

Supplementary Materials for Bensen-Boakes et al., The effect of cognitive behavioural therapy for insomnia (CBT-I) on subjective-objective sleep discrepancy in individuals with co-morbid insomnia and sleep apnoea: A randomized controlled trial.

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Table S1. Average SOSD ratio between groups and time ($\pm 95\%$ confidence intervals).

	Control		CBT-I				
	Baseline	6-weeks	Baseline	6-weeks	Main group effect	Main time effect	Interaction effect
Total Sleep Time SOSD (ratio)	0.13 (0.09)	0.07 (0.09)	0.09 (0.09)	-0.01 (0.09)	$F = 7.86$ $P .203$	$F = 3.62$ $P .059$	$F = 0.30$ $P .588$
Sleep Onset Latency SOSD (ratio)	-4.79 (1.41)	-3.29 (1.44)	-2.10 (1.48)	-1.77 (1.46)	$F = 1.28$ $P .260$	$F = 2.09$ $P .150$	$F = 0.73$ $P .395$
Wake After Sleep Onset SOSD (ratio)	-0.28 (0.22)	-0.14 (0.23)	-0.11 (0.23)	-0.04 (0.23)	$F = 1.03$ $P .311$	$F = 0.49$ $P .484$	$F = 0.27$ $P .604$
Sleep Efficiency SOSD (ratio)	0.13 (0.06)	0.07 (0.06)	0.11 (0.06)	0.01 (0.06)	$F = 1.92$ $P .168$	$F = 6.33$ $P .013$	$F = 0.12$ $P .726$

Table S2a. Complete case analysis, average SOSD between groups and time (standard deviation).

	Control		CBT-I				
	Baseline	6-weeks	Baseline	6-weeks	Main group effect	Main time effect	Interaction effect
Total Sleep Time SOSD	-60.0 (85.7)	-32.0 (83.8)	-45.3 (100)	-11.0 (76)	$F = 2.24$ $P = .137$	$F = 11.93$ $P = .001$	$F = .119$ $P = .731$
Sleep Onset Latency SOSD	37 (83.2)	21.7 (45.21)	32.6 (88.7)	10.8 (34.1)	$F = .776$ $P = .380$	$F = 5.80$ $P = .017$	$F = .183$ $P = .669$
Wake After Sleep Onset SOSD	3.5 (69.6)	2.1 (84.3)	-15.2 (83.3)	-10.7 (51.1)	$F = 2.123$ $P = .147$	$F = .049$ $P = .825$	$F = .195$ $P = .659$
Sleep Efficiency SOSD	-10.4 (17.6)	-6.4 (17.7)	-8.9 (19.0)	-1.8 (15.2)	$F = 1.532$ $P = .218$	$F = 11.11$ $P = .001$	$F = .82$ $P = .367$

Table S2b. ITT Linear Mixed Models results, average SOSD between groups and time ($\pm 95\%$ confidence intervals).

	Control		CBT-I				
	Baseline	6-weeks	Baseline	6-weeks	Main group effect	Main time effect	Interaction effect
Total Sleep Time SOSD	-58.3 (20.3)	-31.5 (20.7)	-45.2 (20.7)	-11.3 (21.0)	$F = 1.979$ $P = .162$	$F = 11.433$ $P = .001$	$F = .156$ $P = .693$
Sleep Onset Latency SOSD	38.0 (15.7)	21.9 (16.0)	30.7 (16.1)	10.4 (16.3)	$F = 1.197$ $P = .276$	$F = 5.692$ $P = .018$	$F = .073$ $P = .787$
Wake After Sleep Onset SOSD	1.9 (17.1)	1.3 (17.4)	-10.4 (17.5)	-8.3 (17.6)	$F = 1.075$ $P = .302$	$F = .014$ $P = .906$	$F = .043$ $P = .835$
Sleep Efficiency SOSD	-10.4 (4.1)	-6.3 (4.1)	-8.9 (4.1)	-1.8 (4.2)	$F = 1.3572$ $P = .246$	$F = 10.94$ $P = .001$	$F = .89$ $P = .347$

Table S3. Correlations between stage-specific, AHI, arousal index and polysomnography sleep duration with SOSD parameters at baseline.

	Total sleep time SOSD	Sleep onset latency SOSD	Wake after sleep onset SOSD	Sleep efficiency SOSD
N1 (minutes)	$r = -.02$ $P = .818$	$r = -.049$ $P = .567$	$r = -.149$ $P = .08$	$r = .062$ $P = .464$
N1 (percent)	$r = .192$ $P = .023$	$r = -.106$ $P = .212$	$r = -.249$ $P = .003$	$r = .226$ $P = .007$
N2 (minutes)	$r = -.362$ $P < .001$	$r = .025$ $P = .766$	$r = .229$ $P = .006$	$r = -.304$ $P < .001$
N2 (percent)	$r = -.11$ $P = .193$	$r = .01$ $P = .908$	$r = .184$ $P = .03$	$r = -.183$ $P = .03$
N3 (minutes)	$r = -.109$ $P = .2$	$r = .04$ $P = .639$	$r = .144$ $P = .09$	$r = -.059$ $P = .489$
N3 (percent)	$r = .001$ $P = .986$	$r = .059$ $P = .488$	$r = .133$ $P = .119$	$r = -.011$ $P = .895$
REM (minutes)	$r = -.295$ $P < .001$	$r = .103$ $P = .225$	$r = .082$ $P = .334$	$r = -.209$ $P = .013$
REM (percent)	$r = -.162$ $P = .055$	$r = .113$ $P = .184$	$r = .036$ $P = .669$	$r = -.13$ $P = .124$
AHI N1	$r = .065$ $P = .444$	$r = .064$ $P = .452$	$r = -.195$ $P = .021$	$r = .061$ $P = .473$
Arousal index N1	$r = .093$ $P = .274$	$r = -.038$ $P = .659$	$r = -.125$ $P = .141$	$r = .102$ $P = .232$
AHI N2	$r = -.007$ $P = .937$	$r = .190$ $P = .025$	$r = -.099$ $P = .244$	$r = -.066$ $P = .436$
Arousal index N2	$r = -.001$ $P = .991$	$r = .023$ $P = .79$	$r = -.082$ $P = .339$	$r = -.008$ $P = .925$
AHI N3	$r = -.079$ $P = .365$	$r = -.126$ $P = .151$	$r = .162$ $P = .064$	$r = -.093$ $P = .291$
Arousal index N3	$r = -.098$ $P = .264$	$r = -.157$ $P = .074$	$r = .1$ $P = .257$	$r = -.077$ $P = .383$
AHI REM	$r = .198$ $P = .022$	$r = -.127$ $P = .145$	$r = -.076$ $P = .386$	$r = .145$ $P = .093$
Arousal index REM	$r = .148$ $P = .086$	$r = -.118$ $P = .174$	$r = -.088$ $P = .31$	$r = .135$ $P = .118$

Table S4. Correlations between SOSD parameters and sociodemographic variables at baseline.

	Total sleep time SOSD	Sleep onset latency SOSD	Wake after sleep onset SOSD	Sleep efficiency SOSD
Age	$r = -.009$ $P = .915$	$r = .079$ $P = .352$	$r = -.167$ $P = .048$	$r = .073$ $P = .39$
BMI	$r = .055$ $P = .526$	$r = -.088$ $P = .308$	$r = .047$ $P = .584$	$r = .04$ $P = .646$
Sex	$r = -.043$ $P = .614$	$r = .004$ $P = .961$	$r = .02$ $P = .811$	$r = -.019$ $P = .823$

Table S5. Correlations between SOSD parameters and 7-day sleep diary variables at baseline.

	Total sleep time SOSD	Sleep onset latency SOSD	Wake after sleep onset SOSD	Sleep efficiency SOSD
7-day diary total sleep time	$r = .215$ $P = .01$	$r = .164$ $P = .053$	$r = -.221$ $P = .009$	$r = .12$ $P = .157$
7-day diary time in bed	$r = .053$ $P = .529$	$r = .167$ $P = .048$	$r = -.166$ $P = .05$	$r = -.028$ $P = .741$
7-day diary sleep onset latency	$r = -.057$ $P = .504$	$r = .08$ $P = .348$	$r = -.12$ $P = .159$	$r = -.016$ $P = .849$
7-day diary wake after sleep onset	$r = -.182$ $P = .03$	$r = -.043$ $P = .611$	$r = .230$ $P = .006$	$r = -.178$ $P = .035$
7-day diary number of awakenings	$r = -.037$ $P = .665$	$r = -.084$ $P = .323$	$r = .055$ $P = .519$	$r = -.059$ $P = .485$
7-day diary sleep efficiency	$r = .212$ $P = .012$	$r = .031$ $P = .719$	$r = -.132$ $P = .119$	$r = .169$ $P = .045$

Table S6. Correlations between SOSD parameters and questionnaire battery variables at baseline.

	Total sleep time SOSD	Sleep onset latency SOSD	Wake after sleep onset SOSD	Sleep efficiency SOSD
Insomnia Severity Index	$r = -.057$ $P = .502$	$r = .105$ $P = .216$	$r = .01$ $P = .907$	$r = -.066$ $P = .44$
Epworth Sleepiness Scale	$r = -.061$ $P = .472$	$r = -.06$ $P = .484$	$r = .093$ $P = .273$	$r = -.02$ $P = .814$
Flinders Fatigue Scale	$r = .041$ $P = .63$	$r = -.041$ $P = .631$	$r = .036$ $P = .671$	$r = .006$ $P = .941$
Dysfunctional Beliefs and Attitudes about Sleep Scale	$r = -.028$ $P = .746$	$r = .074$ $P = .387$	$r = -.139$ $P = .1$	$r = .032$ $P = .71$
Daytime Feelings and Functioning Scale	$r = .069$ $P = .419$	$r = -.026$ $P = .76$	$r = .016$ $P = .849$	$r = .034$ $P = .69$
Depression	$r = .009$ $P = .918$	$r = -.008$ $P = .924$	$r = -.016$ $P = .854$	$r = -.034$ $P = .692$
Anxiety	$r = -.004$ $P = .962$	$r = -.045$ $P = .597$	$r = .001$ $P = .988$	$r = .024$ $P = .774$
Stress	$r = -.062$ $P = .467$	$r = -.034$ $P = .688$	$r = .101$ $P = .235$	$r = -.044$ $P = .606$

Table S7. Correlations between SOSD parameters and polysomnography variables at baseline.

	Total sleep time SOSD	Sleep onset latency SOSD	Wake after sleep onset SOSD	Sleep efficiency SOSD
Total sleep time	$r = -.413$ $P = < .001$	$r = .04$ $P = .638$	$r = .158$ $P = .063$	$r = -.270$ $P = .001$
Sleep efficiency	$r = -.293$ $P = < .001$	$r = .094$ $P = .27$	$r = .408$ $P = < .001$	$r = -.367$ $P = < .001$
Wake after sleep onset	$r = .142$ $P = .092$	$r = .109$ $P = .199$	$r = -.493$ $P = < .001$	$r = .235$ $P = .005$
Sleep onset latency	$r = .095$ $P = .263$	$r = -.399$ $P = < .001$	$r = -.05$ $P = .556$	$r = .211$ $P = .012$
Time in bed	$r = -.245$ $P = .003$	$r = -.114$ $P = .181$	$r = -.183$ $P = .03$	$r = .009$ $P = .914$
AHI	$r = .084$ $P = .322$	$r = .053$ $P = .532$	$r = -.161$ $P = .058$	$r = .055$ $P = .516$
Arousal index	$r = .085$ $P = .314$	$r = -.019$ $P = .826$	$r = -.182$ $P = .032$	$r = .102$ $P = .228$