

WHERE DOES THIS GO? MEMORY ACCURACY FOR OBJECT LOCATIONS ACROSS EGOCENTRIC AND ALLOCENTRIC SPACE IN AGING

Natalia Ladyka-Wojcik, Nathanael K. Shing, Rosanna K. Olsen, Jennifer D. Ryan, & Morgan D. Barense

University of Toronto Rotman Research Institute

BACKGROUND

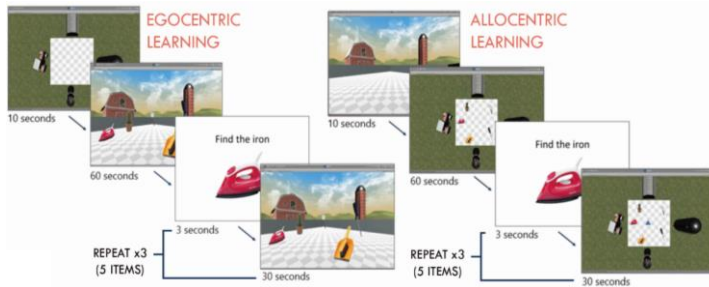
Aging impairs the flexible use of egocentric (first-person) and allocentric (map-based) spatial frames of reference¹ but it remains unclear whether this is related to normal aging or to an early *at-risk* stage of neurocognitive decline (i.e., pre-mild cognitive impairment).

OBJECTIVE

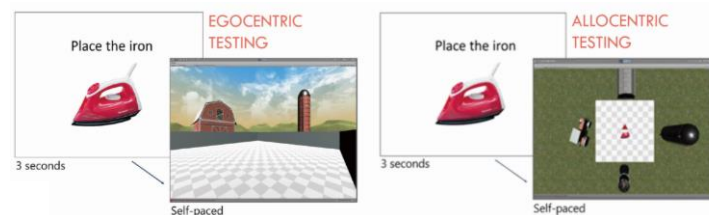
Is memory for object locations across spatial frames of reference sensitive to early cognitive and brain-based changes in *at-risk* aging?

OBJECT-LOCATION TASK

LEARNING PHASE



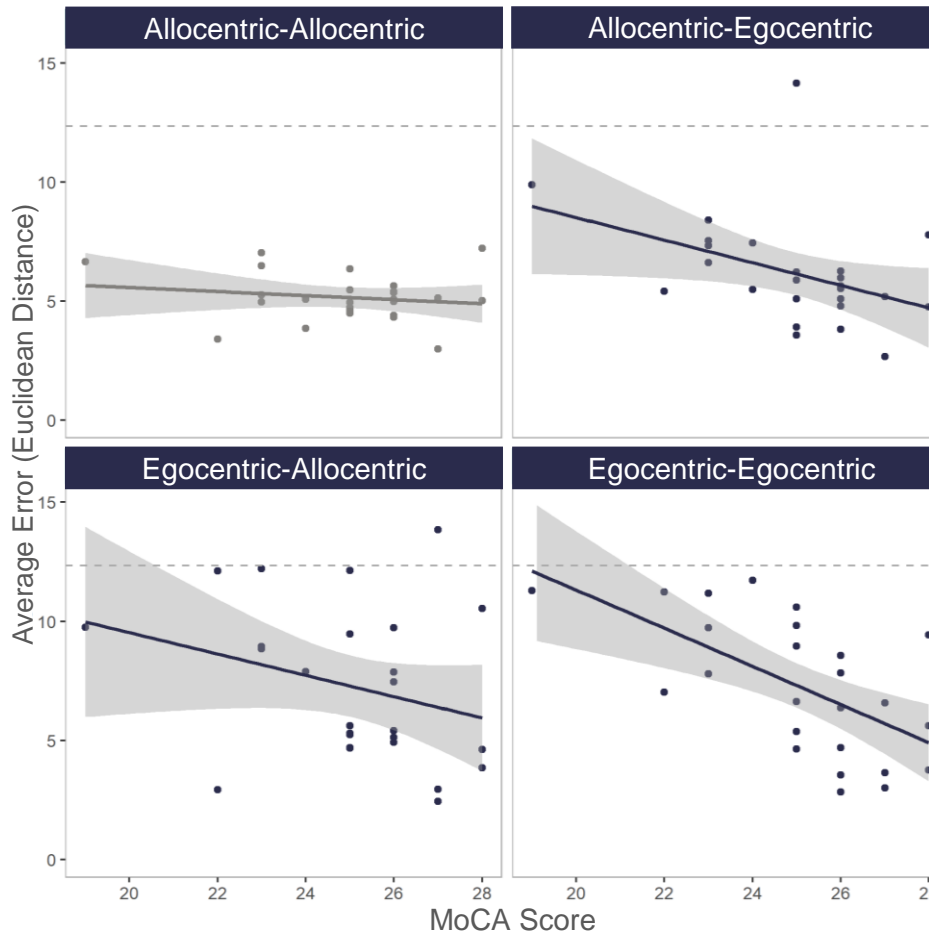
TESTING PHASE



30 older adults ($M_{age} = 75.42$ years) completed the Montreal Cognitive Assessment (MoCA; $M = 25.12$) and an object-location task in OpenMaze²

BEHAVIOURAL RESULTS

Cognitive status, as measured by the MoCA, predicted performance in all frames of reference except the allocentric-allocentric condition.



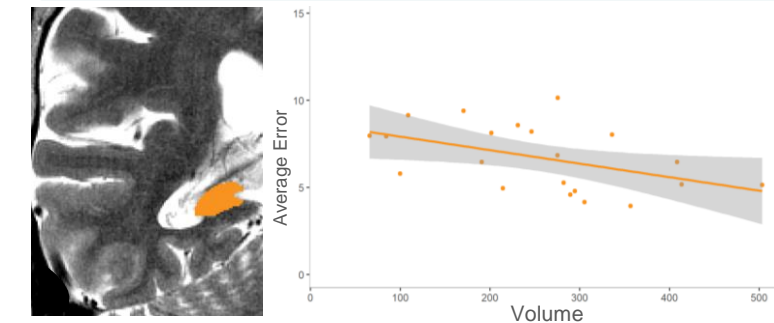
PRECISION AND BINDING MODEL^{3,4}



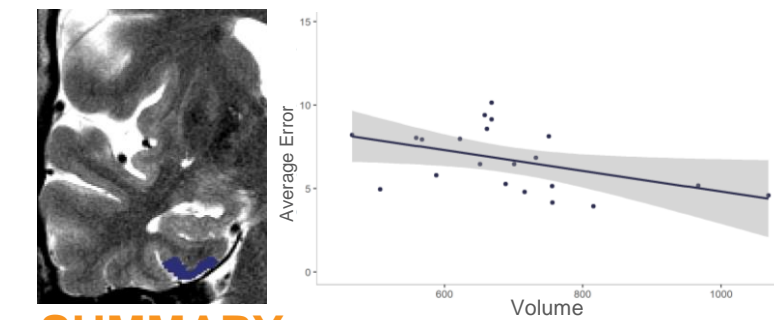
MTL VOLUMES

Grey matter volumes in right posterior hippocampus and right anterolateral entorhinal cortex were associated with error (N = 21 subjects) across all frames of reference conditions (OAP Protocol⁵).

POSTERIOR HIPPOCAMPUS



ANTEROLATERAL ENTORHINAL CORTEX



SUMMARY

High-precision object location memory across spatial frames of reference is sensitive to cognitive and medial temporal lobe changes associated with early *at-risk* aging.

REFERENCES

- ¹Colombo et al. (2017) *Neuroscience & Biobehavioral Reviews*.
- ²Nealy et al. (2018) Open Maze Software. <https://duncanlab.github.io/>
- ³Olsen et al. (2012) *Frontiers in Human Neuroscience*.
- ⁴Yonelinas (2013). *Behavioural Brain Research*.
- ⁵Yeung et al (2019) *Journal of Cognitive Neuroscience*.