explore whether temporal lobe cortical volume is implicated in the relationship between increased CSF Ab levels and cognitive decline, as measured by confrontation naming performance -- an age-independent language task often impaired in preclinical AD -- in AD-vulnerable populations.

Participants and Methods: We selected 87 non-demented Veterans (Sex: 99% male; Age: M=68.2, SD=3.7; Education: M=15.5, SD=2.2) from the Alzheimer's Disease Neuroimaging Initiative-Department of Defense (ADNI-DOD) database based on available Boston Naming Test (BNT) scores, CSF measures of Ab-38 and Ab-40, and structural neuroimaging data. The 30-item BNT assessed confrontation naming performance. CSF Ab concentrations were measured using a 2D-UPLC-tandem mass spectrometry method outlined by ADNI-DOD. T1-weighted images were acquired on a 3T scanner and processed by ADNI to calculate cortical volumes (CVs) for regions of interest (ROIs); the present study focused on three bilateral ROIs in the temporal lobe (fusiform gyrus [FFG], inferior temporal gyrus [ITG], and middle temporal gyrus [MTG]). All CVs were adjusted (CV_adj) for intracranial volume (ICV) using the covariance formula (CV_adj = CV − b [ICV − mean(ICV)]). Linear regression models explored the relationship between CSF Ab peptides and BNT with temporal lobe ROIs as moderators using the PROCESS macro.

Results: CV of the bilateral FFG significantly moderated the relationship between BNT performance and both CSF Ab-38 (p=.025, R^2=.05, b=.0008) and Ab-40 (p=.016, R^2=.06, b=.0002) levels. We then explored effects of the left and right FFG separately and found that the relationship between CSF Ab-38 and BNT was significantly moderated by the left FFG (p=.032, R^2=.05, b=.0006) and nominally by the right FFG (p=.072, R^2=.03, b=.0006). The relationship between CSF Ab-40 and BNT was significantly moderated by both the left (p=.032, R^2=.05, b=.0001) and right (p=.038, R^2=.04, b=.0001) FFG. CV of the bilateral ITG and MTG had no effect on any model (all p >.10).

Conclusions: Increased Ab may trigger alterations in neural gray matter integrity, specifically in the FFG of the temporal lobe, and these changes may in turn be implicated in AD-related cognitive decline, particularly in the language domain. These findings suggest that biomarker models incorporating CSF Ab and CV may aid early identification of disease and risk for cognitive decline in preclinical AD stages, which could help inform early interventions.

Categories: Dementia (Alzheimer's Disease)
Keyword 1: dementia - Alzheimer's disease
Keyword 2: neuroimaging: structural
Keyword 3: language
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20 Global and Local Semantic Coherence of Spontaneous Speech in Persons with Alzheimer's Disease and Healthy Controls

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Objective: Growing evidence demonstrates that subtle changes in spontaneous speech can be used to distinguish older adults with and without cognitive impairment, including those with Alzheimer's disease (AD). Recent work suggests that quantification of the meaningful connectedness of speech – termed semantic coherence – may be sensitive to cognitive dysfunction. The current study compared global coherence (GC; the degree to which individual utterances relate to the overall topic being discussed) and local coherence (LC; the degree to which adjoining utterances relate meaningfully to each other) in persons with AD and healthy controls.

Participants and Methods: Speech transcripts from 81 individuals with probable AD (M_{age} = 72.7 years, SD = 8.8, 70.3% female) and 61 healthy controls (HC) (M_{age} = 63.9 years, SD = 8.5, 62.2% female) from Dementia Bank were analyzed. All participants completed the Cookie Theft and MMSE as part of that larger project. Machine learning analyses of GC and LC were conducted and models evaluated classification accuracy (i.e., AD vs HC) as well as ROC-AUC. Relationships between coherence indices and MMSE performance were also quantified.

Results: Though no significant group differences emerged in LC (Estimate = 0.012, p = 0.32), persons with AD differed from healthy controls in GC (Estimate = 0.03, p = 0.006) and produced less semantically coherent speech. GC indices predicted AD diagnoses

with 65% accuracy. Interestingly, coherence indices showed only modest correlation with MMSE scores (r = .19).

Conclusions: GC metrics of spontaneous speech differentiated between persons with AD and controls, but did not strongly correlate with MMSE performance. Such findings support the notion that many aspects of language are impacted in persons with AD. In addition to replication, future work should evaluate whether GC is also disrupted in persons with pre-clinical AD and its potential to assist with early detection.

Categories: Dementia (Alzheimer's Disease)
Keyword 1: speech
Keyword 2: dementia - Alzheimer's disease
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21 Assessment of Semantic Memory Decline in aMCI : Naming and Semantic Knowledge of Unique and Non-Unique Entities

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Objective: Semantic memory deficits have been reported in both Alzheimer's disease (AD) and amnestic mild cognitive impairment (aMCI). However, the nature of this decline is still a matter of debate. The aim of this study was to explore the patterns of semantic memory impairment in aMCI by examining performance on naming tasks, and on tests assessing both general and specific semantic knowledge.

Participants and Methods: Participants were divided in two groups matched for age and education, one comprising 33 aMCI individuals and the other 39 healthy controls. Three experimental tests assessing naming and semantic knowledge of unique items of famous persons (FACE) and places (PLACE), logos recognition (LOGO: brands and pictograms), and non-unique entities (Boston Naming Test: BNT) were administered, and the performance of the two groups was compared.

Results: Lower scores were observed on all naming tests (PLACE, FACE, LOGO and BNT) in the aMCI group compared to controls. On the PLACE test, the general knowledge mean score (M=84.5, SD=12.9) was significantly higher than the specific knowledge mean score (M=54.2, SD=18.5) in aMCI participants (t(31)=11.9, p<.001), but not in controls (general: M=92.2, SD=11.1; specific: M=73.7, SD=15.8), and there was a significant Group X Type of knowledge interaction (F(1,1)=15.13, p <.001, η^2 =.18). On the FACE test, in addition to significant group and condition (naming, semantic questions) main effects, a significant interaction was found (F(1,1)=7.19, p = .009, η^2 = .09). On the LOGO task, controls were significantly better on brand items (M= 94.4, SD=10.5) than on pictograms (M=83.3, SD=12.2), while no significant difference was noted in aMCI (brands: M=81.5, SD=22.6; pictograms: M=77.5, SD=14.1). Lastly, on the BNT, aMCI participants benefited more from phonemic cues than controls (F(1,1)=16.56, p<.001, η^2=.19), suggesting a lexical access deficit, in addition to their semantic memory impairment.

Conclusions: This study adds to the growing evidence confirming the presence of semantic memory deficits in aMCI. Specific semantic knowledge seems to be more affected than general semantic knowledge, a finding reported in previous studies. Lexical access deficits, in addition to semantic decline, were also observed in the aMCI group. These results allow for a better understanding of the pattern of semantic memory deficits in the prodromal stage of AD and could potentially facilitate diagnosis of aMCI.

Categories: Dementia (Alzheimer's Disease)
Keyword 1: mild cognitive impairment
Keyword 2: dementia - Alzheimer's disease
Keyword 3: semantic processing