

INTRODUCTION

Both **Alzheimer's disease** (AD) and **limbic-predominant age-related TDP-43 encephalopathy** (LATE) are neurodegenerative conditions that present with similar cognitive impairments and structural brain changes, including substantial memory impairment and atrophy of the medial temporal lobe. Therefore, it is essential to identify markers that can distinguish between these conditions.

This study aimed to evaluate the usefulness of spatial navigation and visuospatial assessments in distinguishing between older adults with amnesic mild cognitive impairment (aMCI) due to AD from those with aMCI due to LATE.

METHODS

The participants

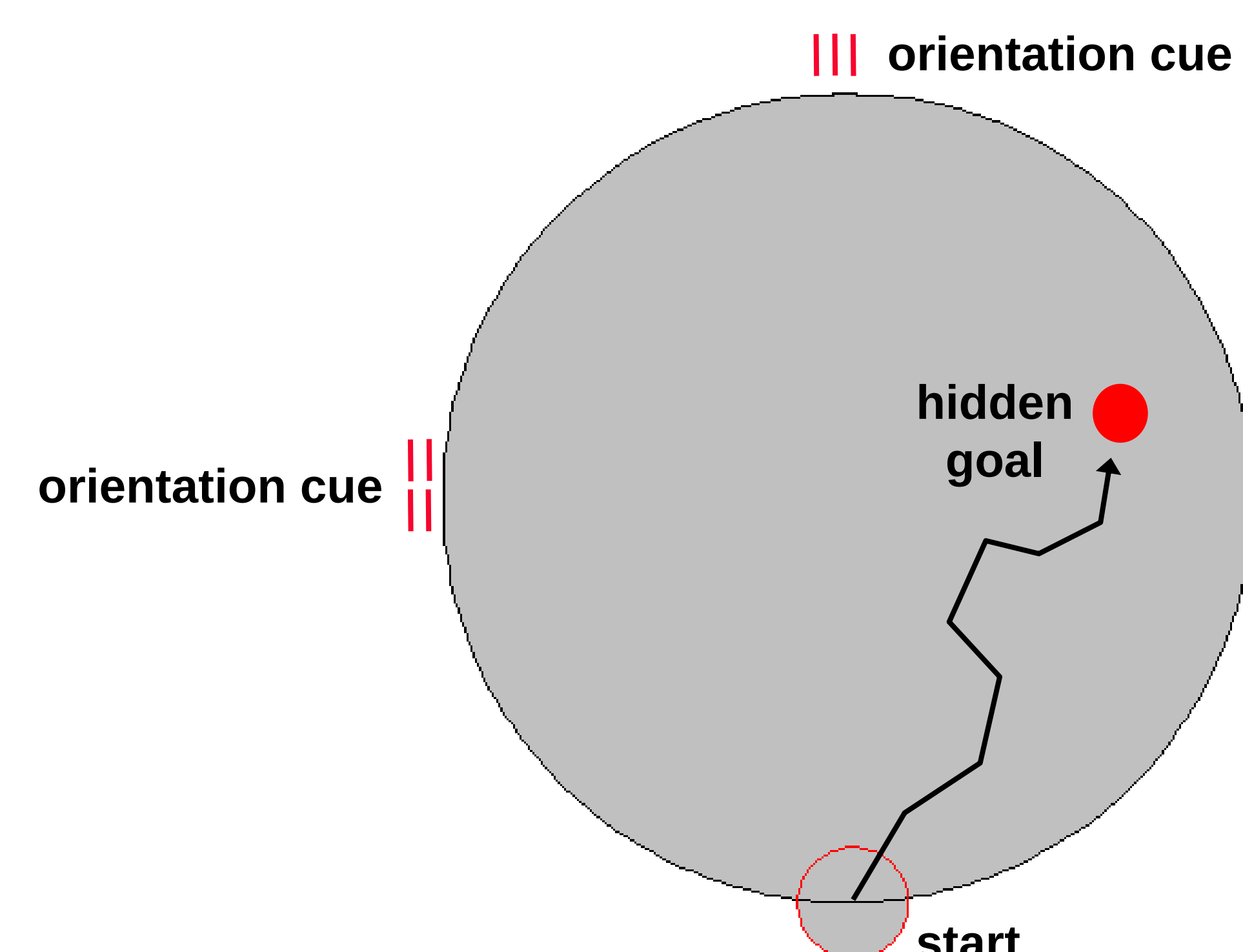
The study involved 83 participants from the **Czech Brain Aging Study** cohort, including: 1) cognitively normal older adults (CN, n=23) and individuals with aMCI, further categorised into 2) AD aMCI (n=27) and 3) LATE aMCI (n=33) groups.

The procedure

Participants underwent a cognitive evaluation, including two visuospatial tasks, a structural brain MRI scan, and spatial navigation testing using a computerised version of the Human Morris Water Maze Task (HMWM). Those with aMCI also underwent amyloid PET imaging and a cerebrospinal fluid biomarker assessment.

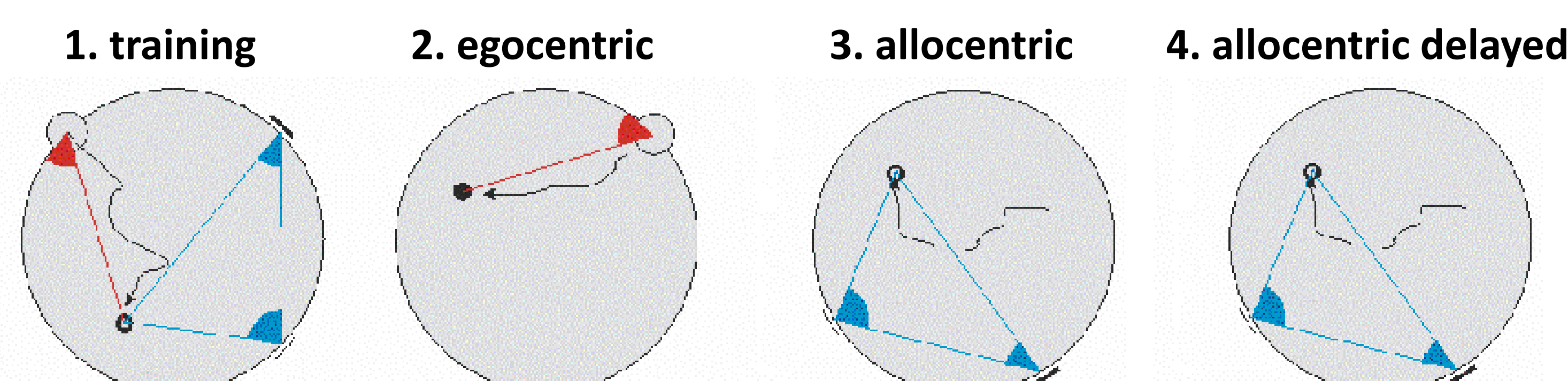
The computerised Human Morris Water Maze

The HMWM is designed to assess two separate types of spatial navigation: 1) body-centered (**egocentric**, parietal cortex-dependent), using start position 2) world-centered (**allocentric**, hippocampus-dependent), using orientation cues



Four spatial navigation tasks

Participants searched for a hidden place using either a start position and two orientation cues (the first training task), a start position only (the second egocentric task), orientation cues only (the third allocentric task), or orientation cues to recall the position of a hidden place after 30 minutes (the fourth allocentric delayed task).



RESULTS

- Participants with LATE aMCI performed better than those with AD aMCI ($p = 0.004$) and similarly to CN participants on the egocentric navigation task ($p = 0.113$).
- In visuospatial tasks, participants with LATE aMCI outperformed those with AD ($p < 0.001$) and performed similarly to CN participants ($p = 0.314$).
- Those with LATE and AD aMCI demonstrated similar performance in allocentric navigation ($p = 0.095$), with both groups performing worse than CN participants ($p < 0.001$).
- Participants with LATE and AD aMCI exhibited comparable deficits in various cognitive functions, including memory, executive function, attention/working memory, and language ($p \geq 0.270$).

CONCLUSION

- **Individuals with early LATE and AD have similar memory profiles, but those with early LATE perform better in tasks involving egocentric navigation and visuospatial abilities**
- **Preserving parietal cortex-associated cognitive functions in early LATE could pave the way for developing digital cognitive markers that effectively distinguish individuals with LATE from those with AD**

Acknowledgements

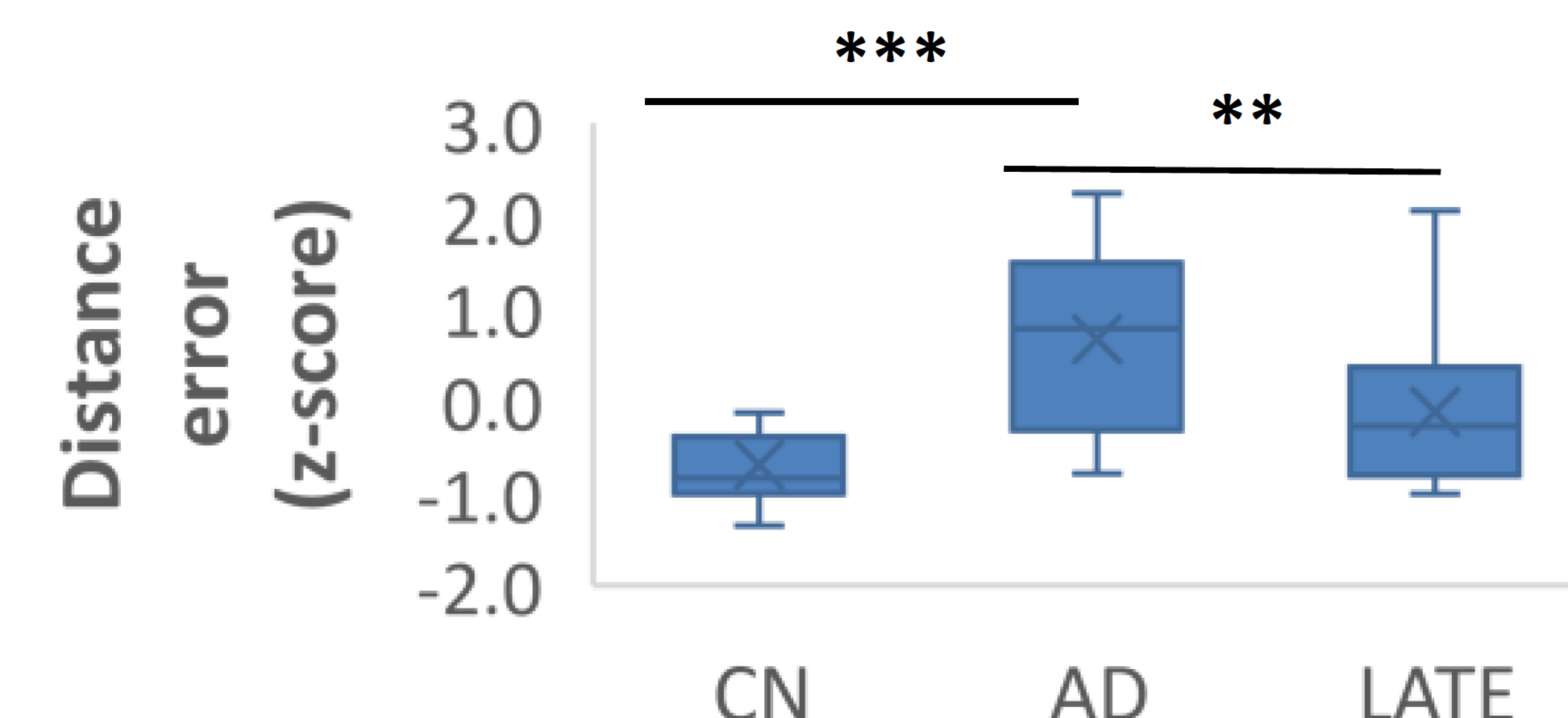
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Demographic characteristics

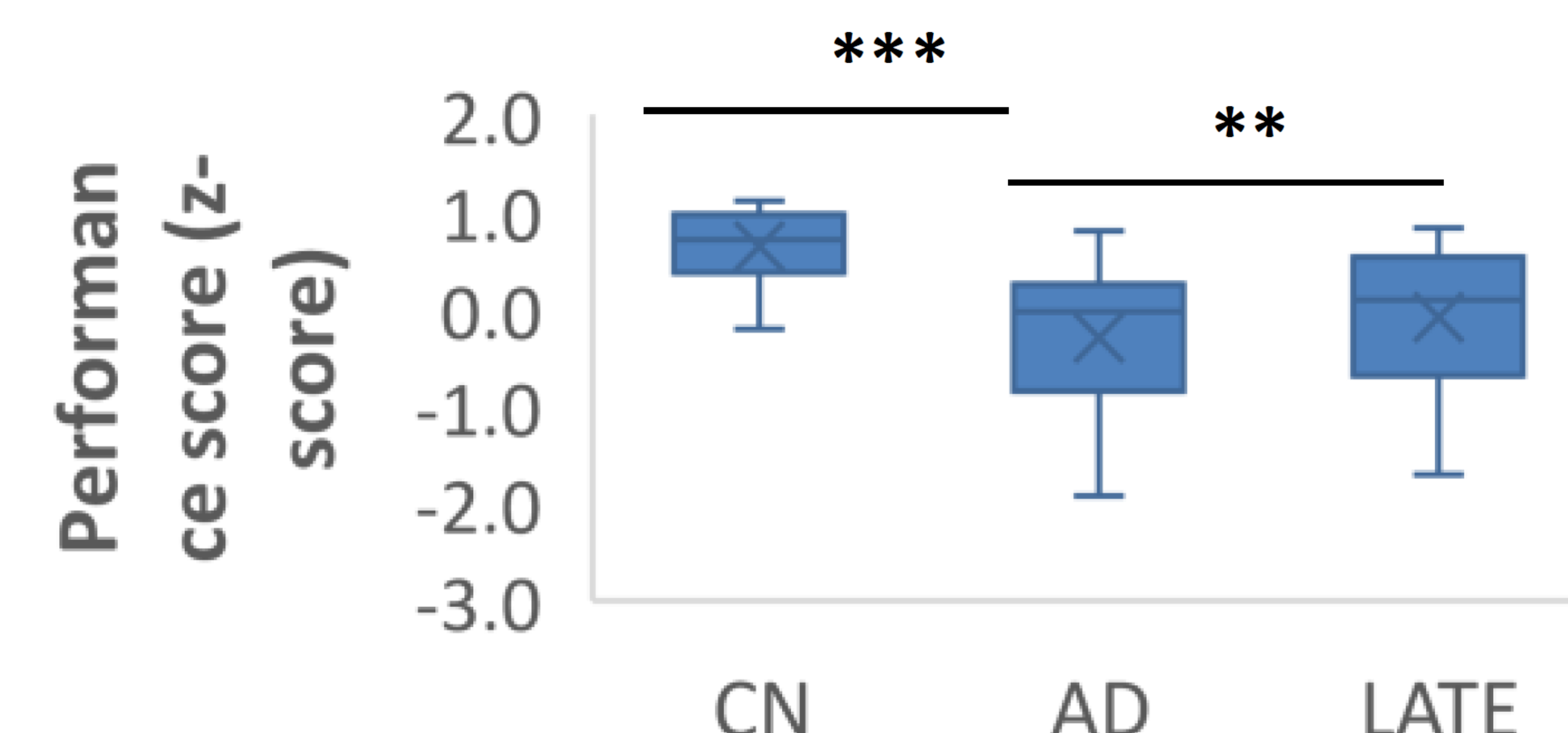
	CN	AD aMCI	LATE aMCI
Age (y)	71.22	72.04	77.48*
Women (%)	65%	59%	49%
Education (y)	16.43	14.67	14.80
MMSE	29.30	24.85*	25.82*

* $p < 0.05$ compared to the CN group

Egocentric navigation



Visuospatial abilities



** $p < 0.01$, *** $p < 0.001$