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The reliability and validity of a novel semantic battery for MCI

Alzheimer Society
CANADA

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INTRODUCTION

- While there is no universal agreement of the definition of Mild Cognitive Impairment (MCI), it widely refers to the transitional state between normal cognitive aging and dementia [1].
- Individuals with MCI are at an increased risk of developing dementia [2].
- Semantic memory (acquired knowledge about the world) [3] is one of the first cognitive domains to decline in MCI [4].
- Current measures testing semantic function are time consuming or lack thorough assessment of multiple semantic areas.

Objectives

- Develop a brief screening tool to assess semantic impairments in MCI.
- Assess the inter-rater reliability and face validity of this novel semantic battery.

METHODS

Participants

- Older adults (OA) were recruited from the community and MCI patients from the Bruyère Memory Program.

	Healthy OA (n=22; 8 males)	MCI (n=18; 12 males)	p-value
Age	72.18 (4.62)	77.11(6.84)	.010*
Education	14.86 (2.49)	15.61 (3.78)	.477

Semantic Battery

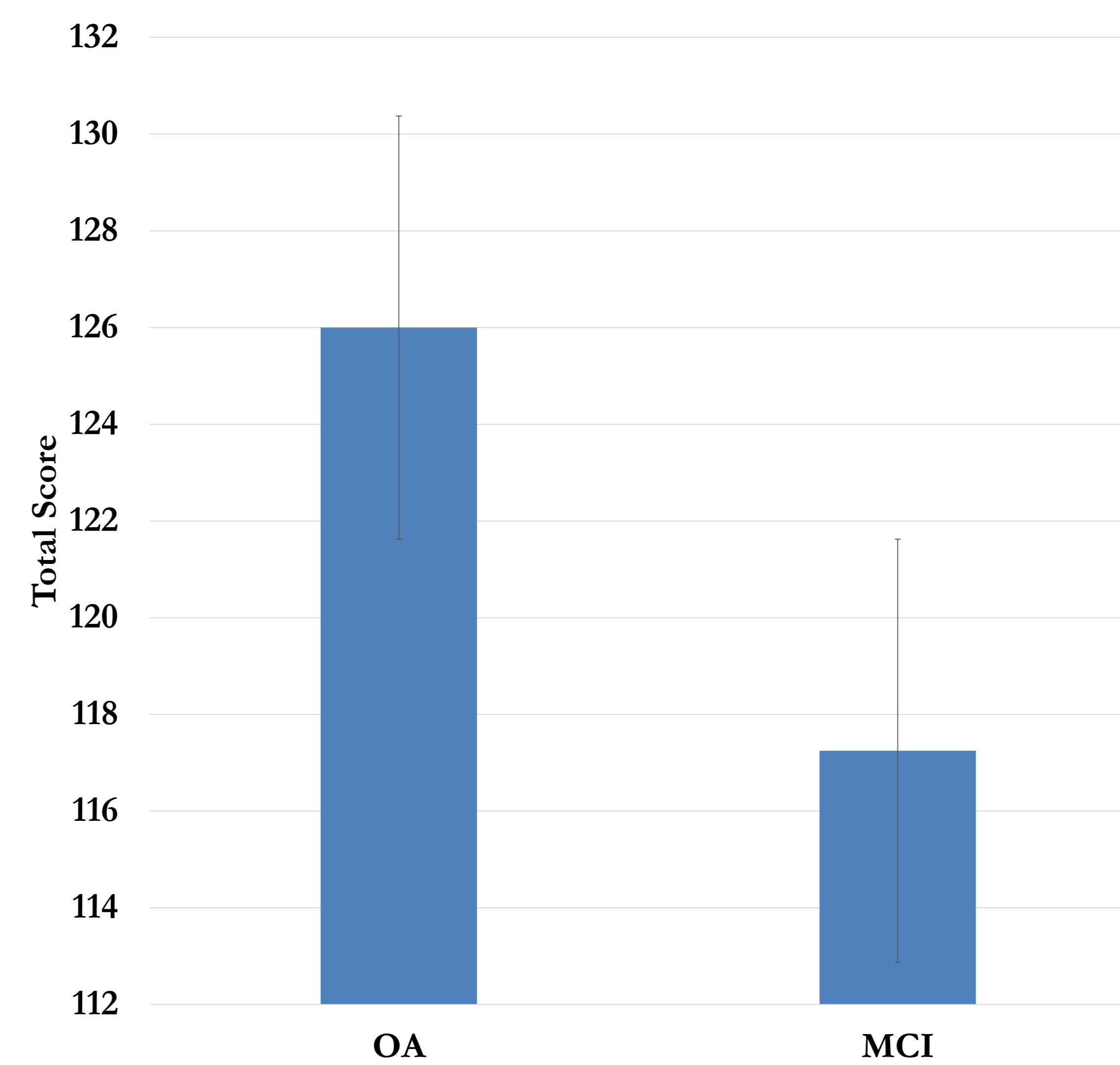
- Tasks included Oral and Written Picture Naming, Semantic Association of Written Words and Images, Shared Semantic Feature Identification with Spoken and Written Input, Semantic Feature Questions, and Verbal Fluency.
- A mix of biological, artifact and action items were included in each task.

Inter-Rater Reliability and Face Validity

- The battery serves to assess different modalities of semantic function (spoken and written input and output; linguistic and non-linguistic measures of semantic function).
- Data was scored by three independent scorers to calculate Intra-Class Correlation Coefficient to assess inter-rater reliability.
- Face validity was assessed through structured interviews with researchers (n=2), neuropsychologists (n=2), and a physician (n=1).
- Interviewees had expertise in MCI and language function.
- Face validity interviews were analyzed to identify features of the battery.

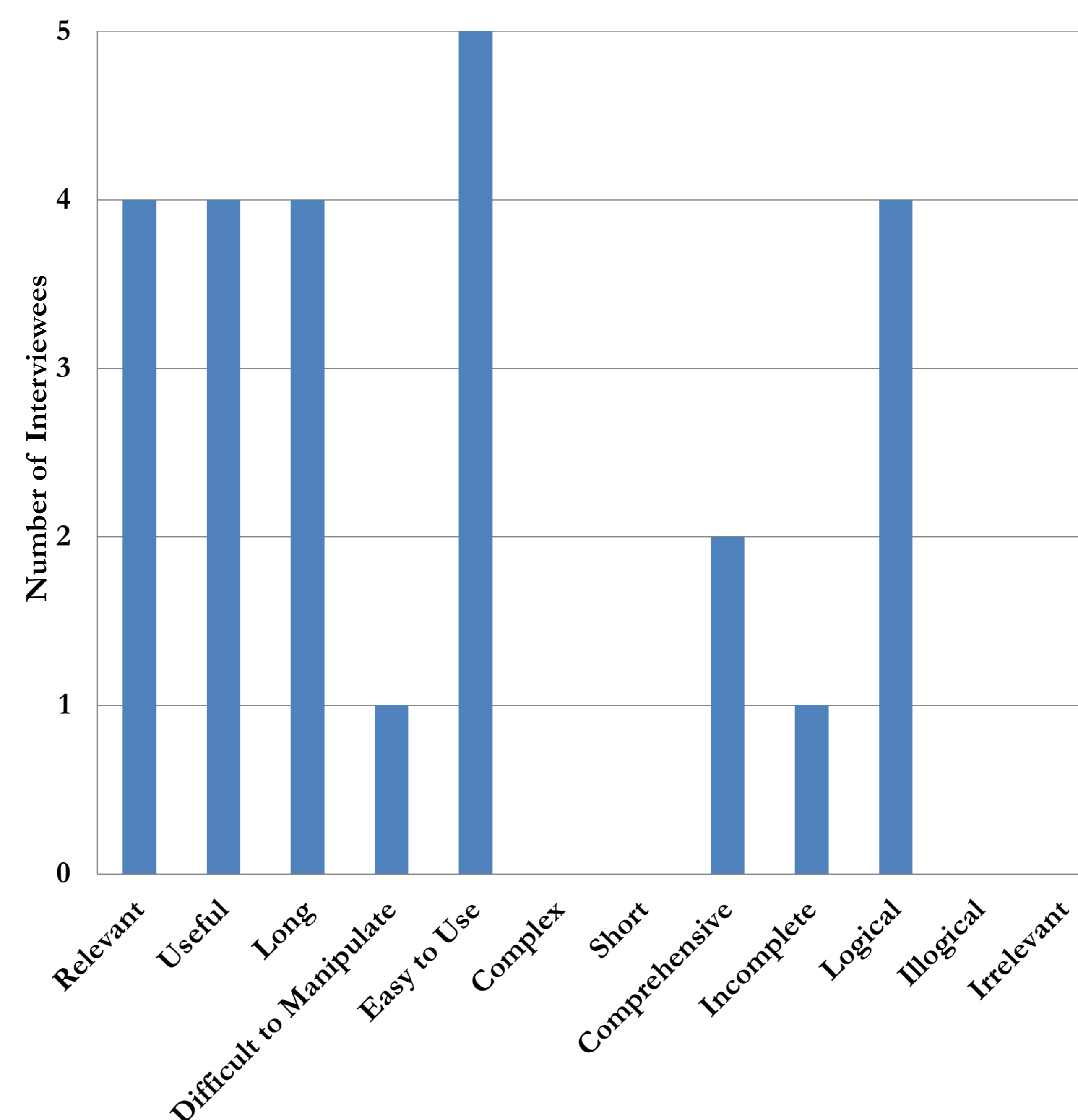
RESULTS

Figure 1. Total Scores on Battery for OA and MCI



- OA ($M= 126.00, SD= 2.49$) scored significantly higher than MCI ($M= 117.25, SD= 7.66$) total scores $t(33)= 4.71, p < .001$.
- Inter-rater reliability was high, with ICC for the scoring of each task ranging from 0.959-1.00.

Figure 2. Description of Semantic Battery per Interviewees



RESULTS

- Face validity interviews illustrate that the battery is an appropriate assessment of semantic function ($M= 4.4, range= 4-5$), and is easy to administer ($M= 4.8, range= 4-5$).
- Interviews suggest the battery is appropriate for populations other than MCI, including Aphasia, Alzheimer's Disease, Progressive Primary Aphasia and Traumatic Brain Injury.
- Semantic function, semantic knowledge, and language semantics are assessed by the battery; however one interviewee felt the battery was incomplete due to a lack of phonetic distractors.
- Overall the instruction sheet and response sheet were found to be clear for each task; however four interviewees suggested the clarity of scoring instructions for *Generation, Spoken Picture Naming* and *Written Picture Naming* tasks could be improved.
- Three interviewees were concerned that the battery occasionally measures information acquired through education, vocabulary level or information type knowledge as opposed to semantic knowledge (especially for the *Semantic Questions* task).
- Two interviewees suggested that cultural differences must also be considered in the *Semantic Questions, Spoken Picture Naming* and *Written Word-to-Word Relationships* tasks (e.g., Are cranberries eaten with turkey?).
- Four interviewees recommended that the battery was too long and should be shortened to five minutes.

DISCUSSION

- These findings suggest the scoring is reliable, the battery is appropriate for assessment of semantic function, and is effective in discriminating between healthy OA and MCI patients.
- Next steps include shortening and modifying the battery to become more efficient for clinical use, and assessing construct validity by comparing performance to that on traditional measures of semantic function.

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References

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