

# Allocentric Navigation Deficits Predict Clinical Progression In Subjective Cognitive Decline And Amnestic Mild Cognitive Impairment

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Spatial navigation

impairment is a known early feature of Alzheimer’s Disease (AD), yet long-term longitudinal data remains limited.

The Hypothesis

Baseline performance on specific navigation tasks may predict clinical progression in at-risk individuals.

Study Aim

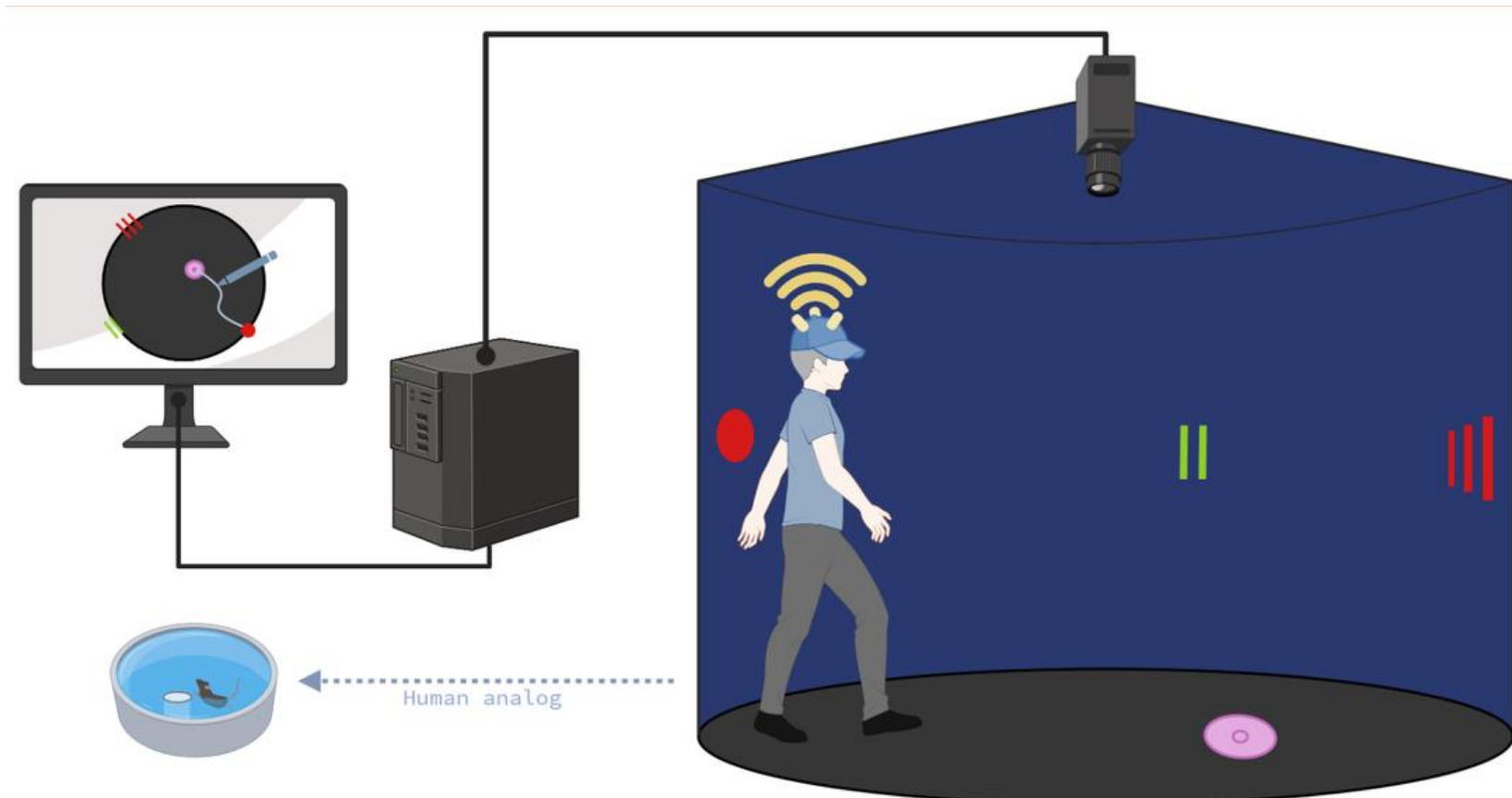
To evaluate allocentric and egocentric navigation as predictive markers for progression to MCI and dementia.

Participants characteristic

| Cohort                             | N   | Max Follow-up | Assessments          |
|------------------------------------|-----|---------------|----------------------|
| Subjective Cognitive Decline (SCD) | 67  | 11 Years      | Cognitive, MRI, hMWM |
| Mild Cognitive Impairment (MCI)    | 120 | 15 Years      | Cognitive, MRI, hMWM |

Cox proportional hazards models adjusted for age, sex, and education.

The Morris Water Maze



Results – demographics

|                           | SCD            | MCI             | Total          |
|---------------------------|----------------|-----------------|----------------|
| Age (years; SD)           | 66.6 (7.4)     | 71.1 (6.8)      | 69.5 (7.3)     |
| Gender (M/F)              | 22/45          | 56/64           | 78/109         |
| Education (years; SD)     | 15.9 (2.8)     | 14.8 (3.0)      | 15.2 (3.0)     |
| MMSE (score; SD)          | 28.9 (1.3)     | 26.9 (2.3)      | 27.6 (2.2)     |
| Follow-up (months; range) | 47.6 (9 – 132) | 44.3 (10 – 181) | 45.5 (9 – 181) |

Results – progression SCD → MCI

|                                        | B    | SE   | P value | aHR  |
|----------------------------------------|------|------|---------|------|
| Real egocentric-allocentric navigation | 0.72 | 0.35 | .038    | 2.05 |
| Real egocentric navigation             | 0.86 | 0.71 | .225    | 2.37 |
| Real allocentric navigation            | 0.52 | 0.41 | .210    | 1.67 |
| Real allocentric navigation delayed    | 1.32 | 0.43 | .002    | 3.75 |

Results – progression MCI → dementia

|                                        | B    | SE   | P value | aHR  |
|----------------------------------------|------|------|---------|------|
| Real egocentric-allocentric navigation | 0.28 | 0.11 | .011    | 1.32 |
| Real egocentric navigation             | 0.20 | 0.10 | .058    | 1.22 |
| Real allocentric navigation            | 0.28 | 0.12 | .017    | 1.33 |
| Real allocentric navigation delayed    | 0.29 | 0.11 | .010    | 1.33 |

✓ Baseline impairments in allocentric navigation are strong predictors of AD-related decline.

Real-space testing is particularly effective for identifying progression from the earliest stage (SCD to MCI).

These findings support the use of spatial navigation as a non-invasive, sensitive early marker for clinical screening.

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