Semantic Relatedness in Category Fluency Among Individuals with Mild Cognitive Impairment: The Vanderbilt Memory and Aging Project

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Background & Hypotheses

- Category fluency (especially Animal Fluency) is a popular measure to assess semantic knowledge in Alzheimer's disease (AD).
- In AD, the number of errors committed in category fluency increases (Ober et al., 1986).
- We researched whether Animal Fluency errors were associated with mild cognitive impairment (MCI), a prodromal phase of AD. We analyzed both total errors and mean distance (number of intervening responses) between repetition errors.

Table 1. Sample Characteristics

	NC n=166	MCI n=168
Age, years	73±7	73±7
Sex, % Female	40	42
MoCA Total Score*	27.1±2.1	23.6±3.4
Animal Fluency, Total*	21.1 ± 4.8	17.0 ± 5.2
Total errors	0.9 ± 1.2	0.9 ± 1.2
Mean Distance between repetition errors	8.1 ± 5.2	6.8 ± 3.8

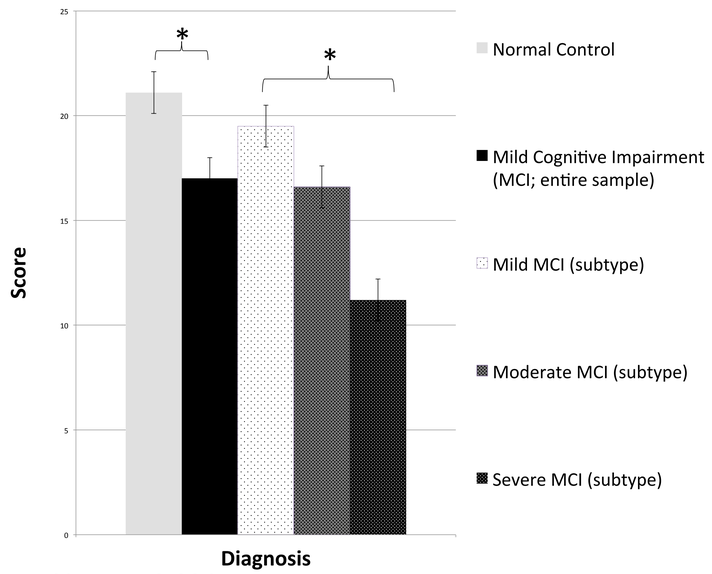
*p<0.001 difference between groups

Table 2. Sample Characteristics by MCI Subtype

	Mild MCI n=48	Moderate MCI n=100	Severe MCI n=20
Age, years	73±7	72±7	79±8
Sex, % Female	40	42	45
MoCA Total Score*	25.6 ± 2.4	23.4 ± 3.3	20.0 ± 3.0
Animal Fluency, Total*	19.5 ± 4.5	16.6 ± 4.4	11.2 ± 4.6
Total errors	0.9 ± 1.5	0.9 ± 1.2	1 ± 0.86
Mean Distance between repetition errors‡	8.1 ± 3.7	6.9 ± 3.7	4.7 ± 3.3

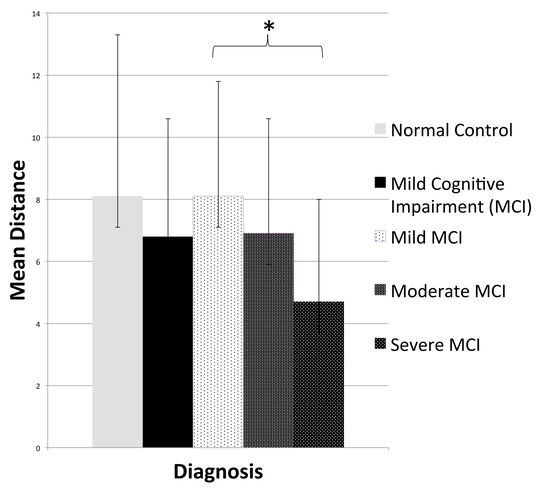
*p<0.001 difference between groups
‡p<0.05 difference between groups

Figure 1. Animal Fluency by Diagnosis



Note: p<0.001

Figure 2. Mean Distance Between Repetition Errors



*Note: p=0.039

Methods

- Cognitively normal (NC) and MCI participants were drawn from the Vanderbilt Memory & Aging Project, a case-control longitudinal study investigating vascular health and brain aging.
- MCI participants were further subtyped into severity stages by clinicians using the CDR, FAQ, and neuropsychological performance at eligibility.
- Participants completed the Animal Fluency task at enrollment.

Results

- Total Animal Fluency output was lower in MCI compared to NC participants ($F_{1, 332}$ = 66, p<0.001). MCI severity subtypes differed on Animal Fluency output (mild>moderate>severe, $F_{2, 165}$ = 24, p<0.001). See **Figure 1**.
- Total Errors did not differ significantly between NC and MCI participants ($F_{1, 332}$ = 0, p=0.97). Similarly, Total Errors did not vary between the MCI severity subtypes (mild=moderate=severe, $F_{2, 165}$ = 1.2 p=0.29).
- Mean Distance between errors was not different between MCI and NC participants ($F_{1,146}$ = 1.4, p=0.23). Conversely, within the MCI subtypes, the more severe the impairment, the greater the Mean Distance between errors was ($F_{2,163}$ = 2.8, p=0.039). See **Figure 2**.

Conclusions & Future Research

- Compared to NC participants, MCI participants demonstrate a decrease in total output, but have the same number of Total Errors and the same Mean Distance between errors.
- In MCI subtypes, there is a decrease in total output and increased Mean Distance between errors with greater MCI severity, but no difference in the number of Total Errors.
- Consideration of the Mean Distance of intervening responses between repetition errors may be predictive of worse cognitive status relative to normal cognition.

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