SUPPLEMENTAL METHODOLOGY

Cognitive assessment:

The cognitive assessment was performed in a two-step process according to our protocol [24]. At the first visit, participants were evaluated with a cognitive screening test, the Dementia Rating Scale version 2 (DRS-2). This test has 5 cognitive subscale scores (Attention, Memory, Initiation-Perseveration, Conceptualization and Construction) as well as a total score. The Attention subscale measures selective attention, verbal span and praxis; the Memory subscale measures verbal and visual memory and orientation; Initiation-Perseveration measures a component of executive function and semantic verbal fluency; Conceptualization measures verbal and nonverbal reasoning; and construction measures visual construction abilities. The Initiation-Perseveration and Conceptualization scores were averaged to obtain an executive function score.

Then, raw DRS-2 scores were adjusted for age and education following previously published normative data of our group in which we used common methodology to normalize cognitive scores[25]. Those participants who were suspected of having cognitive impairment (i.e., having a Total DRS-2 score below 8, adjusted for age and education[25]) were invited to undergo a second cognitive visit. Briefly, this second visit consisted of a complete cognitive, behavioral and functional evaluation, a physical examination and a complete neuropsychological battery, after which cognitive diagnosis was established[24]. Participants with depression or anxiety were also considered for the analysis if the mood disorder was treated and under control (two participants had depression, and one had anxiety).

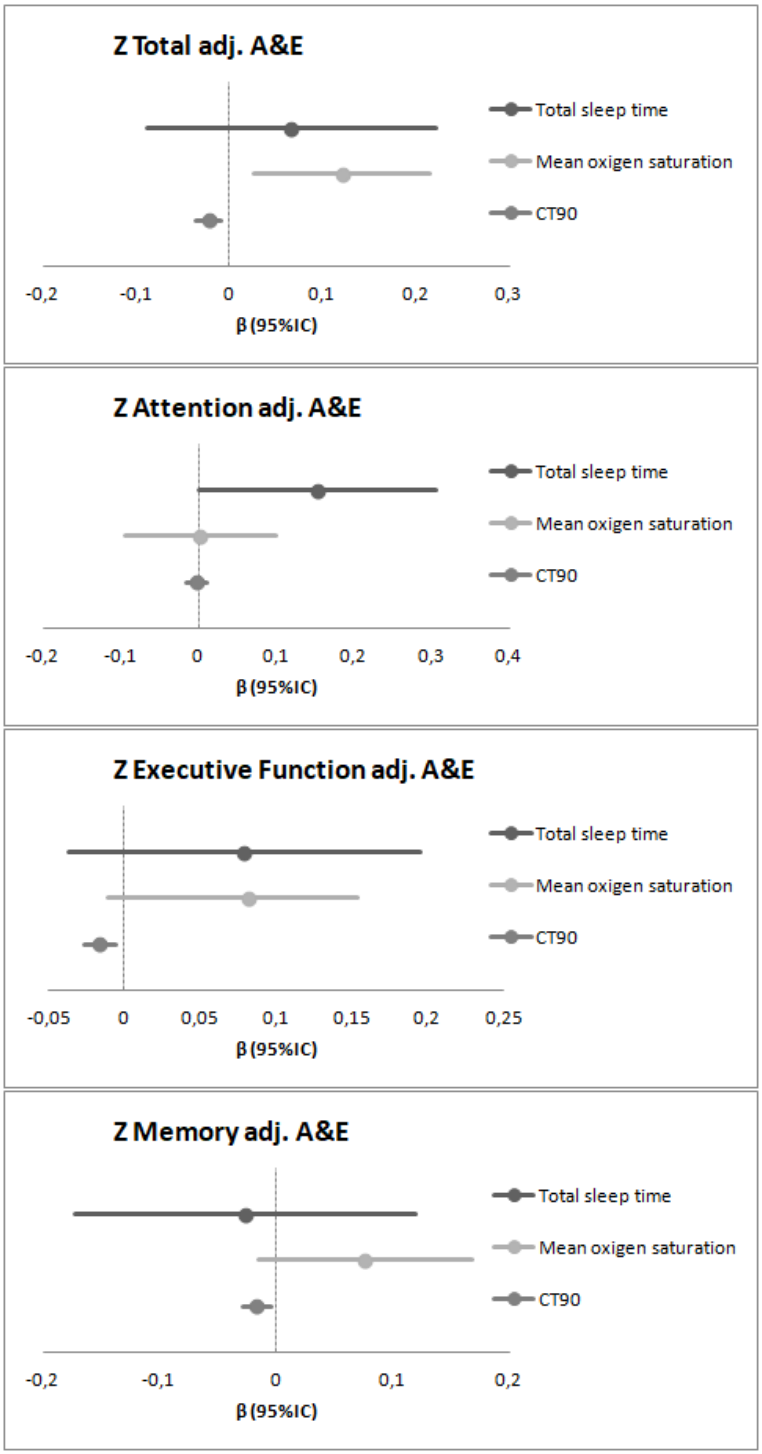
The test conducted and functions evaluated during this second visit are summarized below:

COGNITIVE TEST	FUNCTION EVALUATED
Rey Auditory Verbal Learning Test	Immediate and delayed verbal memory
WMS-III: Visual Reproduction I and II	Immediate and delayed visual memory

TMT A and B	Visual attention and task switching
WAIS-III Block Design	Spatial component of perception
COWAT Fluency Tests	Language and executive function
Stroop Test	Selective attention, cognitive flexibility and processing speed
Clock Drawing	Visuospatial and constructional abilities
Barcelona Test: symbolic gestures	Gestural praxis
Barcelona Test: sequences and imitation of postures	Ideomotor praxis
Interview for Deterioration in Daily Living Activities for Dementia	Basic and instrumental activities of daily living
Zung Self-Rating Depression and Anxiety Scales	Anxiety and depression symptoms

COWAT: Controlled Oral Word Association Test.

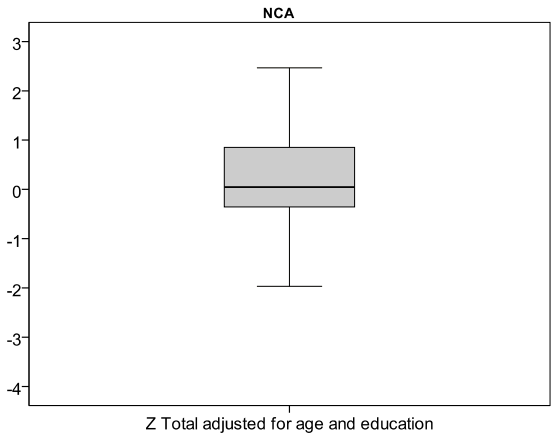
Other participants who had a Total DRS-2 score > 8 adjusted for age and education were considered normal cognitive aging (NCA) participants.

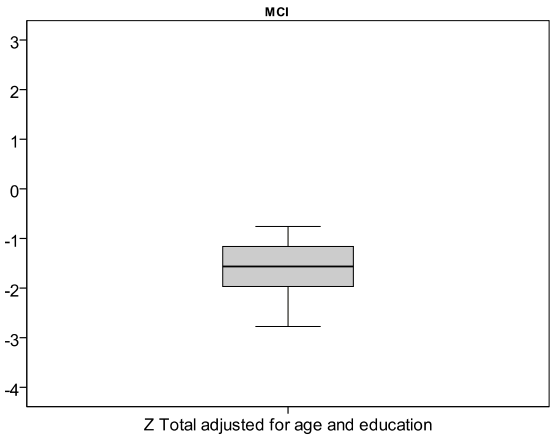


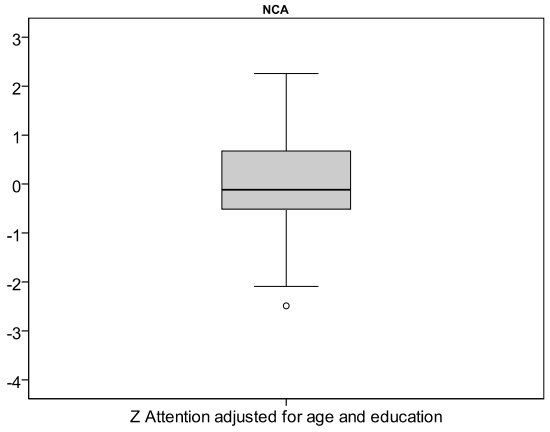
Supplemental Figure 1: Graphic description of the association between the cognitive scores and sleep parameters

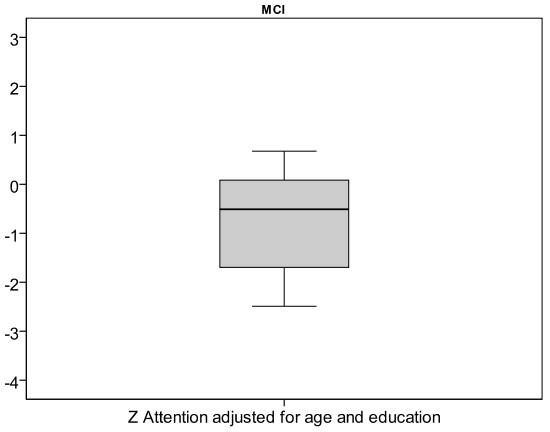
Adj. A&E: adjusted for age and education; CT90: % of time with oxygen saturation < 90%

The analysis is adjusted for sex, systolic blood pressure, diabetes mellitus, body mass index, smoking, silent brain infarcts, and white matter hyperintensities ≥2 on the Fazekas scale

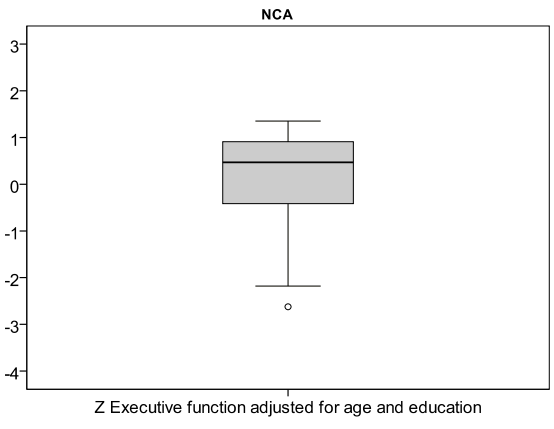

NCA
3
2
1
0
-1
-2
-3
-4
Z Total adjusted for age and education

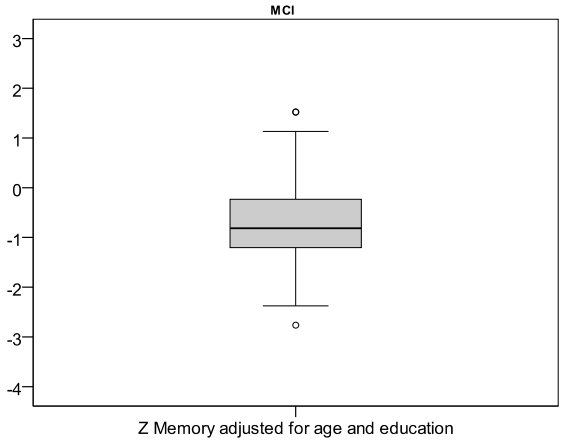

MCI
3
2
1
0
-1
-2
-3
-4
Z Total adjusted for age and education

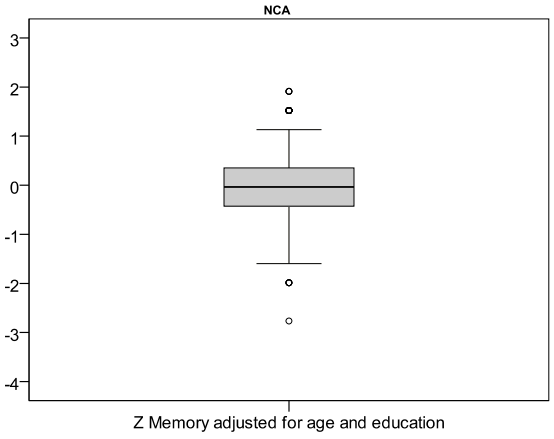

NCA
3
2
1
0
-1
-2
-3
-4
Z Attention adjusted for age and education


MCI
3
2
1
0
-1
-2
-3
-4
Z Attention adjusted for age and education

MCI
3
2
1
0
-1
-2
-3
-4
Z Executive Function adjusted for age and education


NCA
3
2
1
0
-1
-2
-3
-4
Z Executive function adjusted for age and education


MCI
3
2
1
0
-1
-2
-3
-4
Z Memory adjusted for age and education


NCA
3
2
1
0
-1
-2
-3
-4
Z Memory adjusted for age and education

Supplemental Figure 2: Graphical description of the relation between cognitive status and cognitive Z scores on the Dementia Rating Scale version2 .

NCA: normal cognitive aging

MCI: mild cognitive impairment

Supplemental Table 1: Association between cognitive scores and sleep respiratory parameters stratified by the presence or absence of extensive *periventricular* white matter hyperintensities

	WMH	Z Total adj. A&E β(95% CI)	Z Attention adj. A&E β(95% CI)	Z Executive Function adj. A&E β(95% CI)	Z Memory adj. A&E β(95% CI)
Mean O_2 saturation	Yes	0.066(-0.285,0.417)	-0.046(-0.367,0.275)	0.029(-0.202,0.261)	0.093(-0.209,0.395)
	No	**0.125(0.025,0.225)**	0.015(-0.090,0.120)	0.089(0.015,0.163)	0.074(-0.025,0.174)
CT90	Yes	-0.007(-0.057,0.044)	0.009(-0.038,0.056)	-0.007(-0.040,0.026)	0.000(-0.046,0.045)
	No	**-0.023(-0.037,-0.009)**	-0.006(-0.021,0.009)	**-0.015(-0.026,-0.005)**	**-0.021(-0.035,-0.007)**
Total sleep time	Yes	0.101(-0.587,0.789)	0.089(-0.540,0.718)	-0.004(-0.458,0.451)	0.175(-0.418,0.767)
	No	0.052(-0.108,0.213)	**0.171(0.009,0.333)**	0.077(-0.042,0.195)	-0.013(-0.169,0.143)

CT90: % time <90% O_2 saturation

Association between cognitive scores and sleep respiratory parameters stratified by the presence or absence of *deep* white matter hyperintensities

	WMH	Z Total adj. A&E β(95% CI)	Z Attention adj. A&E β(95% CI)	Z Executive Function adj. A&E β(95% CI)	Z Memory adj. A&E β(95% CI)
Mean O_2 saturation	Yes	0.207(-1.13,1.55)	0.291(-0.908,1.490)	0.073(-0.941,1.088)	0.186(-1.512,1.885)
	No	**0.132(0.037,0.226)**	-0.014(-1.112,0.084)	**0.101(0.030,0.173)**	0.066(-0.029,0.161)
CT90	Yes	-0.192(-0.638,0.254)	-0.120(-2.202,1.963)	-0.125(-0.327,0.077)	-0.077(-2.443,2.289)
	No	**-0.024(-0.037,-0.012)**	-0.003(-0.017,0.011)	**-0.018(-0.028,-0.008)**	**-0.017(-0.030,-0.005)**
Total sleep time	Yes	-0.149(-2.340,2.042)	-0.100(-2.331,2.132)	-2.05(-1.645,1.234)	0.625(-1.301,2.550)
	No	0.054(-0.103,0.210)	**0.176(0.022,0.330)**	0.067(-0.051,0.186)	-0.028(-0.179,0.124)

CT90: % time <90% O_2 saturation