

Joint associations of physical activity and sleep duration with cognitive ageing: longitudinal analysis of an English cohort study

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Health Studies User Conference

Background and rationale

Physical activity (PA) and sleep duration are thought to impact cognitive ageing and dementia risk through both independent and interacting mechanisms.¹

Sleep disturbances may also be caused by cognitive dysfunction

More time spent in moderate to vigorous PA might reduce the impact of suboptimal sleep duration (<6 or >8 hours per night) on cognitive function (or vice versa),¹⁻⁵ but confirmation is needed from large-scale, longitudinal studies.

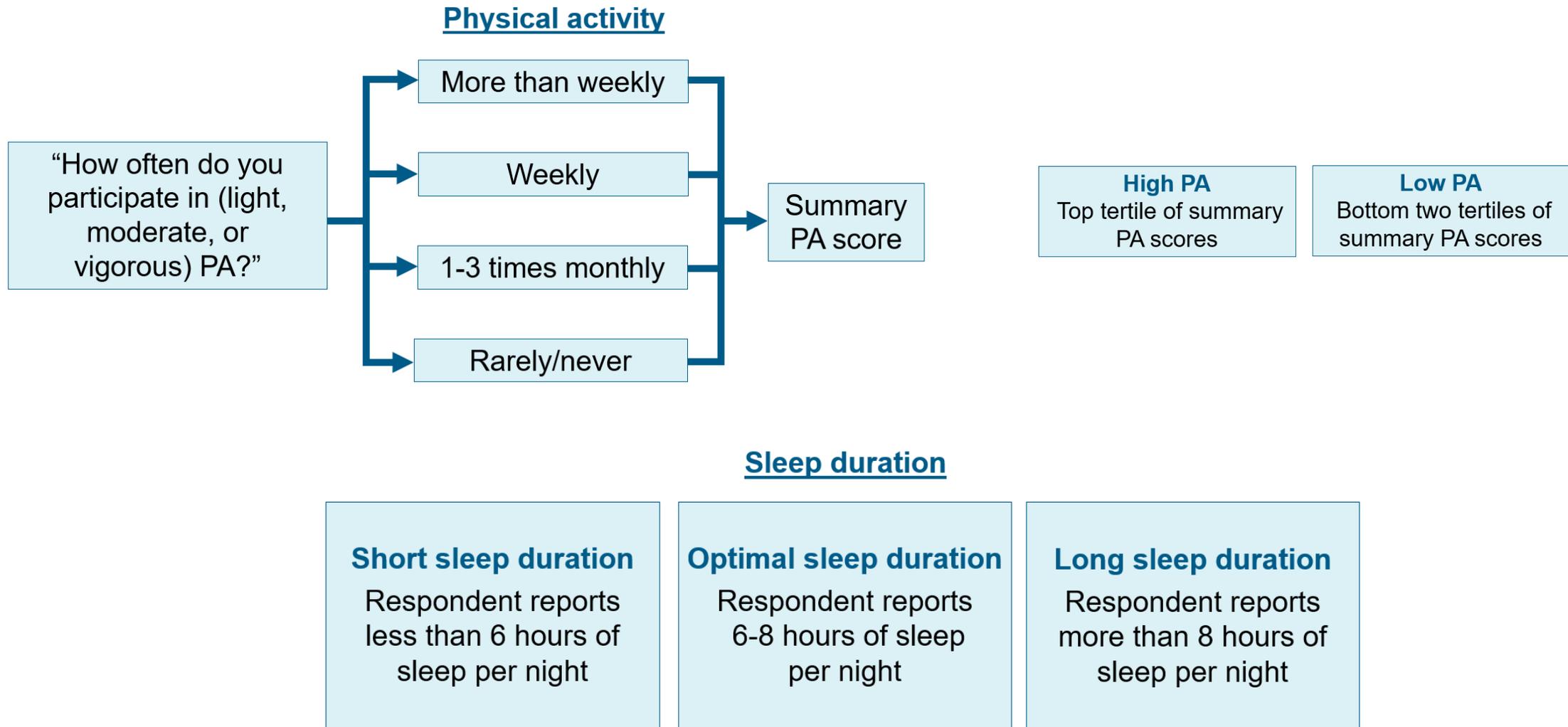
Objective: To examine the joint associations of self-reported PA and sleep duration with ten-year cognitive trajectories in a large-scale cognitively-healthy study population.

Data sources

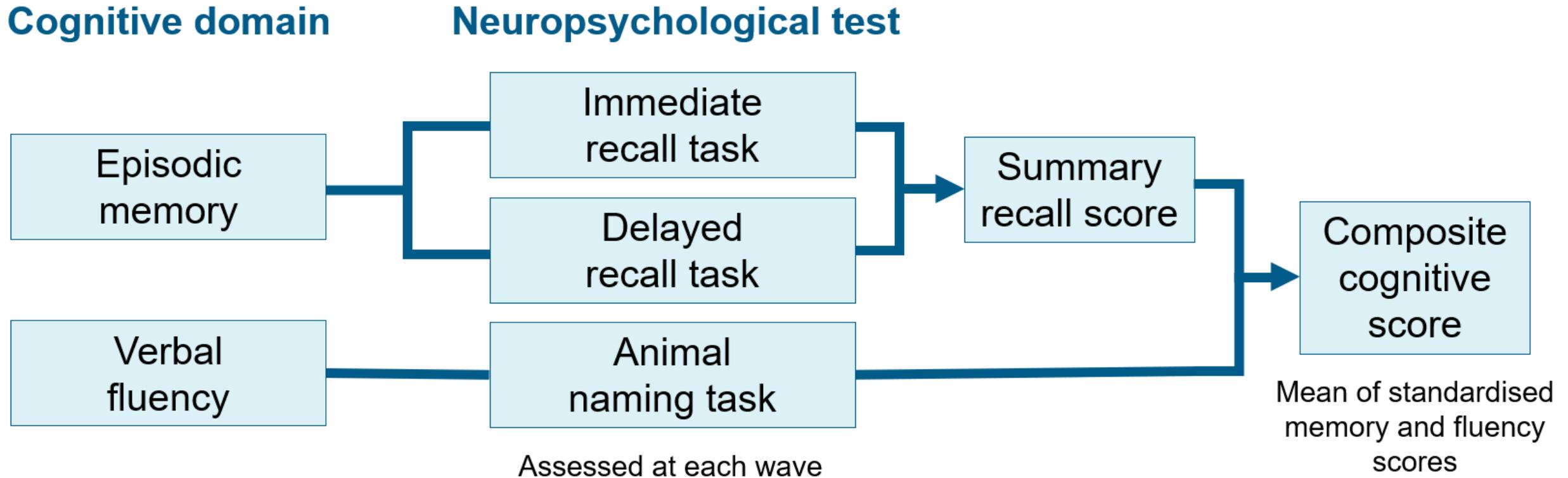


Nationally representative cohort study
of the English population aged ≥ 50 years
Study years: 2008/09, 2010/11,
2014/15-2018/19 (5 waves)
N=8958 cognitively healthy participants

Physical activity and sleep duration



Cognitive function



Statistical methods

Linear mixed models (time-scale: years since baseline) used to construct 10-year cognitive trajectories from ages 50, 60, and 70 years for each PA/sleep group

Adjusted for age at baseline, sex, marital status, education, wealth, smoking status, alcohol consumption, BMI, chronic conditions, depressive symptoms

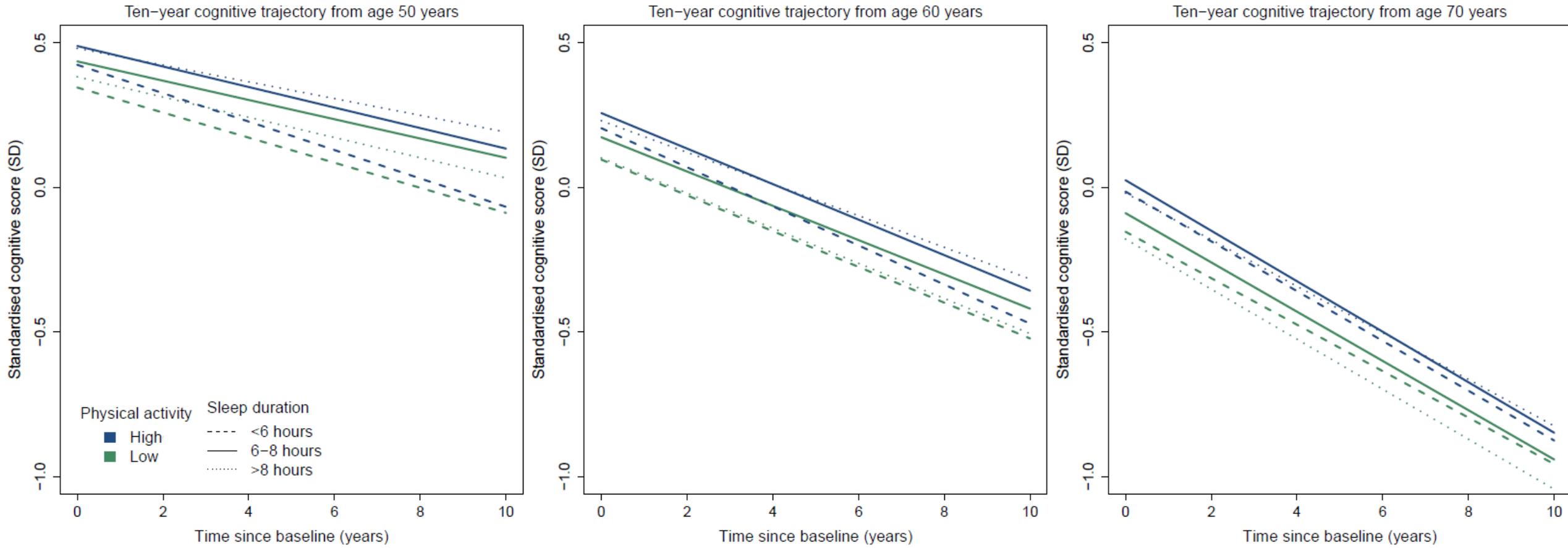
Models used to examine difference between reference PA/sleep group (high PA/optimal sleep) and other PA/sleep groups in:

1. Baseline cognitive performance
2. Rate of cognitive decline
3. Cognitive performance after 10 years of follow-up

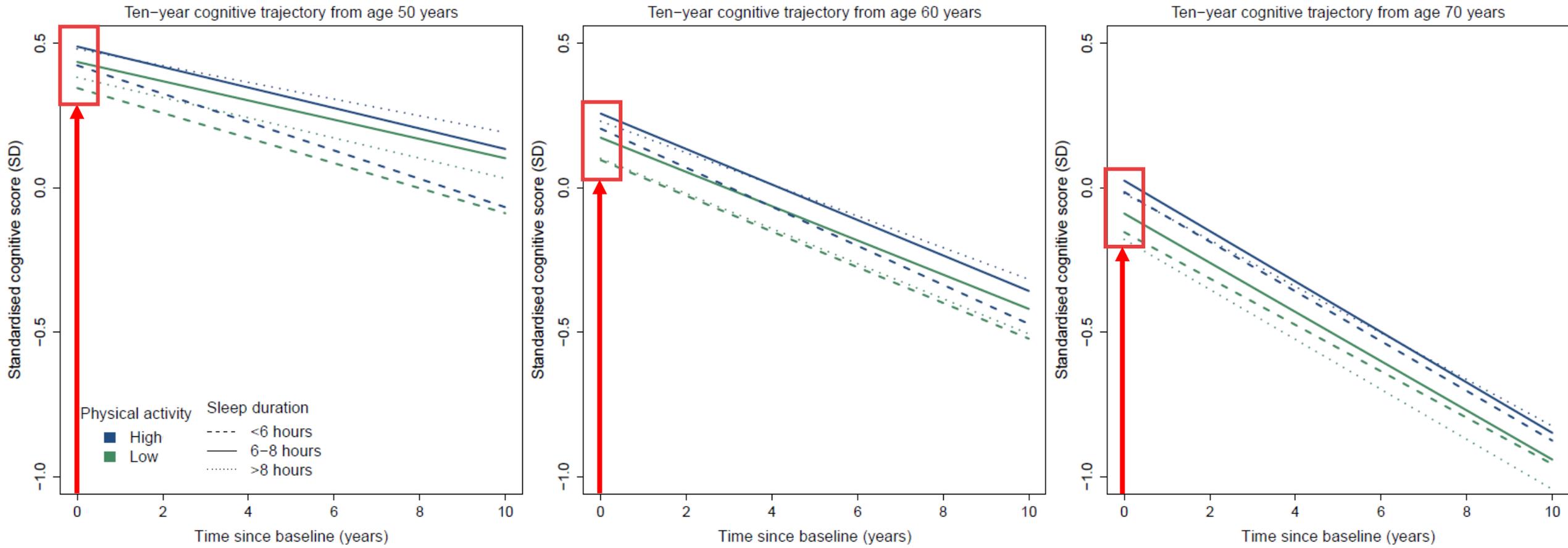
Results

	Low PA N=5889	High PA N=3069	P-value
Short sleep (<6 hours)	943 (16.0%)	328 (0.7%)	
Optimal sleep (6-8 hours)	3208 (54.5%)	1845 (60.1%)	<0.0001
Long sleep (>8 hours)	1738 (29.5%)	896 (29.2%)	

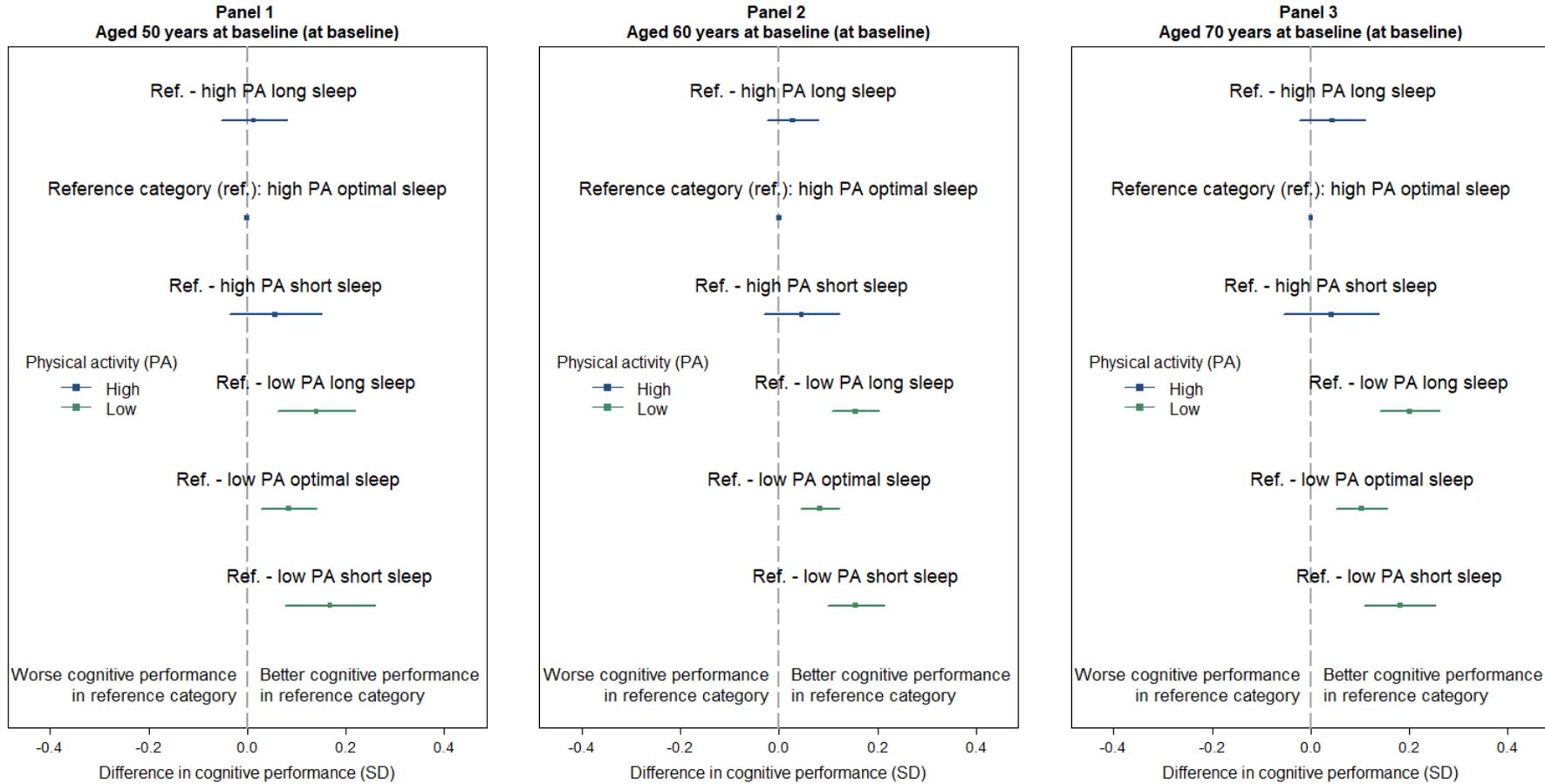
Results



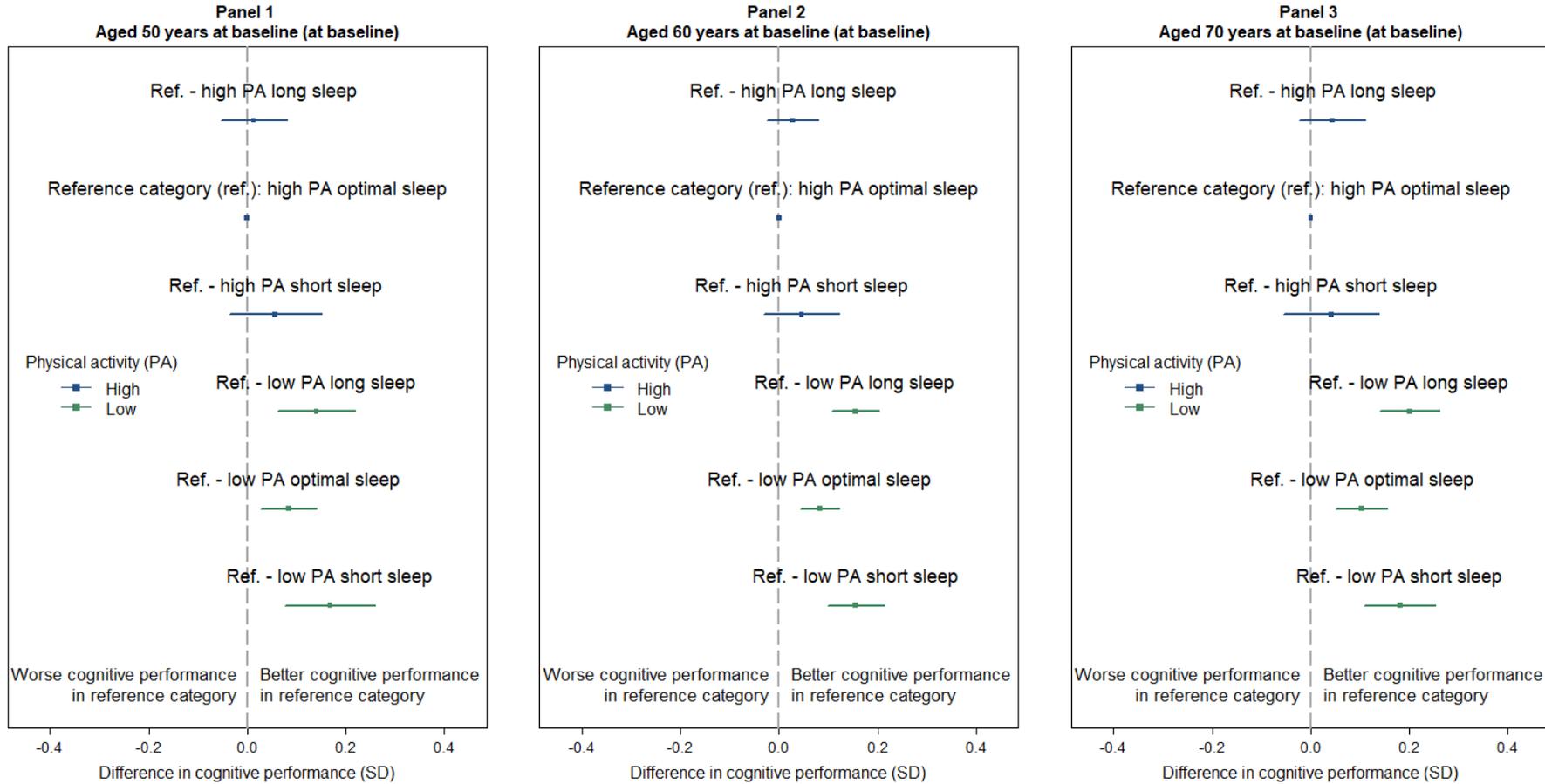
Results



Results

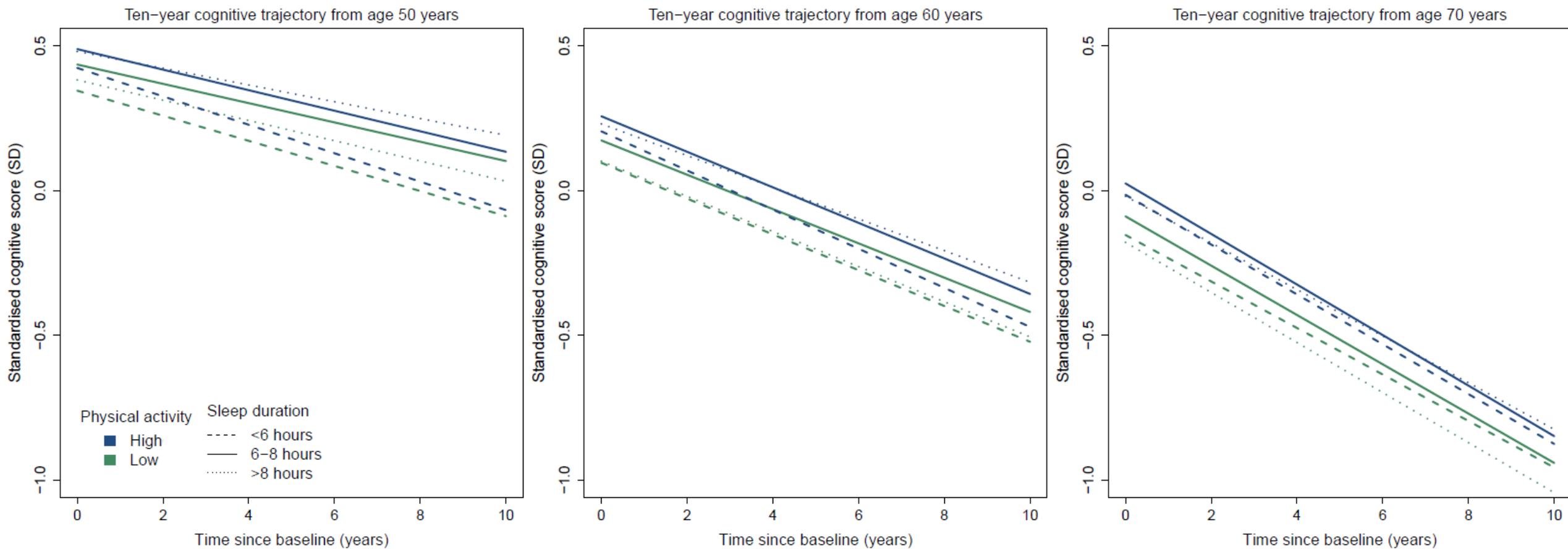


Results

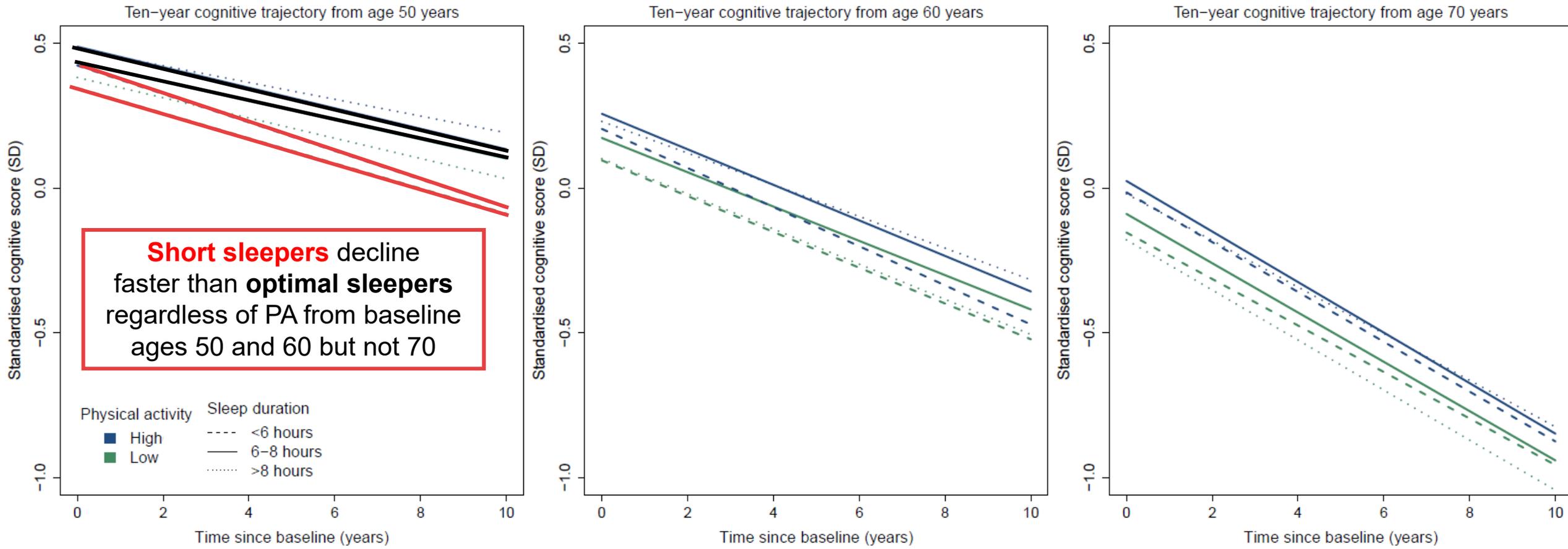


High PA groups outperform **low PA** groups regardless of sleep quality at baseline

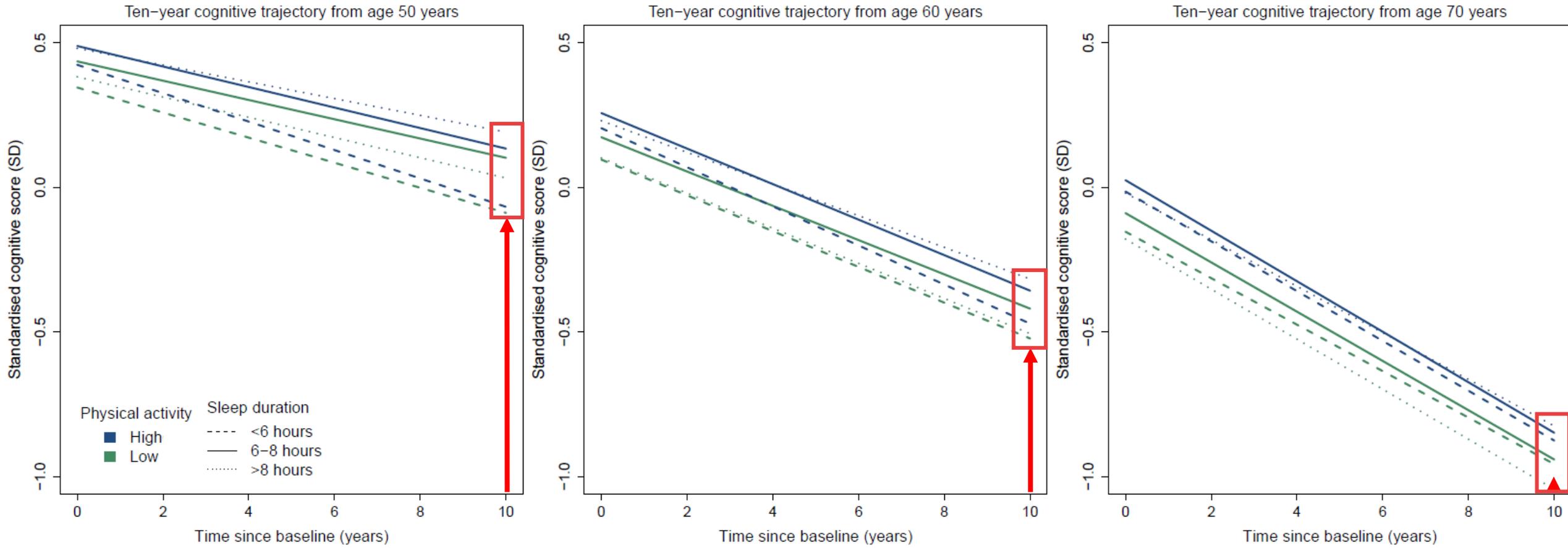
Results



Results

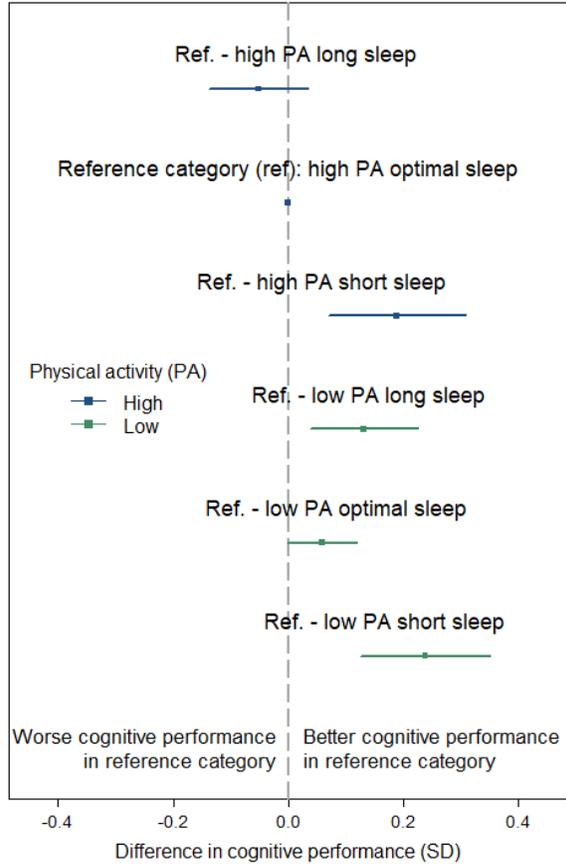


Results

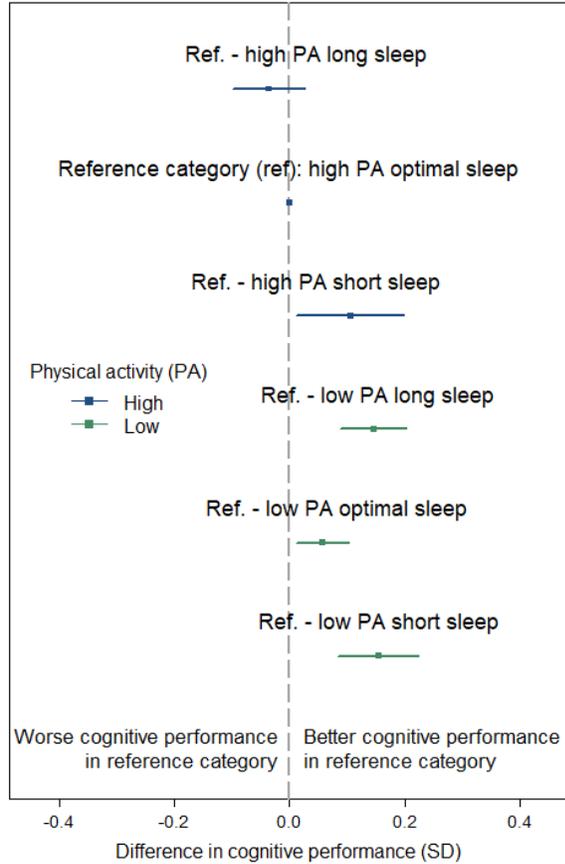


Results

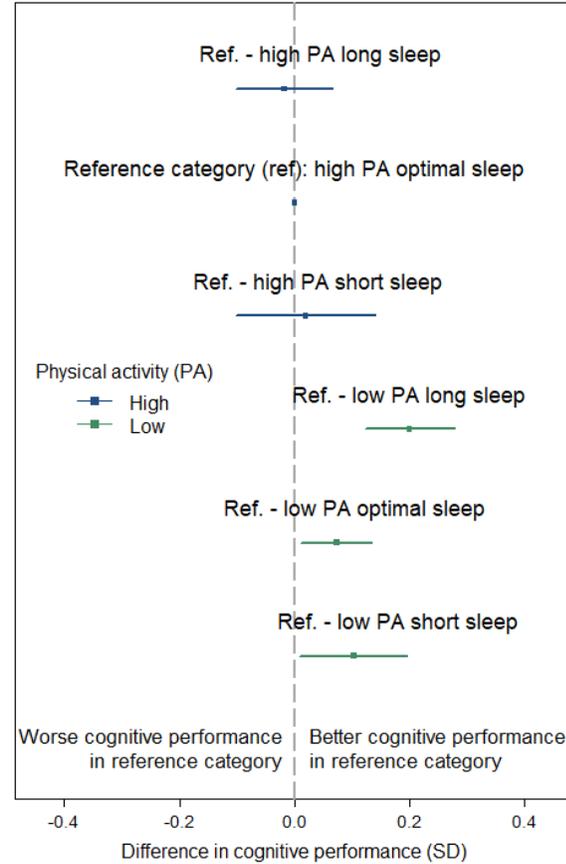
Panel 4
Aged 50 years at baseline (after 10 years follow-up)



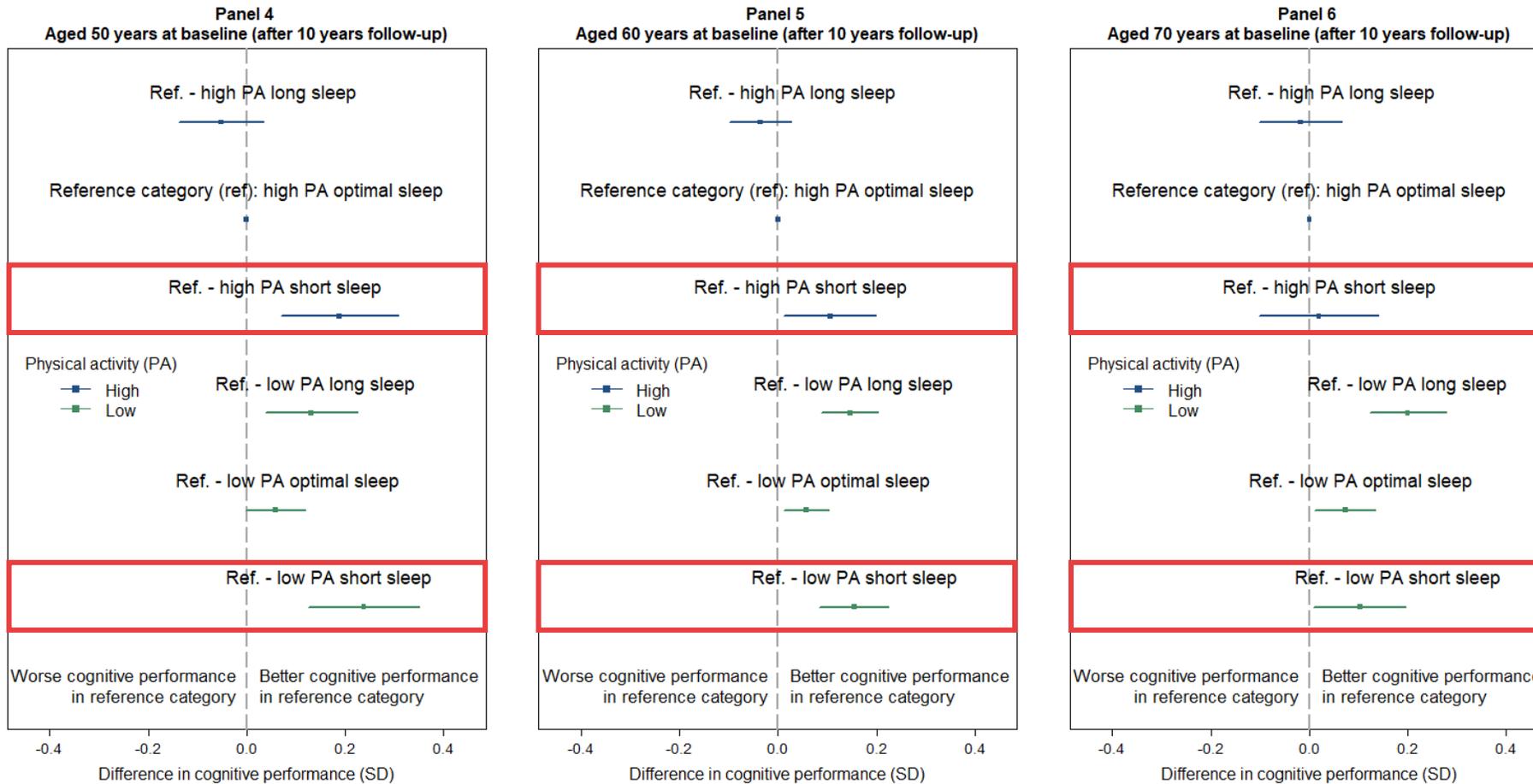
Panel 5
Aged 60 years at baseline (after 10 years follow-up)



Panel 6
Aged 70 years at baseline (after 10 years follow-up)



Results



From ages 50 and 60, though **high PA/short sleepers** performed similarly to **high PA/optimal** sleepers at baseline, after 10 years their scores were similar to **low PA/short sleepers**

High PA protective regardless of sleep duration for age 70

Key results

More frequent, high intensity PA and 6-8 hours of sleep per night were both associated with better cognitive scores at baseline; short sleep also associated with faster cognitive decline

Cognitive benefit afforded by PA was insufficient to blunt the more rapid cognitive decline associated with short (<6 hours) sleep for adults in middle- and early-old age

Conclusion

Long-term cognitive benefits of PA may be reduced if not supported by sufficient sleep

WHO already identify PA as key target for maintenance of cognitive health but PA interventions should also consider sleep habits to maximise benefits for long-term cognitive health

Acknowledgements

Co-authors

Dr Laura Brocklebank

Prof Mark Hamer

Prof Andrew Steptoe

Funder



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See full paper in *The Lancet Healthy Longevity* 6 July 2023:

A thumbnail image of a research paper abstract. The title is 'Joint associations of physical activity and sleep duration with cognitive ageing: longitudinal analysis of an English cohort study'. The authors listed are Mikaela Bloomberg, Laura Brocklebank, Mark Hamer, and Andrew Steptoe. The abstract includes a 'Summary' section with a 'Background' paragraph. The paper is marked as 'Open Access' and is from 'Lancet Healthy Longevity 2023'. The Department of Behavioural Science and Health is also mentioned.

Joint associations of physical activity and sleep duration with cognitive ageing: longitudinal analysis of an English cohort study

Mikaela Bloomberg, Laura Brocklebank, Mark Hamer, Andrew Steptoe

Summary
Background Physical activity and sleep duration are key factors associated with cognitive function and dementia risk. How physical activity and sleep interact to influence cognitive ageing is not well explored. We aimed to examine the associations of combinations of physical activity and sleep duration with 10-year cognitive trajectories.

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