Does the Mnemonic Similarity Task (MST) assess only memory, or is it sensitive to general cognitive function?

Sara Pishdadian[1,2,5], Nick Hoang [2,3], Stevenson Baker[1,2], Morris Moscovitch [2,3], Shayna Rosenbaum [1,2,5]

[1] Department of Psychology, York University, Toronto, Canada
[2] Rotman Research Institute, Baycrest Health Sciences, Toronto, Canada
[3] Department of Psychology, University of Toronto, Toronto, Canada
[4] Vision: Science to Application (VISTA) Program, York University, Toronto, Canada

Background

- The hippocampus is a structure in the medial temporal lobe responsible for memory and contains several subregions including the dentate gyrus (DG).
- Healthy and abnormal aging are associated with changes in the broader hippocampal network

Mnemonic Discrimination

- Mnemonic discrimination refers to the process of separating or distinguishing similar representations in memory from one another [1]
- Mnemonic discrimination has been linked to DG integrity [2]
- The Mnemonic Similarity Task (MST) is a behavioral measure of mnemonic discrimination that is sensitive to changes associated with aging and several other different conditions [3]

Montreal Cognitive Assessment (MoCA)

- Screening measure for amnestic Mild Cognitive Impairment (aMCI) with sensitivity to Parkinson's disease, Huntington's disease & vascular dementia [4][5]
- MoCA is scored out of 30 and contains subscales A) visuospatial/executive B) Naming subscale C) Memory D) Attention E) Language F) Abstraction G) Orientation.

Study Purpose: Determine relation between the MST and cognitive functioning, including memory. Is the MST sensitive to only memory on the MoCA, a popular screening measure?

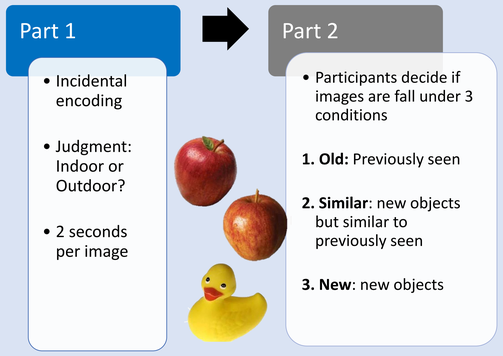
Participants & Method

- N = 94 healthy older adults (54F, 40M)
- All participants were administered the MST & Montreal Cognitive Assessment (MoCA)

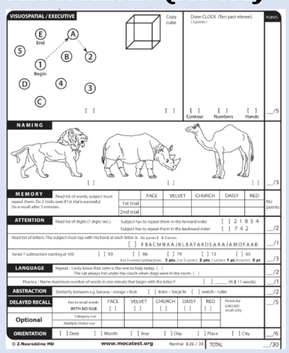
N	MoCA Group	MoCA Score	MST Lure Index (LDI)	Age
35	≤ 25	23.74 (1.79)	8.20 (11.35)	71.49 (6.46)
59	≥ 26	27.76 (1.24)	16.69 (13.73)	69.27 (5.67)

Note. Mean (SD)

Mnemonic Similarity Task (MST)

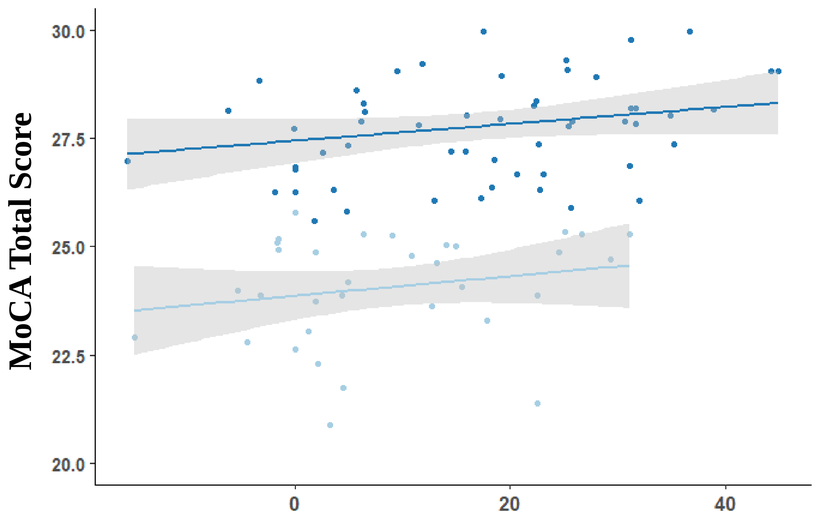


Montreal Cognitive Assessment (MoCA)

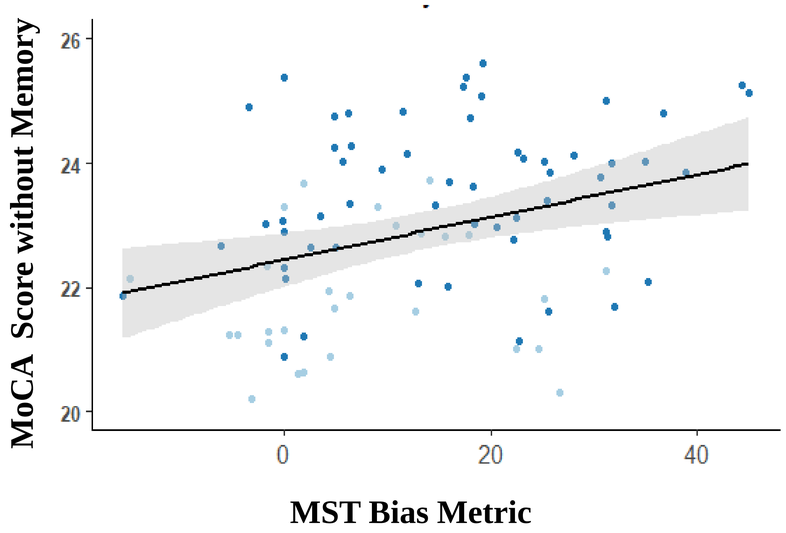


Results

MoCA Score & MST Lure Index (LDI)



MoCA without Memory & MST Lure Index (LDI)



Results

Multivariate linear regression models were used to predict MST LDI score performance.

Model	Predicting	Predictors	Model Significance	Predictor of Interest
1	MST LDI Score	Age, Sex, Years of Education, Sex:Years of Education, **MoCA Memory Subscale (/5)**	Adjusted R^2 = 0.066, $F(5,88)$ = 2.319, p = .050	Not Significant B = 2.068, $t(88)$ = 1.910, p = .059
2	MST LDI Score	Age, Sex, Years of Education, Sex:Years of Education, **MoCA Score (/30)**	Adjusted R^2 = 0.146, $F(5,88)$ = 4.183, p =. 002	Significant B = 1.950, $t(88)$ = 3.496, p < .001
3	MST LDI Score	Age, Sex, Years of Education, Sex:Years of Education, **MoCA Score without memory(/25)**	Adjusted R^2 = 0.117, $F(5,88)$ = 3.458, p = .007	Significant B = 2.164, $t(88)$ = 2.981, p = .004

Discussion

- MST lure score is not predicted by memory abilities in healthy older adults as assessed by the MoCA.
- Instead the measure is predicted by general MoCA Scores, suggesting it may be capturing broader cognitive abilities.
- Future analyses of the relationship between MST lure score and cognition should look at general cognitive status in addition to delayed memory scores.

Future Directions

- Investigate the relationship between the MST and standardized memory as well as executive functioning measures which may also contribute to performance.

References

[1] Bakker, et al.,(2008) *Science*.
[2] Stark et al.,(2013) *Neuropsychologia*.
[3] Leal & Yassa (2018) *Nature neuroscience.*
[4] Nasreddine et al., (2005) *Journal of the American Geriatrics Society*
[5] Julayanont, P., & Nasreddine, Z. S. (2017).*Cognitive screening instruments*

Contact: sarapish@yorku.ca