

Associations Between Daytime Napping, Cognition and Imaging Measures of Neurodegeneration: An Insight46 Study

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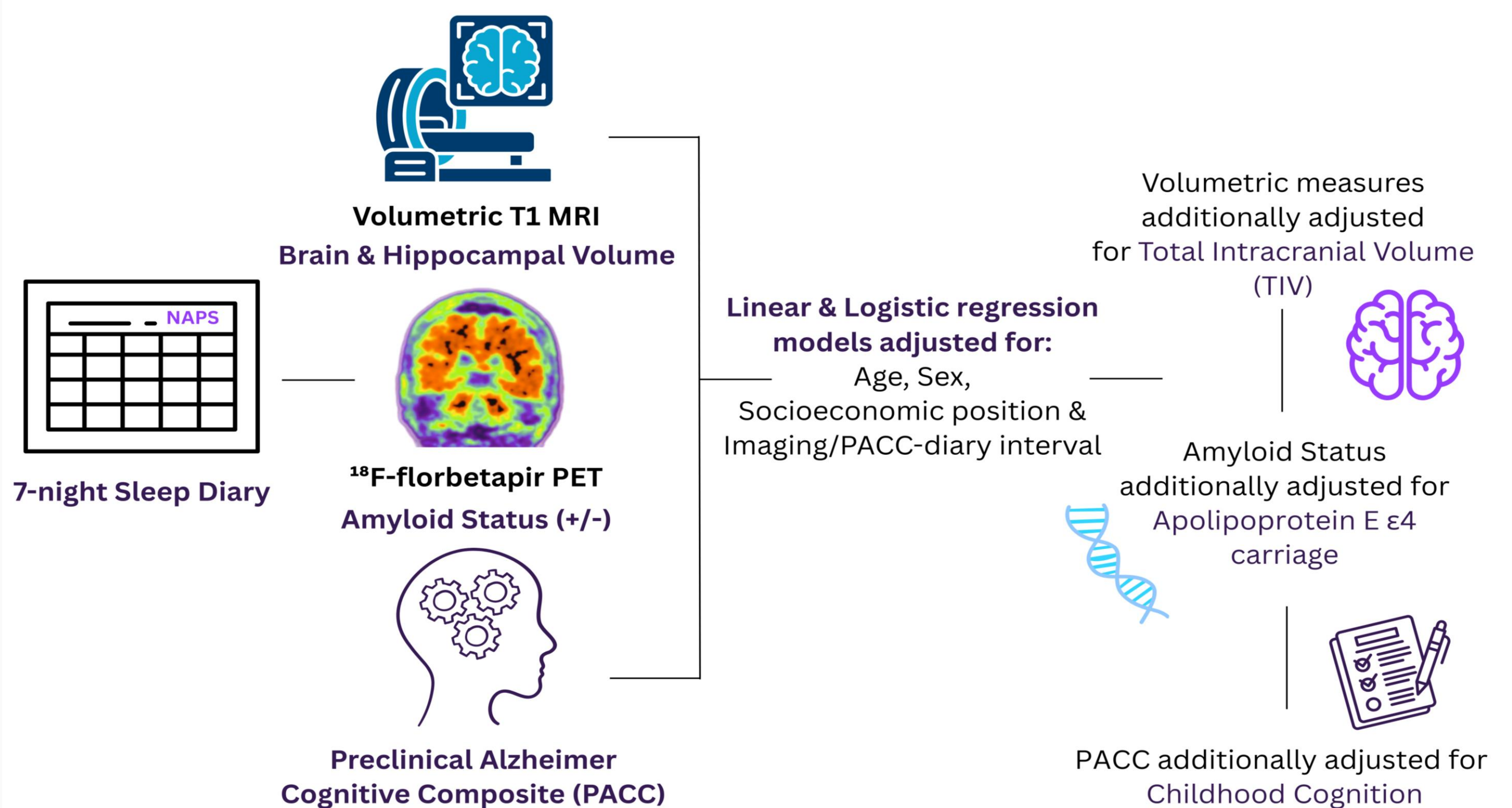
Introduction

- Daytime napping becomes common in older adulthood, but its associations with cognition and brain health remain unclear¹.
- Previous studies have reported mixed findings regarding the cognitive and neurological correlates of napping^{2,3}.
- Few studies have characterised multiple dimensions of daytime naps using prospective self-reported measures^{4,5}.
- This study investigated associations between multiple dimensions of daytime napping, neuroimaging and cognitive outcomes in predominantly healthy older adults.

Methods

- Participants from the Insight 46 neuroimaging sub-study of the MRC National Survey of Health and Development underwent multimodal neuroscience assessment at age 73 (Figure 1).
- A self-reported 7-night sleep diary was completed, from which total weekly nap frequency (none, 1, 2–3, 4+); mean nap duration (none, <30 minutes, 30–60 minutes, >60 minutes); and mean nap start time (<15:00, 15:00–17:59, >18:00) were determined.
- Linear regression examined associations between nap variables and total brain volume, hippocampal volume and PACC; logistic regression examined associations with amyloid PET status. All models were adjusted for covariates shown in Figure 1.

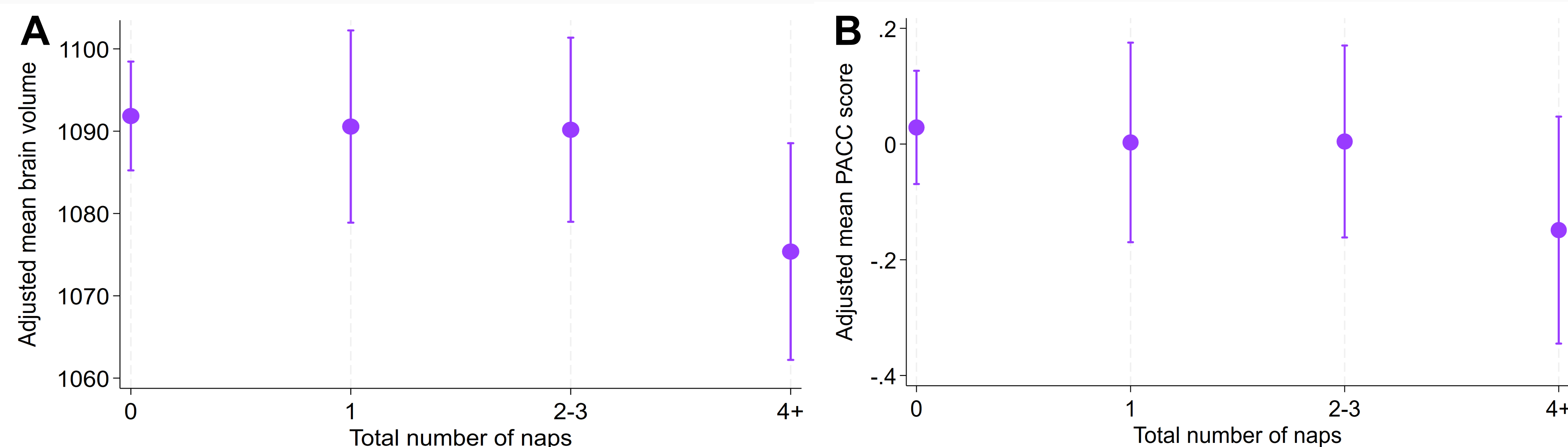
Figure 1: Study design overview.



Results

- 416 participants completed a sleep diary (age 73.1 [0.8], 49% female).
- Participants who reported 4+ naps per week had significantly lower brain volume compared with non-nappers (–16.5 mL, 95% CI –31.2 to –1.7, $P = 0.03$).
- Participants who had 4+ naps per week also had significantly lower PACC z-scores than non-nappers (–0.2, 95% CI –0.4 to –0.0, $P = 0.03$, Figure 2);
- No associations were seen between nap frequency and hippocampal volume or amyloid status. Mean nap duration and mean nap start time were not associated with brain volume, hippocampal volume, amyloid status or PACC.

Figure 2: Frequent nappers have significantly lower brain volume and PACC scores.



Estimated means plots show total weekly nap frequency significantly predicts brain volume (A) and PACC score (B). Points represent marginal means, and error bars represent 95% confidence intervals.

Conclusions

- Frequent daytime napping was associated with lower brain volume and cognitive performance at age 73 and may be a marker of poor brain health in late life.
- Longitudinal studies are needed to clarify directionality and whether nap behaviour predicts cognitive decline.
- Future research could explore which cognitive domains within the PACC drive this association and whether cerebrovascular changes, including white matter hyperintensities, mediate these relationships.

References

- Cai, H., Su, N., Li, W., Li, X., Xiao, S., and Sun, L. (2021). doi:10.1136/gpsych-2020-100361
- Asada, T., Motonaga, T., Yamagata, Z., Uno, M., and Takahashi, K. (2000). doi:10.1093/sleep/23.5.1d
- Li, C. et al. (2023). doi:10.1002/alz.12636.
- Paz, V., Dashti, H. S., and Garfield, V. (2023). doi:10.1016/j.sleh.2023.05.002
- Carvalho, D. Z., et al. (2017). doi:10.1016/j.sleep.2016.08.023