementary therapies, such as bright light therapy, exercise, and massage. This review highlights potential problems with using coding procedures proposed in the EBT coding manual when reviewing the existing insomnia literature. In particular, the classification of older adults as persons age 60 and older and the lack of rigorous consideration of medical comorbidities warrant discussion in the future.

*Keywords:* sleep, insomnia, older adults, cognitive–behavioral therapy, empirically based treatments

Sleep complaints are common in older adults. Epidemiological studies have shown that 30%–60% of all older persons have one or more sleep complaints, including difficulty falling asleep, problems staying asleep at night or falling back asleep after awakening, early morning awakenings, excessive daytime sleepiness, and daytime fatigue (Ancoli-Israel & Roth, 1999; Dodge, Cline, & Quan, 1995; Foley et al., 1995; Maggi et al., 1998). Sleep disturbances in this population are often secondary to medical and psychiatric comorbidities (Foley, Ancoli-Israel, Britz, & Walsh, 2004; Newman et al., 1997; Ohayon, Carskadon, Guilleminault, & Vitiello, 2004; Quan et al., 2005; Vitiello, Moe, & Prinz, 2002) and are associated with an increased risk for the onset of depression and anxiety, substance abuse, falls, cognitive decline, and suicide (Brassington, Kings, & Bliwise, 2000; Byles, Mishra, Harris, & Nair, 2003; Jelcic et al., 2002; Newman et al., 2000; Taylor, Lichstein, & Durrence, 2003).

A number of reviews and meta-analyses over the past decade have supported the efficacy of behavioral and cognitive–behavioral therapies for treating sleep disturbances in older adults (Irwin, Cole, & Nicassio, 2006; Montgomery & Dennis, 2004; Morin, Hauri, et al., 1999; Morin, Mimeault, & Gagne, 1999;

Murtagh & Greenwood, 1995; Nau, McCrae, Cook, & Lichstein, 2005; Pallesen, Nordhus, & Kvale, 1998). However, a recent state-of-the-science conference sponsored by the National Institutes of Health noted that the comparative benefits of a variety of treatments for insomnia remain to be demonstrated (National Institutes of Health, 2005). Furthermore, there is often a gap between knowledge disseminated in the research literature and actual clinical practice (Persons, 1995). To address these concerns, the American Psychological Association's (APA) Society for Clinical Psychology (Division 12) convened a task force in the mid-1990s that set out to develop criteria for evaluating clinical trials that would make information regarding the efficacy of psychological interventions more accessible to practitioners, researchers, policymakers, and the general public (Chambless et al., 1998).

The history of the APA Task Force, and its evolution in the development of manualized classification procedures, has been widely described and debated elsewhere (cf. APA Presidential Task Force on Evidence-Based Practice, 2006; Beutler, Moleiro, & Talebi, 2002; Chambless & Ollendick, 2001; Levant, 2004; Scogin, Welsh, Hanson, Stump, & Coates, 2005; Weisz, Hawley, Pilkonis, Woody, & Follette, 2000; Westen, Novotny, & Thompson-Brenner, 2004). This review is one of five that were approved by Section 2 (Clinical Geropsychology) of the APA Society of Clinical Psychology to be conducted evaluating the benefits of psychological treatments in older adults. In keeping with other reviews in this special section, we defined *psychological treatments* as interventions formulated on the basis of psychological theories or models of behavior change and delivered or supervised by mental health professionals. Applying existing evidence-based criteria to the empirical literature for treating sleep disturbances in older adults is an interesting challenge because the insomnia literature includes a wide mixture of pharmacological, behavioral, somatic, mechanical, and alternative medicine interventions and assessment modalities, which, in some cases, are

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quite different from the psychological treatments the original APA Task Force considered. Our review thus not only includes a description of the evidence-based treatments (EBTs) that emerged as beneficial taking this review approach but also discusses some of the limitations and constraints that we faced, the decision-making process that led to final inclusion or exclusion of particular studies, and the implications for understanding the insomnia treatment literature as a whole.

## Method

### *Review Procedures*

We conducted computerized searches using PubMed, PsycINFO, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), the Cochrane Controlled Trials Register (CENTRAL), and the sleep bibliography available at [www.websciences.org/bibliosleep](http://www.websciences.org/bibliosleep) (1990–2001), as well as hand searches of published reviews, meta-analyses, and journals related to sleep and aging. Only studies that were randomized controlled group design or within-subject trials published in peer-reviewed journals before January 2006 were considered eligible for inclusion. Over 250 studies were initially identified, including 13 published reviews and meta-analyses. Of these, 109 were reviewed for possible relevancy on the basis of titles or abstract information. Twenty studies were eliminated because they included participants outside the allowed age range, 33 studies tested treatments that were not primarily psychological in nature (e.g., light therapy or massage), and 36 studies did not meet treatment design criteria (e.g., they were uncontrolled trials). The remaining 20 studies were considered candidates for the present review.

Methods used to review the final articles are described more fully in Yon and Scogin's (2007) article in this special section. Two psychology students coded the remaining 20 studies using a manual developed by the Committee on Science and Practice (Weisz & Hawley, 2001) to determine whether each study provided information pertinent to rating their EBT status. All coded articles were then reviewed by a faculty member (Susan M. McCurry or Rebecca G. Logsdon), and any discrepancies between the raters were discussed. Questions that were not easily resolved were posed to the larger group of reviewing teams before a final coding decision was made.

### *Study Participants*

The first major coding decision we faced had to do with participant ages allowed for studies that were accepted for review. The EBT manual (Weisz & Hawley, 2001) specifies that comparisons are to be made of studies representing the same age group. Adult age groups are categorized into adult (18–59 years) and geriatric (60 years or older). Many candidate studies for review recruited participants that fell into both of these two age categories. It was not possible to separate data from these investigations to include only persons age 60 years and older, and exclusion of all studies that included younger adults would have resulted in a review that was not truly representative of the research that has been done. After consultation with the other reviewing teams, we decided to include studies whose focus was on older adults and that had

participants with a mean age of 60 years or older, regardless of the total group age range.

### *Definitions of Sleep Disorders*

As noted above, the EBT coding manual compares studies treating the same target problem, symptom, or diagnosis. Relatively few treatment studies enrolled older adults who met criteria for a sleep disorder diagnosis using International Classification of Sleep Disorders, *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994), or International Classification of Disorders 10 criteria (Buysse et al., 1994). Thus, for purposes of this review, studies were included if participants had nighttime symptoms consistent with recently proposed Research Diagnostic Criteria for Insomnia Disorder (Edinger et al., 2004), including problems with sleep initiation, maintenance, early morning awakenings, and timing/scheduling of sleep episodes, based on self-report or confirmed by polysomnography, actigraphy, or behavioral observation. Studies varied with regard to the duration and the frequency with which reported sleep problems were occurring prior to enrollment. We excluded studies treating primary sleep disorders, such as sleep apnea, periodic leg movement or restless legs syndromes, or REM behavior disorder, because treatment for these conditions is predominantly pharmacological or mechanical in nature (e.g., use of continuous positive airway pressure [CPAP] for treating sleep apnea).

### *Treatment Efficacy*

According to the coding manual, for a treatment to be regarded as showing beneficial treatment effects, over 50% of the target problem posttreatment outcome measures must show both statistically significant between-group treatment effects and between-group effect sizes of at least .20 (Weisz & Hawley, 2001). For the sleep treatment literature, this coding criterion presented some challenges in evaluating treatment outcomes because the target problems of sleep quality and quantity are routinely measured in a variety of ways. Furthermore, studies typically included multiple nocturnal and daytime sleep-wake outcomes that were directly related to insomnia but that might theoretically be expected to have different responses to treatment.

For the purposes of this review, all posttreatment measures reported in a published article that were specifically related to sleep, including actigraphy- or polysomnography-derived sleep outcomes, sleep diary reports, or standardized sleep scales and questionnaires, were considered target problem outcome measures. Measures that might be related to sleep quality but were not a direct sleep outcome, such as depression or ratings of dysfunctional beliefs about sleep, were not considered primary outcomes. Effect sizes were obtained from comparison between posttreatment sleep outcomes, unadjusted for baseline differences.

In cases in which one particular sleep outcome was measured in multiple ways, that outcome had to show significant improvements and an adequate effect size on at least half of the reported measures. For example, where sleep efficiency (SE) was measured using daily sleep log reports, items on the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), actigraphy, and polysomnography, there had to be significant

posttreatment improvement on two of the four measures of SE and these two measures had to have an effect size greater than or equal to .20 for the treatment to be considered as showing beneficial effects on SE. However, in cases in which multiple sleep outcomes were measured in a single way (e.g., actigraphic measures of time in bed, total sleep time, SE, sleep latency, and wake time after sleep onset), each outcome was considered separately. In other words, a treatment had to show significant improvement on only one of the actigraphy outcomes to be considered potentially eligible for inclusion.

## Results

Two treatments met evidence-based criteria for treatment of sleep disturbances in older adults: sleep restriction–sleep compression and multicomponent cognitive–behavioral therapy (CBT). One additional treatment (stimulus control) partially met criteria but was without corroborating investigations.

### *Sleep Restriction–Sleep Compression*

Sleep restriction therapy (Spielman, Saskin, & Thorpy, 1987) is based on the principle that curtailing time spent in bed helps solidify sleep. Participants are told to reduce the amount of time spent in bed to correspond to the time they actually spend sleeping, creating a mild state of sleep deprivation that makes it easier to fall asleep and stay asleep. For example, a person who reports that they are in bed 9 hr per night but only asleep for 6 of these hours, would be told to limit their in-bed period to a 6-hr window of time. Gradually, as sleep within that window improves, the permitted time in bed is increased by 15–20-min increments until the individual's optimum sleep duration is achieved. Sleep compression is a variant strategy that allows participants to gradually reduce their time in bed to match total sleep time rather than making an immediate change (Riedel, Lichstein, & Dwyer, 1995). Once the target in-bed time is achieved, participants are encouraged to maintain it rather than allowing subsequent increases in time in bed.

Three studies supportive for the use of sleep restriction–sleep compression with older adults were identified (Friedman et al., 2000; Lichstein, Reidel, Wilson, Lester, & Aguillard, 2001; Riedel et al., 1995). Table 1 provides details of these investigations. A total of 90 participants received sleep restriction–compression in these studies. Riedel et al. (1995) reported that sleep compression guidance in combination with sleep education delivered via a standardized video resulted in greater posttest sleep satisfaction scores among older adults with insomnia than did a wait-list control condition. In Friedman et al.'s (2000) study, 6-week individual sleep restriction therapy was found to be more beneficial than a sleep hygiene control but equal to a nap restriction active treatment in reducing time in bed and SE on sleep logs and more effective than either nap restriction or control on actigraphic total sleep time. In Lichstein et al.'s (2001) study, individual (6-week) sleep compression was comparable with relaxation therapy and more efficacious than placebo control on sleep log reports of number of awakenings and SE. The mean effect size relative to control for the three trials was 0.77. Our review did not yield any studies that were not supportive of sleep restriction–sleep compression.

### *Multicomponent CBT*

Multicomponent CBT protocols include a combination of sleep hygiene education, stimulus control, sleep restriction, and relaxation training. The term “sleep hygiene” was first used by Hauri (1977) to describe a variety of sleep scheduling, dietary, environmental, and activity recommendations designed to minimize impediments to sleep onset and enhance sleep maintenance and quality (Stepanski & Wyatt, 2003). Sleep hygiene factors are generally considered a contributing, not primary, cause of insomnia in older adults.

Stimulus control instructions, originally developed by Bootzin (1977), are intended to strengthen one's association with bed as a cue for sleep, weaken it as a cue for sleep-incompatible activities, and help the person with insomnia acquire a consistent sleep rhythm. Stimulus control rules instruct participants to (a) lie down at night only when you are sleepy, (b) use the bed only for actual sleep (not reading, watching television, etc.), (c) get out of bed if you wake up at night and are unable to quickly fall back asleep, (d) avoid napping, and (e) adhere to a strict morning rising time, regardless of how much sleep you got the night before. Some combination of sleep hygiene, stimulus control, and sleep restriction–sleep compression forms the basis of virtually all multicomponent CBT interventions for insomnia that have been developed.

The use of relaxation as a therapeutic tool to reduce physiologic arousal and enhance sleep dates back to the work of Jacobson in the early 20th century, who published a book advocating the use of progressive relaxation as a treatment for insomnia (Jacobson, 1938). This procedure, which involves progressively tensing and then relaxing each muscle group in a systematic way, is only one of a variety of relaxation techniques that are currently used to treat insomnia, including guided imagery, diaphragmatic breathing, meditation, autogenic training, and biofeedback (Manber & Kuo, 2002). Some form of relaxation is frequently used in multicomponent cognitive interventions, and, for the purposes of this review, CBT treatments were considered comparable regardless of the particular form of relaxation strategy used.

Finally, multicomponent CBT insomnia protocols with older adults vary in the extent to which traditional cognitive or behavioral therapy components are included in the intervention. However, they generally all contain education designed to correct misperceptions about sleep and normal aging, the amount of sleep that is needed for sustaining good health, and the physical or psychological consequences of sleep loss. They also always include motivational strategies to enhance compliance with treatment recommendations.

We found six between-group design studies and one multiple baseline study that supported multicomponent CBT as an EBT (Hoelscher & Edinger, 1988; Lichstein, Wilson, & Johnson, 2000; McCurry, Logsdon, Vitiello, & Teri, 1998; Morin, Colecchi, Stone, Sood, & Brink, 1999; Morin, Kowatch, Barry, & Walton, 1993; Rybarczyk, Lopez, Benson, Alsten, & Stepanski, 2002; Rybarczyk et al., 2005). Table 2 contains basic details of these studies. One additional multiple baseline study (Edinger, Hoelscher, Marsh, Lipper, & Ionescu-Pioggia, 1992) was also supportive, although effect sizes could not be calculated on the basis of available data; thus, this study's comparison of CBT with relaxation therapy is not included in Table 2.

Table 1  
*Research Contributing to the Evidence-Based Treatment Status of Sleep Restriction–Sleep Compression for Sleep in Older Adults*

Study	Sample	Conditions	Manual–protocol	Length of treatment	Outcome measures	Findings <sup>a</sup>
Friedman et al. (2000)	$N = 55$ , 55+ years ( $M = 64.2$ years); insomnia = 5/14 baseline nights based on actigraphy sleep estimate of SE, SL, TST, WASO	1. SH ( $n = 11$ ) 2. SRT ( $n = 16$ ) 3. N-SRT ( $n = 12$ )	SH: Hauri (1992); SRT: Friedman, et al. (1991)	6 weekly individual sessions	Actigraphy, sleep logs (TIB, TST, SE, SL, WASO), MSLT, Stanford Sleepiness Scale	N-SRT, SRT > SH for TIB, SE for sleep logs (mean ES = 0.78)
Lichstein et al. (2001)	$N = 74$ , 59–92 years ( $M = 68.0$ years); sleep onset or maintenance insomnia 6+ months	1. REL ( $n = 27$ ) 2. COM ( $n = 24$ ) 3. PL ( $n = 23$ )	REL: Lichstein (2000); PL: Steinmark & Borkovec (1974)	6 weekly individual sessions, 45 min each	Sleep logs (SL, no. awakenings, WASO, TST, SE, sleep quality rating, daytime nap time)	COM > PL on no. awakenings (ES = 0.44)
Riedel et al. (1995)	$N = 125$ (75 with insomnia, 50 without), 60+ years ( $M = 67.4$ years); sleep onset, maintenance, or terminal insomnia 3+ days/week for 1 year	1. VO ( $n = 50$ ) 2. VG ( $n = 50$ ) 3. WL ( $n = 25$ , insomnia only)	Video: Lichstein (1989)	VO: 2 group sessions (2 weeks apart); VG: 4 weekly group sessions	Sleep logs (SL, TIB, ST, WASO, SE, sleep satisfaction), Stanford Sleepiness Scale	VG insomnia participants > WL, for sleep satisfaction (ES = 1.09)

*Note.* SE = sleep efficiency; SL = sleep latency; TST = total sleep time; WASO = wake time after sleep onset; SH = sleep hygiene control; SRT = sleep restriction therapy; N-SRT = nap sleep restriction therapy; TIB = time in bed; MSLT = multiple sleep latency test; ES = effect size; REL = relaxation therapy; COM = sleep compression therapy; PL = placebo desensitization; VO = education video only; VG = video plus sleep compression guidance; WL = wait-list control.

<sup>a</sup>The greater than symbol (>) in the findings indicates significant benefits of one treatment over another.

The APA coding manual considers two versions of a treatment program to be the same treatment if the study authors judged the treatment to be essentially the same and the treatment duration was at least 75% of the longer version. Among the seven CBT studies included in Table 2 (six group design, one multiple baseline), three examined brief individual CBT interventions that were four sessions in length and four tested group interventions that were eight sessions, supporting the inclusion of both versions of multicomponent CBT and both modes of delivery (individual vs. group) as evidence based. In each of the seven studies, multicomponent CBT was superior to a control condition. In Hoelscher and Edinger's (1988), Lichstein et al.'s (2000), and McCurry et al.'s (1998) studies, brief (4-week) individual and group CBT was found to be more beneficial than a delayed treatment–wait-list control. Morin et al. (1993) and Rybarczyk et al. (2002) found that a longer 8-week group intervention was superior to wait-list controls. One study (Morin, Colecchi, et al., 1999) showed an 8-week group-administered multicomponent CBT to be beneficial both singly and in combination with pharmacotherapy compared with placebo control. Rybarczyk et al. (2005) found that 8-week group CBT was superior to a stress management and wellness placebo control for total scores on the PSQI and Sleep Impairment Index, as well as diary reports of SE, sleep latency, and wake time after sleep onset. Additional research is needed to determine whether multicomponent CBT treatments that are of different lengths or mode of delivery should be considered as separate EBTs.

There were 128 participants in the CBT therapy conditions across the supportive studies (41 participants in the brief four-session individual treatment version and 87 participants in the longer eight-session group versions). The mean effect size for CBT relative to control for the seven trials was 0.97 (mean effect size = 0.87 for brief individual; mean effect size = 1.05 for longer group

treatment). Our review did not yield any studies that were not supportive of multicomponent CBT.

### *Treatments Requiring Additional Evidence*

*Stimulus control.* We identified two studies in which stimulus control showed beneficial effects, but these were not classified as evidence based because they did not have a minimum of 30 participants combined across studies representing the active treatment. Puder, Lacks, Bertelson, and Storandt (1983) found stimulus control instructions administered over 6 weeks of group treatment ( $n = 9$ ) to be superior to a wait-list control ( $n = 7$ ) in self-reported duration of nighttime awakenings and total sleep time. Morin and Azrin (1988) showed that stimulus control ( $n = 9$ ) was superior to delayed treatment control ( $n = 10$ ) in reducing self-reported sleep onset latency after 4 weeks of group treatment. The mean effect size for stimulus control therapy relative to control for the two trials was 0.80.

A 1999 review by the American Academy of Sleep Medicine (AASM; Morin, Hauri, et al., 1999) on nonpharmacologic treatments for chronic insomnia also found that stimulus control fit both AASM criteria at a standard level of recommendation (high degree of clinical certainty) as well as APA criteria for a “well-established” treatment. (The “well-established” rating was used in earlier versions of the coding manual developed by the APA Task Force on Promotion and Dissemination of Psychological Procedures.) However, most of the studies cited in that review in support of stimulus control included adult participants with a mean age younger than 60 years. It should be noted that two additional randomized trials with older adults showed positive treatment effects for combination stimulus control plus sleep hygiene education (Engle-Friedman, Bootzin, Hazlewood, & Tsao, 1992; Pallesen et al., 2003). These were not included in the current

Table 2  
 Research Contributing to the Evidence-Based Treatment Status of Brief (Four Sessions) and Longer (6–8 Weeks) Multicomponent Cognitive–Behavioral Therapy for Sleep in Older Adults

Study	Sample	Conditions	Manual–protocol	Length of treatment	Outcome measures	Findings <sup>a</sup>
Hoelscher & Edinger (1988)	$N = 4$ , 59–72 years ( $M = 65.2$ years); sleep maintenance insomnia 6+ months and nightly WASO > 60 min	Combination behavioral treatment package, including sleep restriction, education, and SC (multiple baseline design)	Hoelscher & Edinger (1986)	4 weekly individual sessions, 60 min each	Sleep logs, sleep assessment device (SL, no. wakings, WASO, TST, TIB, SE, sleep quality ratings), Stanford Sleepiness Scale	Supportive for WASO using logs, sleep assessment device (mean $ES = 1.12$ )
Lichstein et al. (2000)	$N = 44$ , 58–85 years ( $M = 67.1$ and 70.1 years, treatment and control, respectively); sleep onset or maintenance insomnia 6+ months	1. Combination SH, SC, and REL ( $n = 23$ ) 2. Delayed treatment control ( $n = 21$ )	SH: Riedel (2000); SC: Bootzin et al. (1991); REL: Lichstein & Johnson (1993)	4 weekly individual sessions, 60 min each	Sleep logs (SL, TST, no. wakings, WASO, SE, total nap time, sleep quality ratings)	Treatment > control in sleep quality ratings ( $ES = 0.76$ )
McCurry et al. (1998)	$N = 36$ , 50–86 years ( $M = 68.7$ years); one or more sleep problems 3+ times/week during the past month	1. Combination SC, COM, and REL ( $n = 21$ ; 14 for 4 weeks, 7 for 6 weeks) 2. WL ( $n = 15$ ; 10 for 4 weeks, 5 for 6 weeks)	SC: Lacks (1991); COM: Riedel et al. (1995); REL: Benson (1975)	4–6 weekly sessions (6-week group, 4-week individual)	PSQI	Supportive against control for PSQI ( $ES = 0.74$ )
Morin et al. (1993)	$N = 24$ , 60+ years ( $M = 67.1$ years); sleep maintenance insomnia 6+ months	1. CBT ( $n = 12$ ) 2. WL ( $n = 12$ )	CBT: Spielman et al. (1987); Bootzin & Engle-Friedman (1987); Hauri (1991)	8 weekly group sessions, 90 min each	PSG, sleep logs (SL, WASO, early morning awakenings, total wake time, TST, SE), PSG, sleep logs	CBT > WL on total wake time (PSG + logs), WASO, SE (logs only; mean $ES = 1.01$ )
Morin, Colecchi, et al. (1999)	$N = 78$ , 55+ years ( $M = 65$ years); sleep onset or maintenance insomnia 6+ months	1. CBT ( $n = 18$ ) 2. PCT ( $n = 20$ ) 3. Combination CBT + PCT ( $n = 20$ ) 4. PC ( $n = 20$ )	CBT: Spielman et al. (1987); Bootzin et al. (1991); Morin (1993)	8 weekly group sessions, 90 min each	PSG, sleep logs (WASO, SE, TST)	Combination CBT + PCT > PC on total wake time, SE (logs + PSG); all treatments > PC on WASO (logs; mean $ES = 1.07$ )

Table 2 (continued)

Study	Sample	Conditions	Manual—protocol	Length of treatment	Outcome measures	Findings <sup>a</sup>
Rybarczyk et al. (2002)	<i>N</i> = 38, age 55+ years ( <i>M</i> = 67.8 years); comorbid insomnia + medical illness	1. CBT ( <i>n</i> = 11) 2. HART ( <i>n</i> = 14) 3. WL ( <i>n</i> = 13)	CBT: Morin (1993); HART: Inner Health Inc. (1996)	CBT: 8 group sessions, 1.5 hr each; HART: 6 weeks	Sleep logs, actigraphy (SE, SL, WASO, TST, TIB, no. nights medication use), PSQI	CBT > WL for SE, WASO, TIB (logs only), PSQI; CBT > HART for TIB; HART > WL for PSQI (mean ES = 1.36)
Rybarczyk et al. (2005)	<i>N</i> = 92, age 55+ years ( <i>M</i> = 70.1 and 67.7 years, treatment and control, respectively); comorbid insomnia and medical illness	1. CBT ( <i>n</i> = 46) 2. SMW ( <i>n</i> = 46)	CBT: Morin (1993); SMW: Rybarczyk et al. (2001)	8 weekly group sessions, 2 hr each	Sleep logs (SE, SL, WASO, TST, TIB, no. naps/week, day nap time), PSQI, SII	CBT > SMW for SE, SL, WASO, PSQI, SII (mean ES = 0.76)

Note. WASO = wake time after sleep onset; SC = stimulus control therapy; SL = sleep latency; TST = total sleep time; TIB = time in bed; SE = sleep efficiency; ES = effect size; SH = sleep hygiene; REL = relaxation therapy; COM = sleep compression therapy; WL = wait-list control; PSQI = Pittsburgh Sleep Quality Index; CBT = cognitive-behavior therapy; PSG = polysomnography; PCT = pharmacotherapy; PC = placebo control; HART = home audiotape relaxation therapy; SMW = stress management and wellness placebo control; SII = Sleep Impairment Index.

<sup>a</sup> The greater than symbol (>) in the findings indicates significant benefits of one treatment over another.

review because both studies reported outcomes that included wait-list–measurement control participants who were randomized to treatment after the wait-list period had ended, which was not allowed by the coding procedures followed here. However, in combination with the body of literature supporting the efficacy of stimulus control with younger adults, these studies add further support that stimulus control treatment should be considered promising for older adults.

*Multicomponent interventions with special populations.* There were also studies in the literature that used variants of EBT interventions or that were conducted with unique aging populations that were not included in this review but should be considered as being worth further investigation. One variant to the multicomponent CBT interventions of particular interest is the use of CBT treatments to improve the sleep of chronic hypnotic medication users. Morgan, Dixon, Mathers, Thompson, and Tomeny (2003) found that 6-week multicomponent individual CBT delivered in primary care settings was more beneficial for sleep and led to greater reductions in sleeping medication consumption by chronic hypnotic medication users than usual care control. Two additional studies have demonstrated the efficacy of multicomponent group CBT for facilitating the tapering of benzodiazepine use in older adults with chronic insomnia (Baillargeon et al., 2003; Morin et al., 2004), compared with a standard tapering protocol alone. Although these studies are not included in Table 2 because of their focus on decreasing medication use, they provide further support for the efficacy of both individual and group multicomponent CBT for improving the sleep of older adults. Future research will determine whether CBT for the management and tapering of hypnotic drug use is a separate CBT with older populations.

Guilleminault et al. (2002) studied the efficacy of a six-session, multicomponent CBT treating postmenopausal women with and without sleep-disordered breathing (SDB) compared with participants receiving nasal CPAP or treatment of nasal turbinates (SDB participants only) or delayed treatment control (non-SDB participants). CBT-treated groups had better posttreatment sleep latencies and total sleep time based on polysomnography compared with the SDB treated and delayed treatment groups. Because this study included participants with a primary sleep disorder, it was not included in the review. However, it also adds support to the finding of multicomponent CBT as an EBT.

Finally, a recent study by Richards, Beck, O'Sullivan, and Shue (2005) tested an individualized social activity intervention that was a variant of a daytime sleep restriction program and was designed to be delivered by nursing assistants to nursing home residents with dementia. Participants received 1–2 hr of social activities in 15- to 30-min sessions for 21 consecutive days. Study results found that the individualized social activity intervention significantly reduced actigraphic measures of daytime sleep, sleep latency, and number of nighttime awakenings among participants who had severely disturbed sleep (estimated baseline sleep percent < 50%) compared with a usual care control. Other studies have also found that increasing activity and decreasing daytime sleep can be beneficial for improving the sleep of elderly persons with dementia (Alessi et al., 2005; McCurry, Gibbons, Logsdon, Vitiello, & Teri, 2005; Naylor et al., 1997), although these other studies have included activation as only one part of a multidimensional nonpharmacological intervention package that includes somatic as well as cognitive or behavioral treatment elements. Ad-

ditional research is needed to evaluate the efficacy of daytime activation–sleep restriction on the sleep of older persons with and without cognitive impairment.

### *Treatments Lacking Evidence for Older Adults*

Three psychological interventions not included in this review—progressive muscle relaxation, paradoxical intention, and biofeedback—have been reported by the AASM to fit the guideline level of recommendation (reflecting a moderate degree of clinical certainty) for the treatment of chronic insomnia (Chesson et al., 1999; Morin, Hauri, et al., 1999). A variety of additional treatments, including cognitive therapy, alternative forms of relaxation (e.g., imagery or autogenic training), and sleep hygiene education as a stand-alone intervention, have also been reported in reviews to have potential efficacy for treating insomnia in older adults (Morin, Mimeault, & Gagne, 1999; Nau et al., 2005). Several methodological issues, such as the absence of a control condition or random assignment of participants, prevented us from including many studies that tested these interventions in the current review. The predominant reason for exclusion, however, was participant age. Much of the research that has been conducted using such psychological treatments for sleep disturbances have enrolled participants with mean ages in the 40s and 50s, even if older adults were included in the trial and were noted to have good treatment response. Because we were restricted by the APA manual coding rules to consider only studies in which the mean age was 60 years or older, it is not known whether these treatments would have met criteria as evidence based.

### *Alternative–Complementary Therapies*

Alternative–complementary treatments, including bright light therapy, exercise, and massage, were not considered in this review because they were not judged to meet our criteria for psychological treatments. That does not mean, however, that they might not offer some benefits in the treatment of insomnia in older adults. A large body of research has begun investigating the efficacy of bright light therapy for synchronizing sleep and reducing nocturnal disturbances in institutionalized older adults with Alzheimer's disease and other dementias (see reviews by Forbes et al., 2004; Skjerve, Bjorvatn, & Holsten, 2004). There is also a growing literature on the use of exercise and physical stimulation, including walking, weight training, Tai Chi, and acupressure, for improving sleep in older individuals (Chen, Lin, Wu, & Lin, 1999; King, Oman, Brassington, Bliwise, & Haskell, 1997; Li et al., 2004; Tsay, Rong, & Lin, 2003).

However, there are a number of difficulties with these studies that make them poor candidates for an evidence-based review that compares studies with the same age group, candidate treatment, and target problem. There is no agreement on the duration and timing of light exposure or the type, duration, or intensity of exercise activity that is needed to achieve treatment effects. The mechanisms by which these interventions affect sleep are highly complex and, in many cases, not well understood. Issues of study sample age span and medical comorbidities are substantial concerns. Many of the studies to date have relied only on self-report screening criteria and outcomes. Finally, issues surrounding participants' acceptance of and adherence to alternative treatments are

particularly complicated. In agreement with other recent reviews, we conclude that there is currently inadequate information available to evaluate the efficacy of these alternative sleep treatments for older adults (Montgomery & Dennis, 2004; National Institutes of Health, 2005).

### Discussion

This review was the first to be conducted for psychological treatments of insomnia using criteria for EBTs developed by the APA Committee on Science and Practice of the Society for Clinical Psychology (Division 12). Consistent with reviews that have been conducted in recent years using other rating criteria, sleep restriction–compression therapy, multicomponent CBT, and, potentially, stimulus control therapy are supported by convincing clinical evidence as efficacious for treating sleep disturbances in older adults.

A number of methodological concerns became apparent in conducting this review that bear mentioning here. Some, such as the age limitations we faced in selecting what literature to review, have already been discussed. Many insomnia intervention studies included older adults but were not restricted to persons over the age of 60, making it difficult to extract efficacy information for persons in that age group. As the average life span continues to lengthen, there is also a growing recognition that physical and psychological characteristics are much different for persons at age 60 than at age 80 or 100. We suggest that the “geriatric” age group classification (60 years and older) be divided into smaller categories (e.g., young-old, middle-old, and old-old), as is the case with childhood groupings (which are divided into infant, preschool, elementary, and adolescent categories in the latest coding manual).

Another issue, unique to the insomnia treatment literature, has to do with methods of assessment. In traditional psychological interventions, treatment eligibility is driven by *DSM-IV* diagnostic considerations, and treatment outcome is evaluated using a combination of self-report and/or interviewer observations on standardized instruments that rate symptoms related to the initial diagnosis. In the insomnia treatment literature, measurement of sleep status includes these assessment methods as well, but also may include objective measurement of sleep using polysomnography or actigraphy. Unlike the case of someone being treated for his or her depression, it is possible to objectively measure whether someone is sleeping better, regardless of whether they think they are. Thus, in an extreme case, a treatment could fail to meet criteria as evidence based because improvement is demonstrated by one form of measurement, such as self-report, but not another (actigraphy and polysomnography). One could argue that this is a good thing, in that it holds the nonpharmacological insomnia treatment literature to a higher standard than most psychological interventions must meet. It also perhaps illustrates the importance of having a theoretical basis for choosing outcome measures that one expects would be affected by a particular intervention as a way of increasing the likelihood that agreement might be found across assessment modalities. Nevertheless, it is a different use of the criteria developed by the Society of Clinical Psychology Committee on Science and Practice than is typically found in most other evidence-based comparisons.

A final consideration is that of the health status of study participants. The EBT coding manual classifies client comorbid condi-

tions that were not a primary focus of treatment as additional information that should be provided when available but is not essential to designating a treatment as an EBT. With the exception of the work being conducted by Rybarczyk and colleagues (Rybarczyk, DeMarco, DeLaCruz, Lapidus, & Fortner, 2001; Rybarczyk et al., 2002; Rybarczyk, Lopez, Schelble, & Stepanski, 2005), little was provided about health conditions that might significantly impact insomnia treatment delivery and responses in the articles reviewed. This issue is not unique to sleep disturbances in aging; certainly psychiatric conditions, such as depression and anxiety, are also frequently associated with comorbid health problems in older adults. However, there is a growing body of evidence that the vast majority of serious sleep problems in older adults are tied to physical and psychological health status. For the field to be able to move beyond efficacy trials to establish treatment effectiveness, additional assessments of comorbidity need to be routinely incorporated into the coding process.

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