

Supplementary Material

Article Title: Interdisciplinary Weight Loss and Lifestyle Intervention for Daily Functioning and Psychiatric Symptoms in Obstructive Sleep Apnea: The INTERAPNEA Randomized Clinical Trial

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Supplementary Table 1. Baseline Characteristics of the Study Participants (Per-Protocol Approach)

Characteristics ^b	No. (%) ^a	
	Control (n = 49)	Intervention (n = 40)
Age, mean (SD), y	55.4 (8.9)	52.6 (7.2)
Educational level		
Primary Education	8 (22.9)	10 (25.0)
Secondary Education	6 (17.1)	6 (15.0)
Vocational Education	11 (31.4)	17 (42.5)
Higher Education	10 (28.6)	7 (17.5)
Marital status		
Single	4 (11.4)	2 (5.0)
Married	25 (71.4)	34 (85.0)
Divorced	6 (17.1)	4 (10.0)
Occupational status		
Employed	19 (54.3)	21 (52.5)
Self-employed	6 (17.1)	12 (30.0)
Unemployed	3 (8.6)	5 (12.5)
Retired	7 (20.0)	2 (5.0)
Medical Conditions ^c		
Hypertension	22 (62.9)	27 (67.5)
Diabetes Mellitus II	12 (34.3)	10 (25.0)
Cardiovascular disease	8 (22.9)	7 (17.5)
Other medical conditions	18 (51.4)	26 (65.0)
Medication ^c		
Antihypertensive	21 (60.0)	24 (60.0)
Statins	9 (25.7)	7 (17.5)
Oral antidiabetic	4 (11.4)	2 (5.0)
Insulin	3 (8.6)	1 (2.5)
Beta-blockers	5 (14.3)	5 (12.5)
Polymedication ^d	9 (25.7)	6 (15.0)
Body mass index, mean (SD), kg/m ²	33.7 (4.5)	35.0 (6.0)
Body weight status		
Overweight	7 (20.0)	5 (12.5)
Class I obesity	17 (48.6)	19 (47.5)
Class II obesity	10 (28.6)	11 (27.5)
Class III obesity	1 (2.9)	5 (12.5)
Apnea-hypopnea index, mean (SD), events/hr	39.2 (20.7)	41.6 (23.5)
Obstructive sleep apnea severity		
Moderate	15 (42.9)	15 (37.5)
Severe	20 (57.1)	25 (62.5)
Time since obstructive sleep apnea diagnosis, mean (SD), y	8.6 (6.0)	6.5 (6.5)

^a No. (%) reported unless otherwise specified.

^b No significant between-group differences were observed in any of the baseline characteristics.

^c Participants could have more than one condition or medication.

^d Defined as the use of five or more medications.

Supplementary Table 2. Daily Functioning, Psychological Distress, Anxiety and Depression Outcomes (Per-Protocol Approach)

Endpoints	Control (n=49)		Intervention (n=40)				Mean difference between groups at 8 weeks (95% CI)	Mean difference between groups at 6 months (95% CI)
	At baseline (95% CI) ^a	Change at 8 weeks (95% CI)	Change at 6 months (95% CI)	At baseline (95% CI) ^a	Change at 8 weeks (95% CI)	Change at 6 months (95% CI)		
Functional Outcomes of Sleep Questionnaire ^b								
General productivity score	3.4 (3.3 to 3.6)	0.2 (-0.001 to 0.3)	0.04 (-0.1 to 0.2)	3.5 (3.4 to 3.7)	0.4 (0.2 to 0.5)	0.3 (0.2 to 0.5)	0.2 (0.03 to 0.4) ^g	0.3 (0.1 to 0.5) ^h
Social outcome score	3.5 (3.3 to 3.8)	-0.1 (-0.4 to 0.3)	-0.4 (-0.7 to 0.02)	3.5 (3.2 to 3.8)	0.4 (0.1 to 0.8)	0.4 (0.1 to 0.8)	0.5 (0.1 to 0.9) ^g	0.8 (0.4 to 1.2) ⁱ
Activity level score	3.2 (3.0 to 3.4)	0.1 (-0.1 to 0.3)	0.05 (-0.1 to 0.2)	3.3 (3.1 to 3.5)	0.4 (0.3 to 0.6)	0.5 (0.3 to 0.6)	0.3 (0.1 to 0.5) ^h	0.4 (0.2 to 0.6) ⁱ
Vigilance score	3.2 (3.0 to 3.5)	-0.03 (-0.3 to 0.3)	0.1 (-0.2 to 0.4)	3.3 (3.1 to 3.5)	0.4 (0.1 to 0.6)	0.5 (0.2 to 0.8)	0.4 (0.1 to 0.7) ^g	0.4 (0.03 to 0.7) ^g
Sexual relationships and intimacy score	3.0 (2.6 to 3.3)	-0.3 (-0.8 to 0.2)	0.02 (-0.5 to 0.6)	3.3 (3.0 to 3.6)	0.6 (0.2 to 1.1)	0.6 (0.2 to 1.1)	0.9 (0.4 to 1.4) ^h	0.6 (0.02 to 1.2) ^g
Total score	16.4 (15.6 to 17.2)	-0.1 (-0.9 to 0.6)	-0.1 (-1.0 to 0.7)	16.9 (16.2 to 17.7)	2.2 (1.5 to 2.9)	2.3 (1.5 to 3.0)	2.3 (1.5 to 3.2) ⁱ	2.4 (1.5 to 3.4) ⁱ
General Health Questionnaire ^c								
Somatic symptoms score	5.8 (4.7 to 6.9)	-0.9 (-2.3 to 0.5)	0.9 (-0.6 to 2.5)	6.6 (5.6 to 7.6)	-5.1 (-6.4 to -3.8)	-3.9 (-5.3 to -2.5)	-4.1 (-5.7 to -2.6) ⁱ	-4.9 (-6.6 to -3.1) ⁱ
Anxiety symptoms score	5.9 (4.7 to 7.0)	-0.5 (-2.2 to 1.3)	0.5 (-1.4 to 2.4)	6.2 (5.2 to 7.3)	-3.6 (-5.2 to -1.9)	-3.7 (-5.4 to -2.0)	-3.1 (-5.1 to -1.1) ^h	-4.2 (-6.3 to -2.1) ⁱ
Social dysfunction symptoms score	8.5 (7.8 to 9.3)	-1.0 (-2.2 to 0.3)	-0.7 (-2.1 to 0.7)	7.9 (7.2 to 8.6)	-3.1 (-4.2 to -1.9)	-2.7 (-3.9 to -1.4)	-2.1 (-3.5 to -0.7) ^h	-2.0 (-3.5 to -0.5) ^g
Depression symptoms score	2.1 (1.2 to 3.0)	-0.03 (-1.1 to 1.2)	-0.1 (-1.2 to 1.4)	2.7 (1.8 to 3.5)	-2.2 (-3.3 to -1.1)	-2.1 (-3.3 to -1.0)	-2.2 (-3.5 to -0.9) ^h	-2.2 (-3.6 to -0.8) ^h
Total score	22.3 (19.2 to 25.3)	-2.3 (-6.8 to 2.1)	0.8 (-4.2 to 5.7)	23.4 (20.5 to 26.2)	-13.9 (-18.1 to -9.7)	-12.5 (-16.9 to -8.1)	-11.5 (-16.6 to -6.5) ⁱ	-13.2 (-18.6 to -7.8) ⁱ
State-Trait Anxiety Inventory ^d								
Anxiety-state total score	14.5 (11.6 to 17.3)	1.9 (-1.7 to 5.5)	2.8 (-1.2 to 6.8)	16.7 (14.0 to 19.3)	-5.7 (-9.1 to -2.4)	-7.2 (-10.7 to -3.6)	-7.6 (-11.7 to -3.6) ⁱ	-10.0 (-14.4 to -5.6) ⁱ
Anxiety-trait total score	18.5 (15.3 to 21.6)	0.5 (-2.5 to 3.5)	1.1 (-2.2 to 4.4)	20.7 (17.7 to 23.6)	-6.1 (-8.9 to -3.3)	-8.2 (-11.2 to -5.3)	-6.6 (-9.9 to -3.2) ⁱ	-9.3 (-13.0 to -5.7) ⁱ
State-Trait Depression Inventory ^e								
Euthymia-state score	11.3 (10.2 to 12.4)	-0.3 (-1.6 to 0.9)	1.0 (-0.4 to 2.4)	11.6 (10.6 to 12.7)	-1.9 (-3.0 to -0.7)	-1.6 (-2.9 to -0.4)	-1.5 (-2.9 to -0.1) ^g	-2.6 (-4.1 to -1.1) ⁱ
Dysthymia-state score	5.7 (5.1 to 6.3)	0.4 (-0.4 to 1.3)	0.9 (-0.1 to 1.8)	6.1 (5.5 to 6.6)	-0.7 (-1.4 to 0.1)	-0.4 (-1.2 to 0.5)	-1.1 (-2.0 to -0.1) ^g	-1.2 (-2.2 to -0.2) ^g
Depression-state total score	17.0 (15.4 to 18.5)	0.1 (-1.7 to 1.9)	1.9 (-0.1 to 3.8)	17.7 (16.2 to 19.1)	-2.5 (-4.2 to -0.8)	-2.0 (-3.7 to -0.2)	-2.6 (-4.6 to -0.6) ^g	-3.8 (-6.0 to -1.6) ⁱ
Euthymia-trait score	10.9 (9.7 to 12.0)	-0.3 (-1.5 to 0.9)	0.4 (-0.9 to 1.8)	11.3 (10.2 to 12.4)	-2.6 (-3.7 to -1.4)	-1.6 (-2.8 to -0.4)	-2.2 (-3.6 to -0.9) ^h	-2.0 (-3.5 to -0.6) ^h
Dysthymia-trait score	6.5 (5.7 to 7.3)	0.5 (-0.3 to 1.2)	0.5 (-0.3 to 1.3)	7.0 (6.2 to 7.7)	-1.3 (-1.9 to -0.6)	-1.0 (-1.7 to -0.3)	-1.7 (-2.5 to -0.9) ⁱ	-1.5 (-2.4 to -0.6) ^h
Depression-trait total score	17.4 (15.6 to 19.2)	0.1 (-1.4 to 1.7)	1.0 (-0.8 to 2.7)	18.3 (16.6 to 20.0)	-3.8 (-5.3 to -2.3)	-2.6 (-4.2 to -1.1)	-3.9 (-5.7 to -2.2) ⁱ	-3.6 (-5.5 to -1.7) ⁱ
Beck Depression Inventory-Fast Screen ^f								
Total score	2.3 (1.5 to 3.1)	-0.000 (-1.1 to 1.1)	0.6 (-0.6 to 1.7)	3.2 (2.4 to 3.9)	-2.3 (-3.2 to -1.3)	-1.9 (-2.9 to -0.9)	-2.3 (-3.4 to -1.1) ⁱ	-2.5 (-3.7 to -1.2) ⁱ

Abbreviations: CI, confidence interval.

^a No significant between-group differences were observed in mean baseline values.

^b The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴

^c The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6}

^d The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹

^e The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰

^f The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12}

^g $P < 0.05$

^h $P < 0.01$

ⁱ $P < 0.001$

Supplementary Table 3. Daily Functioning, Psychological Distress, Anxiety and Depression Outcomes (Changes from 8 weeks to 6 months)

Endpoints	Control (n=49)			Intervention (n=40)		
	8 weeks Mean (95% CI)	6 months Mean (95% CI)	Mean change (95% CI)	8 weeks Mean (95% CI)	6 months Mean (95% CI)	Mean change (95% CI)
Functional Outcomes of Sleep Questionnaire^b						
General productivity score	3.6 (3.4 to 3.7)	3.5 (3.3 to 3.6)	-0.1 (-0.3 to 0.1)	3.9 (3.7 to 4.0)	3.8 (3.7 to 4.0)	-0.03 (-0.2 to 0.1)
Social outcome score	3.4 (3.1 to 3.7)	3.1 (2.8 to 3.4)	-0.3 (-0.7 to 0.1)	3.9 (3.7 to 4.2)	3.9 (3.6 to 4.2)	0.01 (-0.3 to 0.4)
Activity level score	3.3 (3.1 to 3.5)	3.2 (3.1 to 3.4)	-0.1 (-0.2 to 0.1)	3.7 (3.6 to 3.9)	3.8 (3.6 to 3.9)	0.04 (-0.1 to 0.2)
Vigilance score	3.2 (3.0 to 3.4)	3.4 (3.1 to 3.6)	0.1 (-0.2 to 0.4)	3.7 (3.5 to 3.9)	3.8 (3.6 to 4.0)	0.1 (-0.2 to 0.4)
Sexual relationships and intimacy score	2.7 (2.4 to 3.1)	3.0 (2.7 to 3.4)	0.3 (-0.2 to 0.8)	3.9 (3.6 to 4.2)	3.9 (3.6 to 4.3)	0.02 (-0.4 to 0.5)
Total score	16.3 (15.6 to 17.1)	16.3 (15.5 to 17.1)	-0.02 (-0.9 to 0.8)	19.1 (18.3 to 19.8)	19.2 (18.4 to 20.0)	0.1 (-0.6 to 0.9)
General Health Questionnaire^c						
Somatic symptoms score	5.0 (3.9 to 6.1)	6.9 (5.7 to 8.1)	1.9 (0.4 to 3.5) [§]	1.5 (0.5 to 2.6)	2.7 (1.6 to 3.8)	1.2 (-0.2 to 2.6)
Anxiety symptoms score	5.5 (4.4 to 6.7)	6.4 (5.1 to 7.7)	0.9 (-1.1 to 2.8)	2.7 (1.5 to 3.8)	2.5 (1.3 to 3.7)	-0.1 (-1.9 to 1.6)
Social dysfunction symptoms score	7.6 (6.8 to 8.4)	7.9 (7.0 to 8.8)	0.3 (-1.1 to 1.7)	4.9 (4.1 to 5.6)	5.2 (4.4 to 6.0)	0.4 (-0.9 to 1.7)
Depression symptoms score	2.4 (1.4 to 3.3)	2.4 (1.3 to 3.4)	0.02 (-1.3 to 1.3)	0.5 (-0.5 to 1.4)	0.5 (-0.4 to 1.5)	0.1 (-1.1 to 1.2)
Total score	20.4 (17.2 to 23.7)	23.5 (19.8 to 27.1)	3.0 (-2.1 to 8.1)	9.5 (6.4 to 12.6)	11.0 (7.7 to 14.2)	1.5 (-3.1 to 6.0)
State-Trait Anxiety Inventory^d						
Anxiety-state total score	16.9 (14.1 to 19.8)	17.8 (14.7 to 20.9)	0.9 (-3.1 to 4.9)	11.0 (8.2 to 13.7)	9.5 (6.6 to 12.4)	-1.4 (-5.0 to 2.2)
Anxiety-trait total score	19.9 (16.9 to 23.0)	20.5 (17.2 to 23.8)	0.5 (-2.8 to 3.9)	14.6 (11.4 to 17.7)	12.4 (9.2 to 15.7)	-2.1 (-5.1 to 0.9)
State-Trait Depression Inventory^e						
Euthymia-state score	11.0 (9.9 to 12.1)	12.3 (11.1 to 13.4)	1.3 (-0.1 to 2.6)	9.8 (8.7 to 10.8)	10.0 (8.9 to 11.1)	0.2 (-1.0 to 1.4)
Dysthymia-state score	6.2 (5.6 to 6.8)	6.6 (6.0 to 7.3)	0.4 (-0.5 to 1.4)	5.4 (4.8 to 6.0)	5.7 (5.1 to 6.3)	0.3 (-0.5 to 1.1)
Depression-state total score	17.3 (15.8 to 18.8)	19.0 (17.3 to 20.6)	1.7 (-0.3 to 3.7)	15.2 (13.7 to 16.7)	15.7 (14.1 to 17.3)	0.5 (-1.3 to 2.3)
Euthymia-trait score	10.5 (9.4 to 11.6)	11.2 (10.0 to 12.4)	0.7 (-0.7 to 2.0)	8.8 (7.6 to 9.9)	9.7 (8.5 to 10.9)	0.9 (-0.3 to 2.1)
Dysthymia-trait score	7.1 (6.4 to 7.8)	7.1 (6.3 to 7.8)	-0.02 (-0.8 to 0.8)	5.7 (5.0 to 6.4)	6.0 (5.2 to 6.7)	0.2 (-0.5 to 1.0)
Depression-trait total score	17.6 (16.0 to 19.3)	18.3 (16.5 to 20.0)	0.7 (-1.1 to 2.4)	14.5 (12.8 to 16.2)	15.7 (13.9 to 17.4)	1.2 (-0.4 to 2.8)
Beck Depression Inventory-Fast Screen^f						
Total score	2.5 (1.7 to 3.4)	3.0 (2.1 to 4.0)	0.5 (-0.7 to 1.7)	0.9 (0.1 to 1.7)	1.3 (0.4 to 2.1)	0.4 (-0.7 to 1.4)

Abbreviations: CI, confidence interval.

^a No significant between-group differences were observed in mean baseline values.

^b The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴

^c The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6}

^d The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹

^e The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰

^f The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12}

[§] $P < 0.05$

Supplementary Table 4. Functional Outcomes of Sleep Questionnaire^a by group and clinical status

Group	At baseline		At 8 weeks		At 6 months	
	No. (%)	Mean (SD)	No. (%)	Mean (SD)	No. (%)	Mean (SD)
Control/usual care						
All	49 (100)	16.48 (2.82)	49 (100)	16.38 (3.16)	49 (100)	16.41 (2.97)
With impaired daily functioning	29 (59.2)	14.65 (2.22)	32 (65.3)	14.78 (2.76)	31 (63.3)	14.72 (2.41)
No impaired in daily functioning	20 (40.8)	19.13 (0.59)	17 (34.7)	19.40 (0.60)	18 (36.7)	19.33 (0.62)
Intervention						
All	40 (100)	16.91 (2.29)	40 (100)	19.09 (1.07)	40 (100)	19.23 (0.93)
With impaired daily functioning	25 (62.5)	15.61 (1.88)	7 (17.5)	17.07 (0.44)	3 (7.5)	16.74 (0.49)
No impaired in daily functioning	15 (37.5)	19.10 (0.61)	33 (82.5)	19.52 (0.52)	37 (92.5)	19.43 (0.60)

^a The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴

Supplementary Table 5. General Health Questionnaire^a by group and clinical status

Group	At baseline		At 8 weeks		At 6 months	
	No. (%)	Mean (SD)	No. (%)	Mean (SD)	No. (%)	Mean (SD)
Control/usual care						
All	49 (100)	24.04 (13.54)	49 (100)	22.37 (12.65)	49 (100)	23.63 (11.98)
With psychological distress	20 (40.8)	36.20 (12.79)	19 (38.8)	35.37 (10.22)	21 (42.9)	34.33 (10.68)
No psychological distress	29 (59.2)	15.66 (4.97)	30 (61.2)	14.13 (4.38)	28 (57.1)	15.61 (3.86)
Intervention						
All	40 (100)	23.38 (10.11)	40 (100)	9.5 (4.29)	40 (100)	10.25 (4.02)
With psychological distress	18 (45.0)	32.44 (7.25)	0 (0.0)	-	0 (0.0)	-
No psychological distress	22 (55.0)	15.96 (4.35)	40 (100)	9.5 (4.29)	40 (100)	10.25 (4.02)

^a The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6}

Supplementary Table 6. State-Trait Anxiety Inventory^a by group and clinical status

		At baseline		At 8 weeks		At 6 months	
		No. (%)	Mean (SD)	No. (%)	Mean (SD)	No. (%)	Mean (SD)
State Anxiety	Control/usual care						
	All	49 (100)	15.65 (9.97)	49 (100)	17.02 (9.54)	49 (100)	17.7 (10.22)
	With state anxiety	14 (28.6)	28.43 (6.58)	16 (32.7)	28.31 (6.66)	19 (38.8)	28.3 (6.50)
	No state anxiety	35 (71.4)	10.54 (5.45)	33 (67.3)	11.55 (4.60)	30 (61.2)	11.0 (5.26)
	Intervention						
	All	40 (100)	16.68 (9.89)	40 (100)	10.95 (6.92)	40 (100)	9.60 (6.21)
	With state anxiety	11 (27.5)	29.18 (8.00)	3 (7.5)	23.00 (1.00)	2 (5.0)	22.00 (0.00)
	No state anxiety	29 (72.5)	11.93 (5.34)	37 (92.5)	9.97 (6.23)	38 (95.0)	8.95 (5.65)
Trait Anxiety	Control/usual care						
	All	49 (100)	19.90 (11.03)	49 (100)	20.25 (10.69)	49 (100)	20.35 (11.64)
	With trait anxiety	19 (38.8)	31.00 (7.59)	20 (40.8)	30.45 (7.24)	19 (38.8)	32.11 (7.80)
	No trait anxiety	30 (61.2)	12.87 (5.82)	29 (59.2)	13.20 (5.88)	30 (61.2)	12.90 (6.21)
	Intervention						
	All	40 (100)	20.65 (10.36)	40 (100)	14.55 (8.15)	40 (100)	12.60 (8.19)
	With trait anxiety	15 (37.5)	31.67 (5.35)	3 (7.5)	33.67 (3.21)	2 (5.0)	36.00 (0.00)
	No trait anxiety	25 (62.5)	14.04 (6.03)	37 (92.5)	13.00 (6.20)	38 (95.0)	11.37 (6.29)

^a The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹

Supplementary Table 7. State-Trait Depression Inventory^a by group and clinical status

Group	At baseline		At 8 weeks		At 6 months	
	No. (%)	Mean (SD)	No. (%)	Mean (SD)	No. (%)	Mean (SD)
State Depression	Control/usual care					
	All	49 (100)	17.43 (4.88)	49 (100)	17.49 (5.57)	49 (100) 18.41 (5.81)
	With state depression	14 (28.6)	24.00 (2.22)	15 (30.6)	24.33 (3.64)	17 (34.7) 25.18 (3.66)
	No state depression	35 (71.4)	14.80 (2.61)	34 (69.4)	14.47 (2.98)	32 (65.3) 14.81 (2.61)
	Intervention					
	All	40 (100)	17.68 (4.27)	40 (100)	15.18 (3.48)	40 (100) 15.68 (4.29)
	With state depression	11 (27.5)	23.09 (2.77)	5 (12.5)	21.60 (1.67)	6 (15.0) 24.00 (2.28)
Trait Depression	No state depression	29 (72.5)	15.62 (2.60)	35 (87.5)	14.26 (2.57)	34 (85.0) 14.21 (2.47)
	Control/usual care					
	All	49 (100)	17.59 (5.45)	49 (100)	17.69 (6.08)	49 (100) 18.02 (6.21)
	With trait depression	14 (28.6)	24.86 (2.77)	15 (30.6)	25.47 (3.81)	14 (28.6) 26.36 (3.91)
	No trait depression	35 (71.4)	14.69 (2.94)	34 (69.4)	14.27 (2.83)	35 (71.4) 14.69 (2.93)
	Intervention					
	All	40 (100)	18.28 (5.22)	40 (100)	14.48 (3.88)	40 (100) 15.55 (4.87)
	With trait depression	12 (30.0)	24.50 (3.37)	3 (7.5)	24.00 (1.73)	7 (17.5) 24.14 (3.29)
	No trait depression	28 (70.0)	15.61 (3.19)	37 (92.5)	13.70 (2.82)	33 (82.5) 13.73 (2.70)

^a The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥ 20 and ≥ 21 suggests clinical levels of state and trait depression, respectively).¹⁰

Supplementary Table 8. Beck Depression Inventory-Fast Screen^a by group and clinical status

Group	At baseline		At 8 weeks		At 6 months	
	No. (%)	Mean (SD)	No. (%)	Mean (SD)	No. (%)	Mean (SD)
Control/usual care						
All	49 (100)	2.78 (3.22)	49 (100)	22.37 (12.65)	49 (100)	3.08 (3.67)
With symptoms of depression	12 (24.5)	7.42 (3.29)	15 (30.6)	6.67 (3.27)	17 (34.7)	6.88 (3.85)
No symptoms of depression	37 (75.5)	1.27 (1.02)	34 (69.4)	1.06 (1.04)	32 (65.3)	1.06 (1.01)
Intervention						
All	40 (100)	3.15 (2.50)	40 (100)	9.5 (4.29)	40 (100)	1.18 (1.74)
With symptoms of depression	16 (40.0)	5.69 (1.66)	1 (2.5)	4 (0.0)	2 (5.0)	7.00 (2.83)
No symptoms of depression	24 (60.0)	1.46 (1.14)	39 (97.5)	0.82 (0.97)	38 (95.0)	0.87 (1.02)

^a The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥ 4 suggests presence of depression).^{11,12}

Supplementary Table 9. Repeated measures correlation analyses examining association of changes in daily functioning, psychological distress, anxiety and depression over time (at 8 weeks and 6 months after intervention) with changes in obstructive sleep apnea severity, body mass index, excessive daytime sleepiness and subjective sleep quality outcomes

Outcomes	Apnea-hypopnea index, events/hr			Body mass index, kg/m ²			Epworth Sleepiness Scale, total score ^a			Pittsburgh Sleep Quality Index, total score ^b		
	r	95% CI	P value	r	95% CI	P value	r	95% CI	P value	r	95% CI	P value
Functional Outcomes of Sleep Questionnaire, total score ^c	-0.66	-0.78 to -0.51	< 0.001	-0.55	-0.70 to -0.37	<0.001	-0.72	-0.82 to -0.59	< 0.001	-0.69	-0.79 to -0.55	<0.001
General Health Questionnaire, total score ^d	0.67	0.51 to 0.78	<0.001	0.64	0.49 to 0.76	<0.001	0.67	0.52 to 0.78	<0.001	0.75	0.62 to 0.83	<0.001
State-Trait Anxiety Inventory ^e												
Anxiety-state total score	0.53	0.35 to 0.68	<0.001	0.54	0.35 to 0.68	<0.001	0.49	0.29 to 0.65	<0.001	0.53	0.34 to 0.68	<0.001
Anxiety-trait total score	0.62	0.45 to 0.74	<0.001	0.62	0.46 to 0.75	<0.001	0.61	0.45 to 0.74	<0.001	0.65	0.50 to 0.77	<0.001
State-Trait Depression Inventory ^f												
Depression-state total score	0.38	0.17 to 0.56	<0.001	0.40	0.19 to 0.58	<0.001	0.39	0.18 to 0.57	<0.001	0.39	0.18 to 0.57	<0.001
Depression-trait total score	0.57	0.39 to 0.71	<0.001	0.55	0.36 to 0.69	<0.001	0.48	0.28 to 0.64	<0.001	0.50	0.31 to 0.66	<0.001
Beck Depression Inventory-Fast Screen ^g	0.63	0.47 to 0.75	<0.001	0.59	0.42 to 0.72	<0.001	0.53	0.34 to 0.67	<0.001	0.61	0.45 to 0.74	<0.001

Abbreviations: CI, confidence interval.

^a The Epworth Sleepiness Scale evaluates excessive daytime sleepiness (range, 0-24; higher scores indicate more daytime sleepiness; score >10 indicates presence of hypersomnolence).¹³

^b The Pittsburgh Sleep Quality Index assess subjective sleep quality (range, 0-21; higher scores indicate worse sleep quality; score >5 suggests poor sleep quality).¹⁴

^c The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴

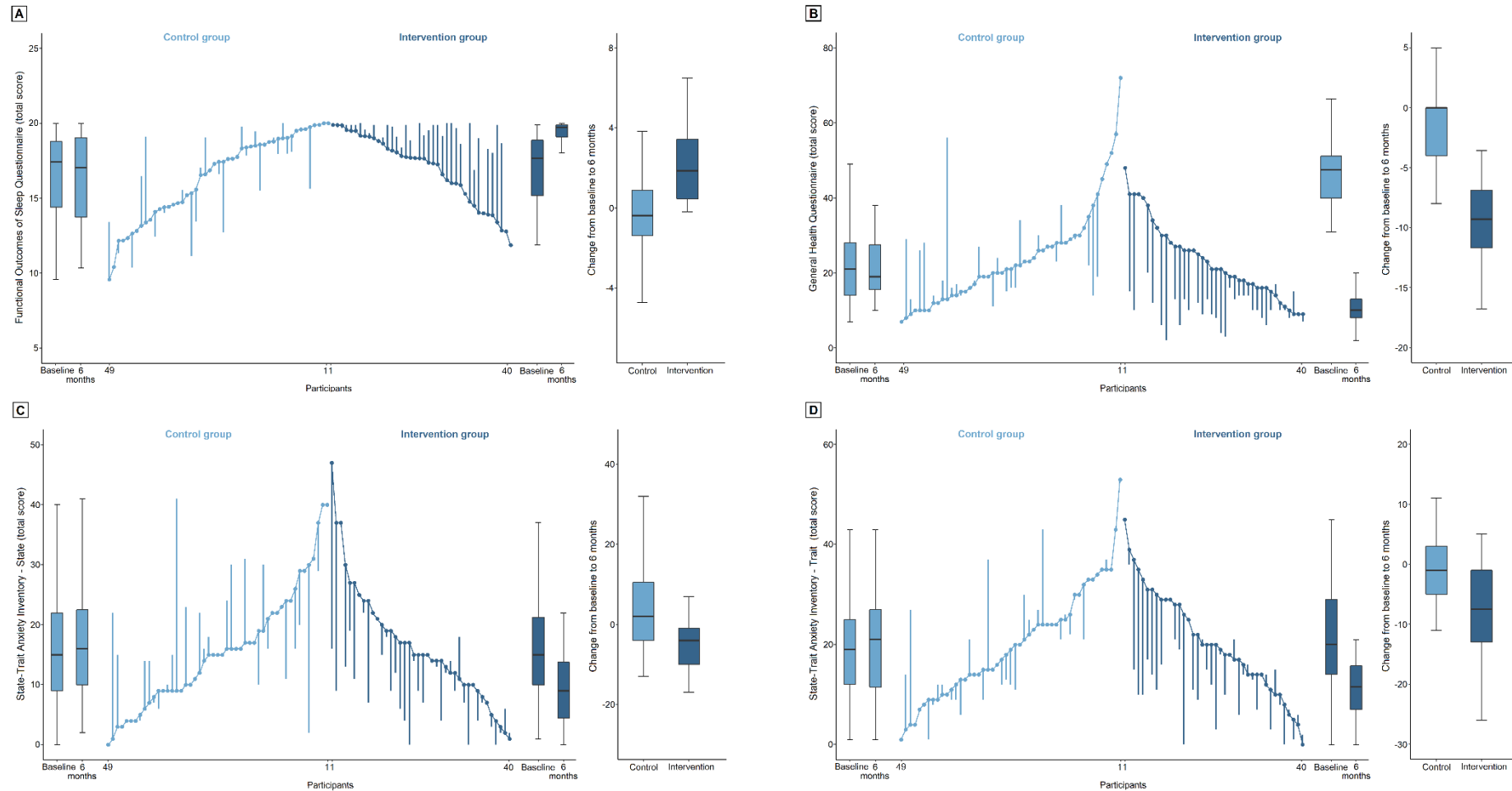
^d The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6}

^e The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹

^f The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰

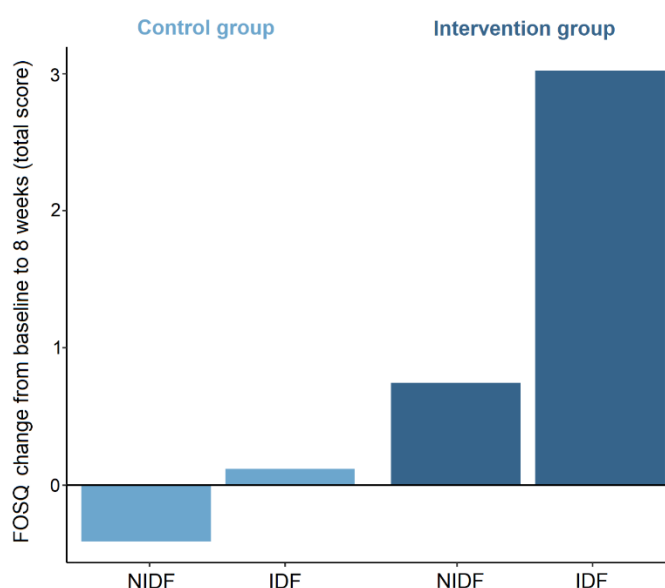
^g The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12}

Supplementary Figure 1. Daily Functioning, Psychological Distress, and Anxiety Outcomes (Changes from baseline to 6 months)^a



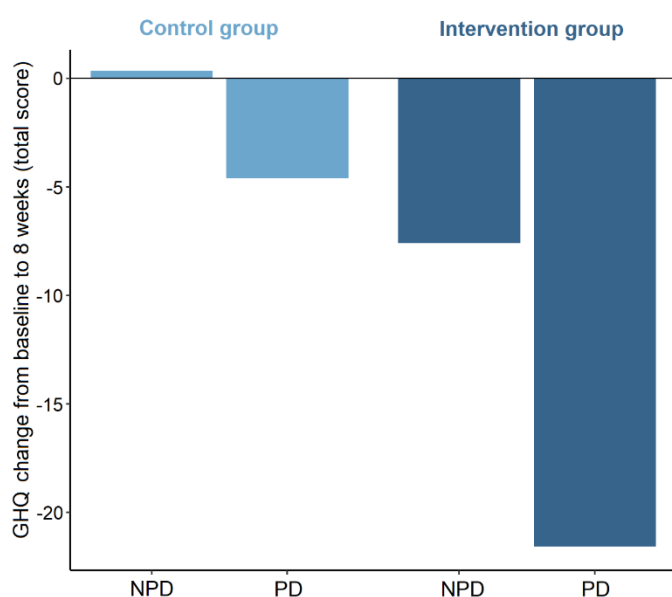
^a The ends of the boxes in the boxplots are located at the first and third quartiles, with the black line in the middle illustrating the median. Whiskers extend to the upper and lower adjacent values, the location of the furthest point within a distance of 1.5 interquartile ranges from the first and third quartiles. The parallel line plot contains 1 vertical line for each patient which extends from their baseline value to their 6-month value. Ascending lines indicate an improvement in the outcome (A). Descending lines indicate an improvement in the outcome (B, C, D). Baseline values are placed in ascending order for the control group and descending order for the intervention group. A, The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴ B, The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6} C,D, The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥ 21 and ≥ 24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹

Supplementary Figure 2. Changes in the Functional Outcomes of Sleep Questionnaire (FOSQ) by group and daily functioning status at baseline



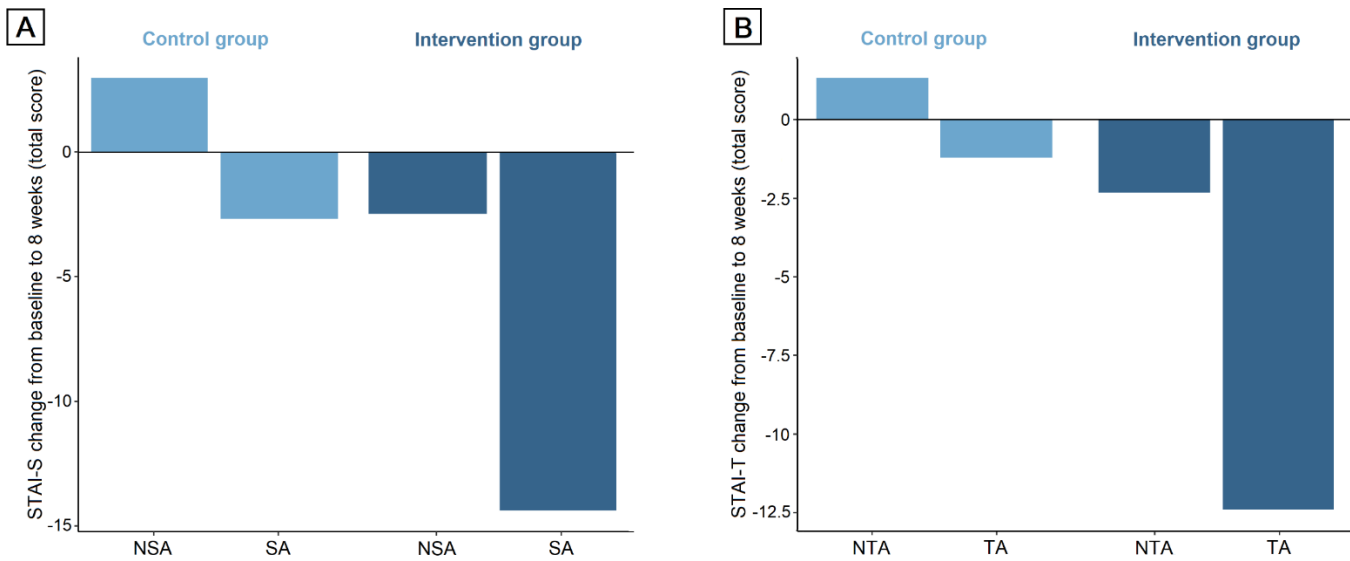
Abbreviations: IDF, participants who reported impaired daily functioning at baseline; NIDF, participants with no/minimal impaired daily functioning reported at baseline.

Supplementary Figure 3. Changes in the General Health Questionnaire (GHQ) by group and psychological distress status at baseline



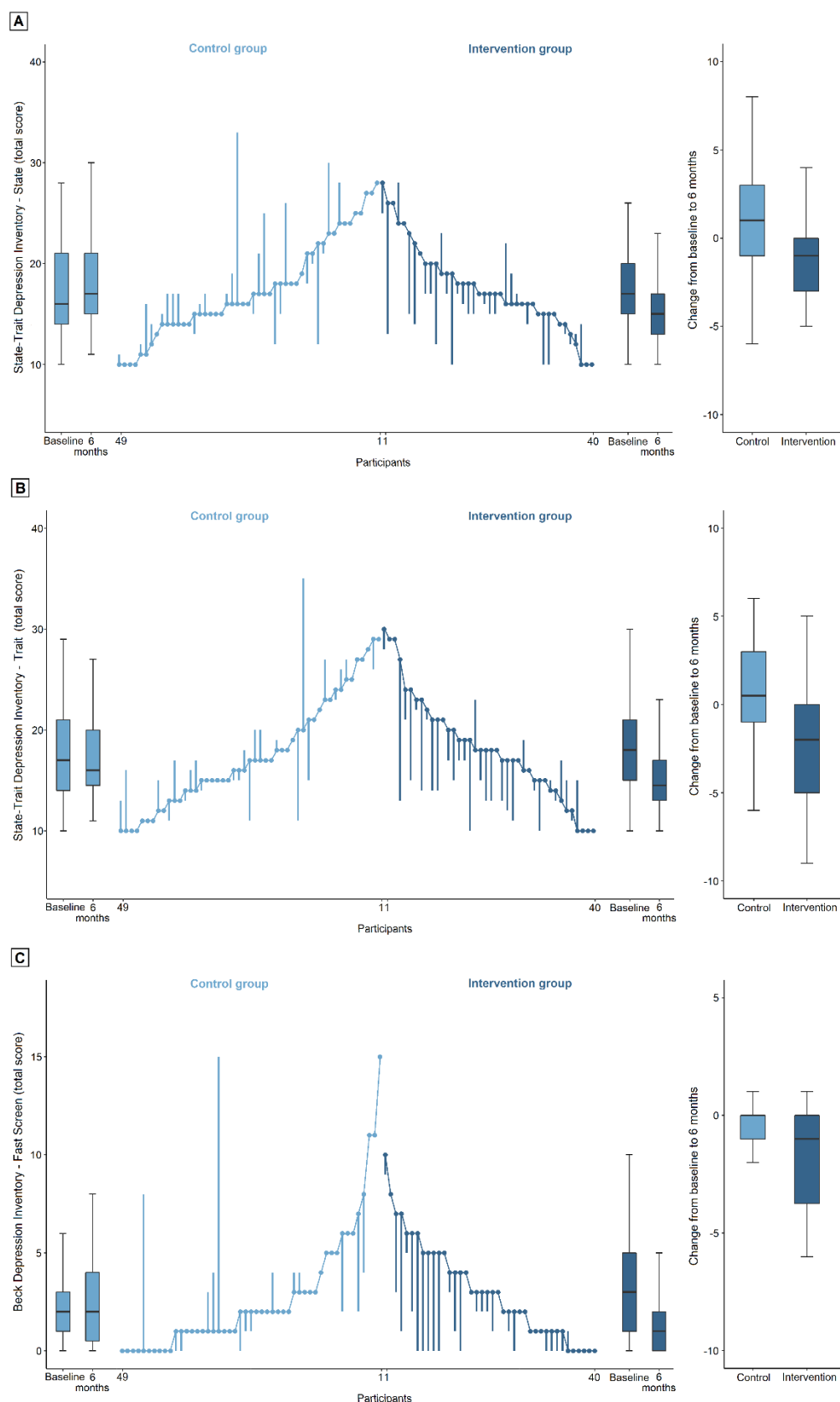
Abbreviations: PD, participants who reported psychological distress at baseline; NPD, participants with no/minimal psychological distress reported at baseline.

Supplementary Figure 4. Changes in the State-Trait Anxiety Inventory (STAI) by group and anxiety status at baseline



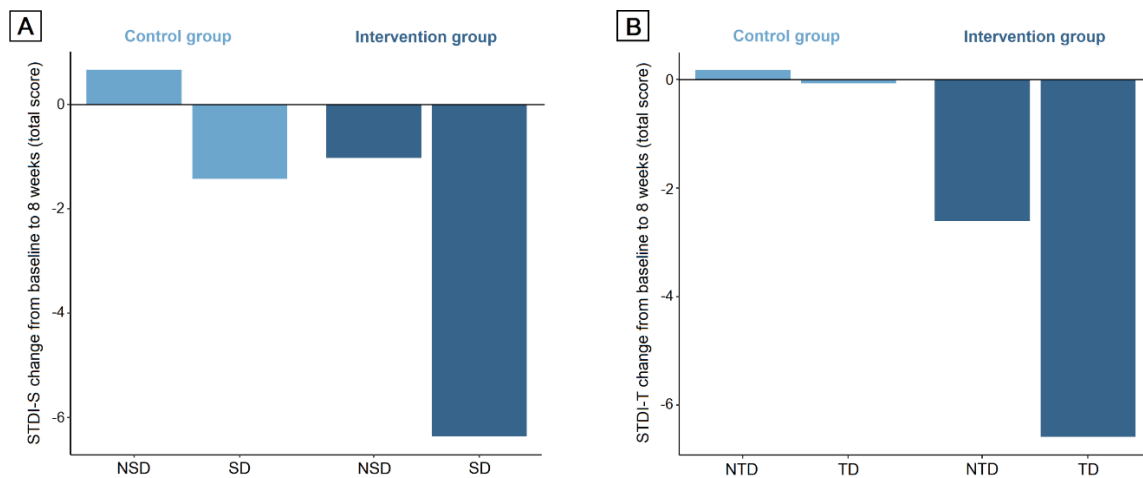
Abbreviations: A, State Anxiety (STAI-S); SA, participants who reported state anxiety at baseline; NSA, participants with no/minimal state anxiety reported at baseline. B, Trait Anxiety (STAI-T);
Abbreviations: TA, participants who reported trait anxiety at baseline; NTA, participants with no/minimal trait anxiety reported at baseline.

Supplementary Figure 5. Depression Outcomes (Changes from baseline to 6 months)^a



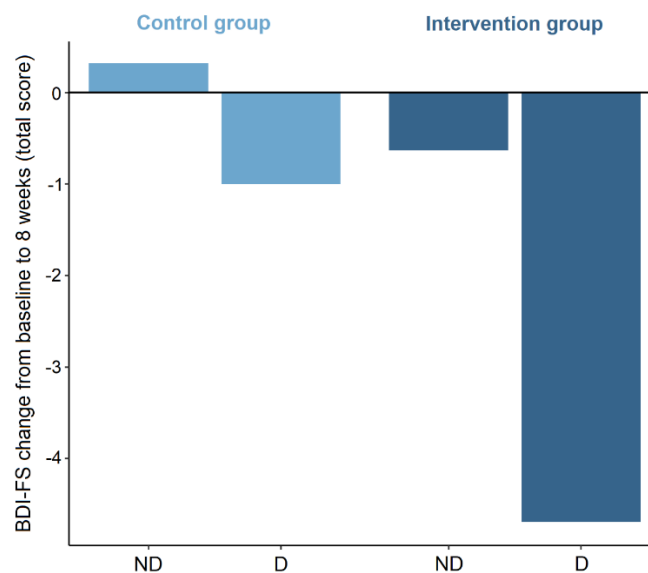
^a The ends of the boxes in the boxplots are located at the first and third quartiles, with the black line in the middle illustrating the median. Whiskers extend to the upper and lower adjacent values, the location of the furthest point within a distance of 1.5 interquartile ranges from the first and third quartiles. The parallel line plot contains 1 vertical line for each patient which extends from their baseline value to their 6-month value. Descending lines indicate an improvement in the outcome. Baseline values are placed in ascending order for the control group and descending order for the intervention group. A, B, The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥ 20 and ≥ 21 suggests clinical levels of state and trait depression, respectively).¹⁰ C, The Beck Depression Inventory-Fast Screen evaluates psychological distress (range, 0-21; higher scores indicate greater depression; score ≥ 4 suggests presence of depression).^{11,12}

Supplementary Figure 6. Changes in the State-Trait Depression Inventory (STDI) by group and depression status at baseline



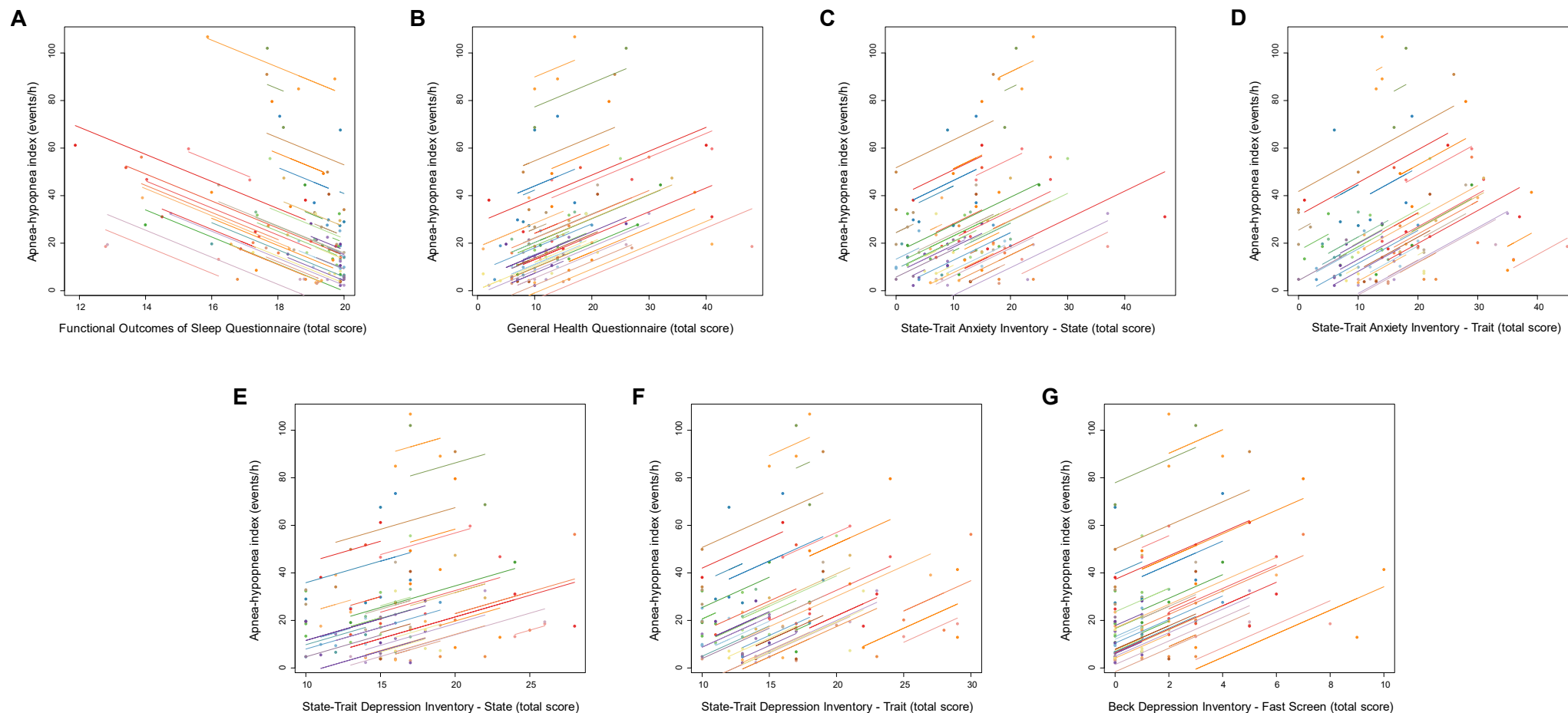
Abbreviations: A, State Depression (STDI-S); SD, participants who reported state depression at baseline; NSD, participants with no/minimal state depression reported at baseline. B, Trait Depression (STDI-T); TD, participants who reported trait depression at baseline; NTD, participants with no/minimal trait depression reported at baseline.

Supplementary Figure 7. Changes in the Beck Depression Inventory-Fast Screen (BDI-FS) by group and depression status at baseline



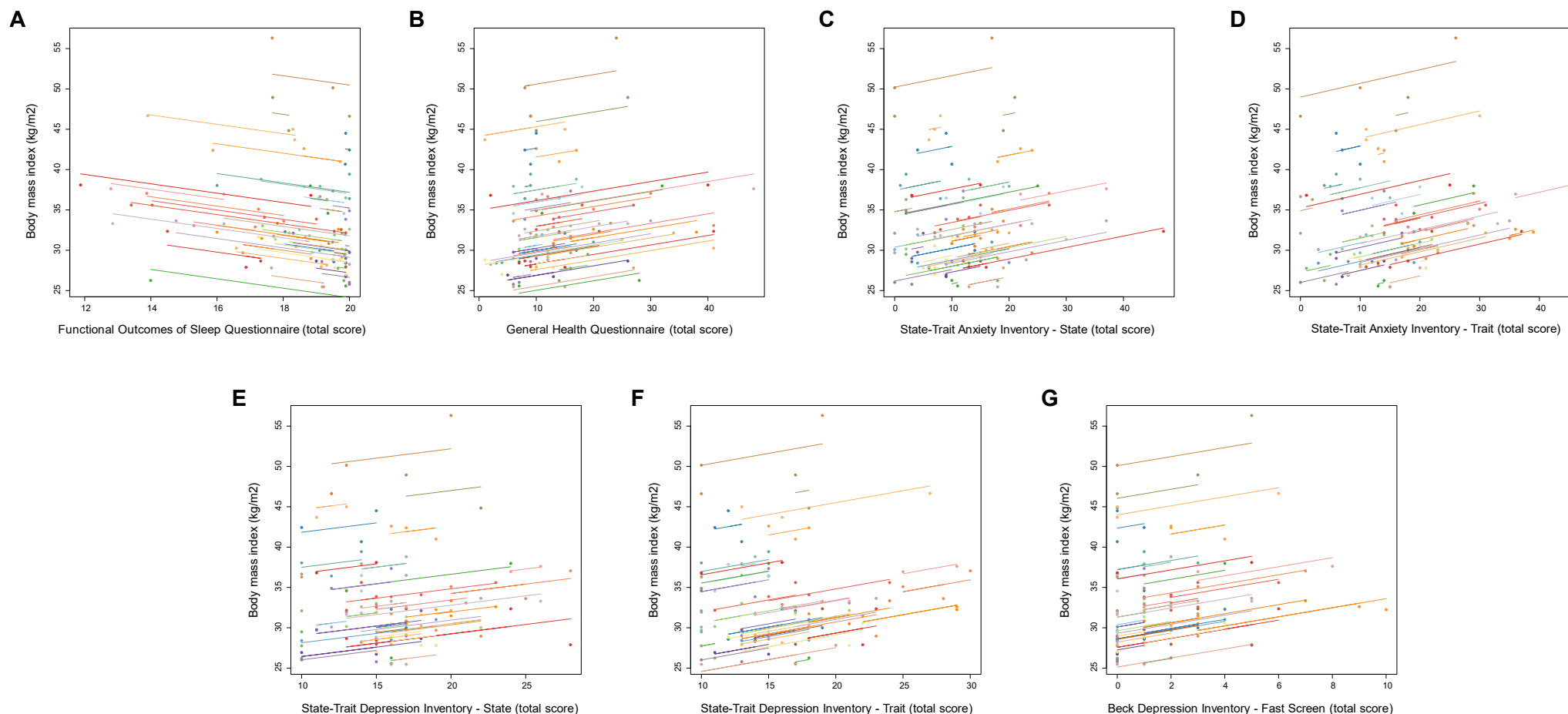
Abbreviations: D, participants who reported depression at baseline; ND, participants with no/minimal symptoms of depression reported at baseline.

Supplementary Figure 8. Association of changes in daily functioning and psychiatric symptoms over time with changes in obstructive sleep apnea severity.^a



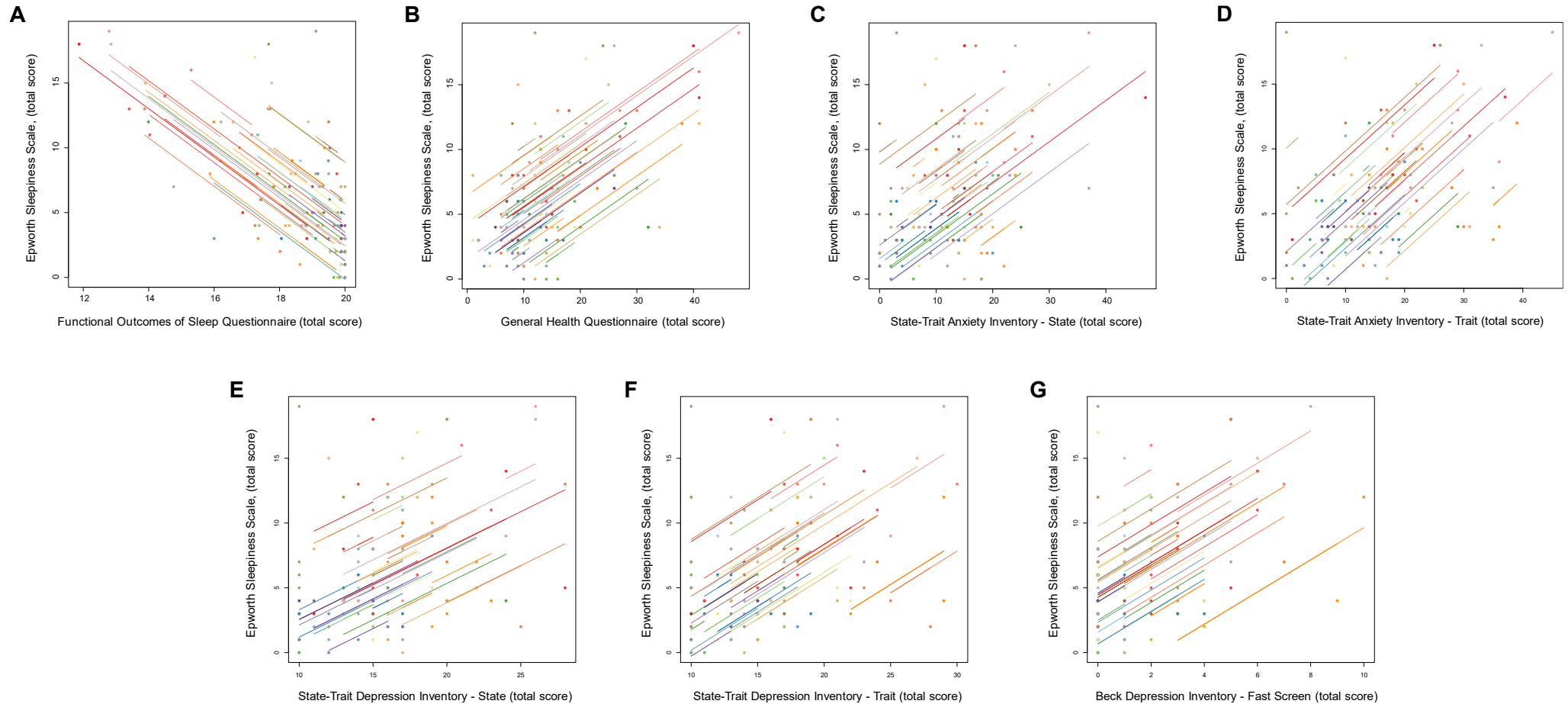
^aEach dot represents one of three separate observations (baseline, 8 weeks and 6 months after intervention) of psychiatric symptoms — as measured by the Functional Outcomes of Sleep Questionnaire (A), General Health Questionnaire (B), State-Trait Anxiety Inventory (C, D), State-Trait Depression Inventory (E,F) and Beck Depression Inventory – Fast Screen (G) — and obstructive sleep apnea severity — as measured by the apnea-hypopnea index — for a participant. Observations from the same participant are given the same color, with corresponding lines to show the repeated measures correlation fit for each participant. The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴ The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6} The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹ The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰ The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12}

Supplementary Figure 9. Association of changes in daily functioning and psychiatric symptoms over time with changes in body mass index.^a



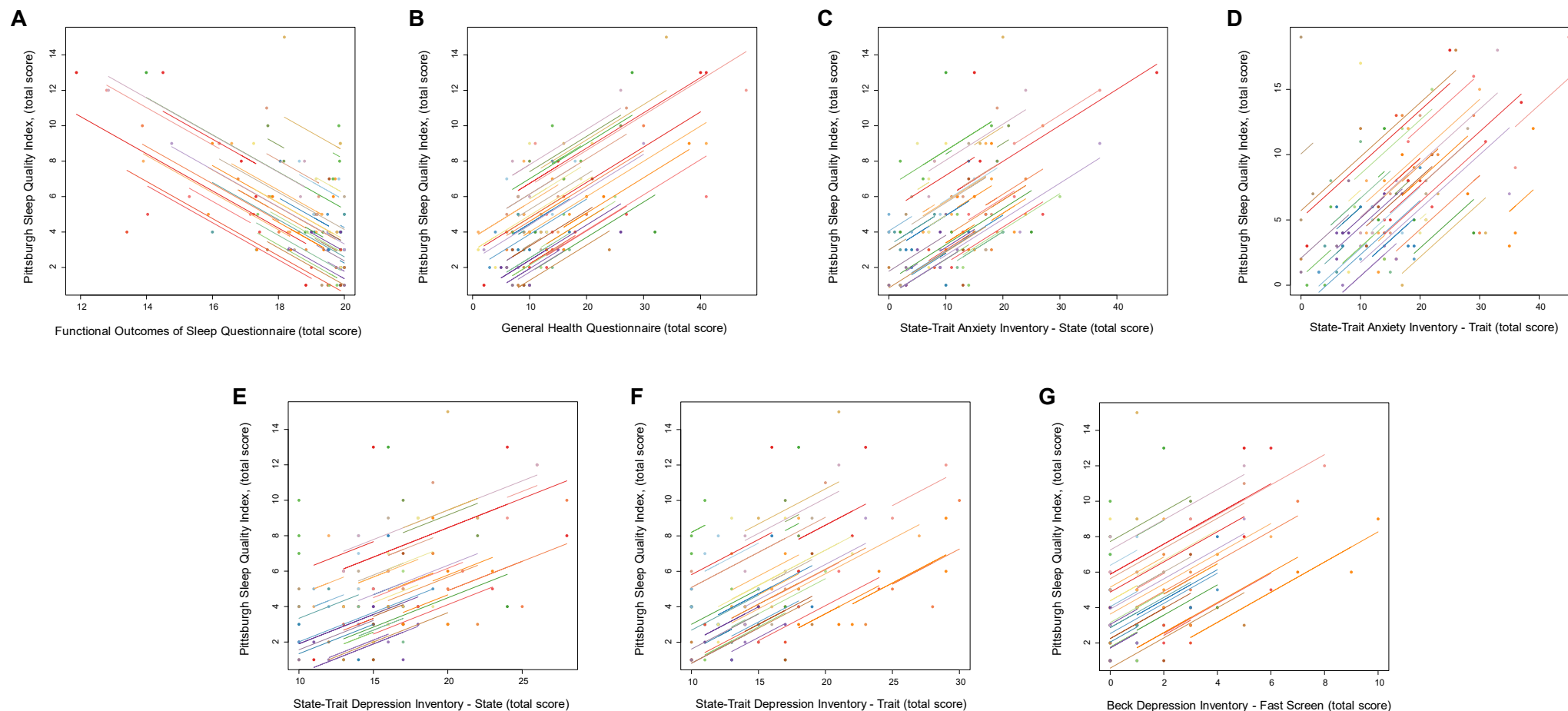
^aEach dot represents one of three separate observations (baseline, 8 weeks and 6 months after intervention) of psychiatric symptoms — as measured by the Functional Outcomes of Sleep Questionnaire (A), General Health Questionnaire (B), State-Trait Anxiety Inventory (C, D), State-Trait Depression Inventory (E,F) and Beck Depression Inventory – Fast Screen (G) — and body mass index for a participant. Observations from the same participant are given the same color, with corresponding lines to show the repeated measures correlation fit for each participant. The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴ The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6} The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹ The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰ The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12}

Supplementary Figure 10. Association of changes in daily functioning and psychiatric symptoms over time with changes in excessive daytime sleepiness.^a



^aEach dot represents one of three separate observations (baseline, 8 weeks and 6 months after intervention) of psychiatric symptoms — as measured by the Functional Outcomes of Sleep Questionnaire (A), General Health Questionnaire (B), State-Trait Anxiety Inventory (C, D), State-Trait Depression Inventory (E,F) and Beck Depression Inventory – Fast Screen (G) — and excessive daytime sleepiness — as measured by the Epworth Sleepiness Scale — for a participant. Observations from the same participant are given the same color, with corresponding lines to show the repeated measures correlation fit for each participant. The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴ The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6} The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹ The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰ The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12} The Epworth Sleepiness Scale evaluates excessive daytime sleepiness (range, 0-24; higher scores indicate more daytime sleepiness; score >10 indicates presence of hypersomnolence).¹³

Supplementary Figure 11. Association of changes in daily functioning and psychiatric symptoms over time with changes in subjective sleep quality.^a



^aEach dot represents one of three separate observations (baseline, 8 weeks and 6 months after intervention) of psychiatric symptoms — as measured by the Functional Outcomes of Sleep Questionnaire (A), General Health Questionnaire (B), State-Trait Anxiety Inventory (C, D), State-Trait Depression Inventory (E,F) and Beck Depression Inventory – Fast Screen (G) — and subjective sleep quality — as measured by the Pittsburgh Sleep Quality Index — for a participant. Observations from the same participant are given the same color, with corresponding lines to show the repeated measures correlation fit for each participant. The Functional Outcomes of Sleep Questionnaire assess the impact of excessive daytime sleepiness on daily functioning (range, 5-20; higher scores indicate greater functioning; score <18 reflects negative effect of sleepiness on daily functioning).¹⁻⁴ The General Health Questionnaire evaluates psychological distress (range, 0-84; higher scores indicate greater psychological distress; score >23 indicates presence of psychological distress).^{5,6} The State-Trait Anxiety Inventory measures state anxiety and trait anxiety (range, 0-60; higher scores indicate greater anxiety; score ≥21 and ≥24 suggests clinical levels of state and trait anxiety, respectively).⁷⁻⁹ The State-Trait Depression Inventory measures state depression and trait depression (range, 10-40; higher scores indicate greater depression; score ≥20 and ≥21 suggests clinical levels of state and trait depression, respectively).¹⁰ The Beck Depression Inventory-Fast Screen evaluates depression (range, 0-21; higher scores indicate greater depression; score ≥4 suggests presence of depression).^{11,12} The Pittsburgh Sleep Quality Index assess subjective sleep quality (range, 0-21; higher scores indicate worse sleep quality; score >5 suggests poor sleep quality).¹⁴

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