COGNITIVE SKILLS MODEL FOR PREDICTING ALZHEIMER'S DISEASE

Kate Keegan, Solangel Reyes, Isaac Reyes Bardales, Lily Sheehan
Project Supervisors: Dorota Kossowa-Kuhn, Gillian Gouviea

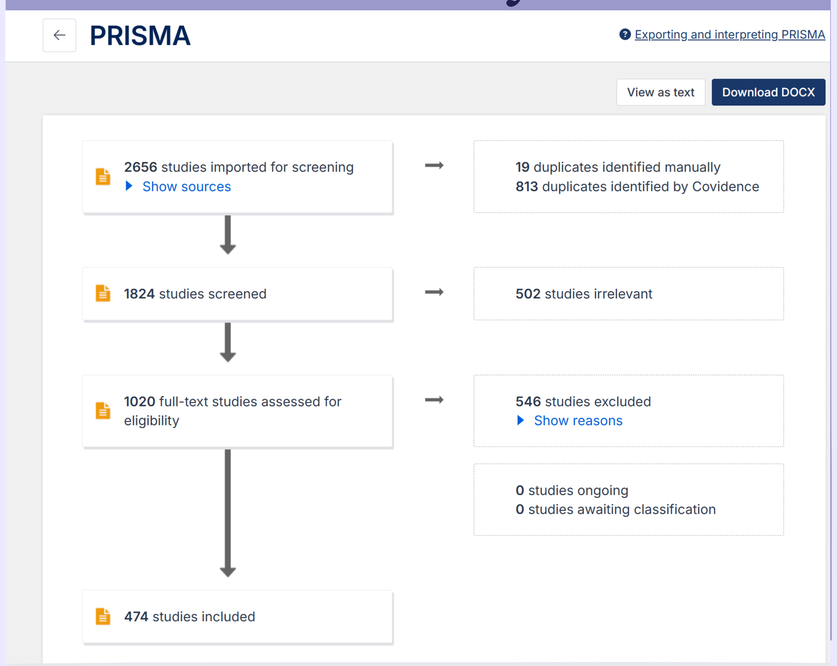
Introduction

- Our research is a gathering of studies done on MCI, and how certain predictors can lead to diagnosis of MCI.
- Mild Cognitive Impairment (MCI) is a transitional stage between normal aging and dementia, characterized by noticeable declines in cognitive function that do not yet significantly interfere with daily activities. (Peterson, 2011).
- The goal of this meta-data analysis is to examine the relationships between cognitive variables. We are doing this by comparing the same cognitive tests/skills to one another in different studies.
- Amnestic Mild Cognitive Impairment (aMCI) is a subtype of MCI that primarily affects memory and is associated with a higher risk of developing Alzheimer's disease. (Vos, et. al 2013).
- Alzheimer's disease (AD) is a progressive neurodegenerative disorder that impairs memory, thinking, and the ability to perform everyday activities (Rosenberg et. al, 2013).
- Early identification of cognitive changes is critical because Alzheimer's disease develops gradually and symptoms worsen over time.
- Early cognitive deficits in individuals with aMCI can be detected using tasks that assess memory, spatial processing, and face perception. These measures are directly related to the signature characteristics that make up MCI. Because MCI is the intermediate stage between normal aging and Alzheimer's disease, identifying these measures may help identify individuals at risk for developing Alzheimer's.
- This meta-data analysis includes the largest database for cognitive skills scores in older adults diagnosed with MCI
- The hypothesis is that there is a link between tests like executive function, memory, working memory and there is a relationship between them all.

References

- Rosenburg, P., M. Mielke, B. Appleby, E. Oh, Y. Geda, and C. Lyketsos. 2013. The Association of Neuropsychiatric Symptoms in MCI with Incident Dementia and Alzheimers Disease *The American Journal of Geriatric Psychiatry* 21: 685-695
- Peterson R. 2011. Mild Cognitive Impairment *New England Journal of Medicine* 364: 2227-34.
- Vos, S., I. Van Rossum, F. Verhey, D. Knol, H. Soininen, L. Wahlund, H. Hampel, M. Tsolaki, and L. Minthon. 2013. Prediction of Alzheimer Disease in Subjects with Amnestic and Non Amnestic MCI. *Neurology 80 1124-1132.*

Data Analysis



- PRISMA diagram showing the flow of articles through the different screening phases.

Discussion

- The strength of the final model will depend on the number of eligible studies and completeness of reported correlation data
- This study can help the scientific community understand how cognitive skill tests related to spatial navigation can predict cognitive decline over time
- This framework may guide future longitudinal studies examining how relationships between cognitive skills change over time in older adults

Methods

- Subjects studied were older adults represented in previously published empirical studies with Mild Cognitive Impairment
  - Amnestic MCI (aMCI),
  - Non-amnestic MCI (naMCI)
- Only human, English-language, Original empirical studies were included
- Databases searched for studies included: PsychInfo, PubMed, and Dissertation and Theses Global
- Study aimed to measure the relationships between multiple cognitive skills/predictors/models can be for predicting MCI and later on, Alzheimer's.
- PRISMA guidelines were used to provide a structured framework for identifying, screening, and evaluating studies in the meta-analysis
- Took from a database of studies that met the meta-data analysis criteria, and used software Covidence to code them
- Studies underwent different phases of screenings. The first two phases of screening worked on finding cognitive constructs in the studies
- Coding phase included comparing cognitive performances across the groups of MCI subtypes and healthy controls by reporting sample sizes means, and standard deviations of statistical test results

Conclusion

- Title and Abstract screening and Full text review phases have been completed: 1824 articles were screened in Title and Abstract with 1020 articles screened in Full Text Review phase.
- Data extraction and coding phase is currently in progress
- Meta-analytic structural equation modeling (MASEM) will be conducted after coding stage complete