

Keyword 3: psychometrics

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2 Reading Aloud Elicits Connected Speech and Autocorrection: a Novel Marker of Alzheimer's Disease and Risk

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Objective: Spontaneous speech involves tight coordination of a constellation of cognitive mechanisms (including planning, lexical selection, grammatical encoding, internal & external monitoring). Recent years brought a flurry of interest in detailed analysis of spontaneous speech in search of markers of prodromal Alzheimer's disease. This work dates back to the nun studies by Snowdon et al (1996) and reveals promise for early detection through identification of subtle but significant changes in the nature of speech output years prior to diagnosis of dementia.

A major challenge for neuropsychology is to develop methods to harness the potential sensitivity of language to subtle cognitive changes when testing individuals in clinical settings. In this talk I will present two lines of research that illustrate how reading aloud can be used to engage the cognitive mechanisms of spontaneous speech production in a manner that provides an easily accessible measure of Alzheimer's disease/risk.

Participants and Methods: In the first study, Spanish-English bilinguals with mild-to-moderate Alzheimer's disease (n=20) and proficiency matched controls (n=29) read aloud mixed-language paragraphs with a small number of language-switched words, and we recorded the number of times they automatically translated switch words by accident (e.g., saying pero instead of but; effectively autocorrecting language switches to avoid producing switches overtly). In the second study, cognitively normal monolinguals at risk for AD based on CSF biomarkers (n=14) and controls (n=50) read aloud short paragraphs in which ten critical target words were replaced with autocorrect targets (e.g., The player who scored that final [paint] for the local team reported [him]

experience). Participants were instructed to avoid autocorrecting (e.g., avoid saying point instead of paint or his instead of him), and we recorded the number of times they autocorrected by accident.

Results: Bilinguals with AD translated switch words more often than controls, and ROC curves revealed good-to-excellent discrimination between patients and controls based solely on the number of errors produced during reading aloud (AUC or Area Under the Curve values ranged from .71-.92). In the second study, cognitively normal monolinguals with high CSF Tau/A β 42 (i.e., an AD-like biomarker profile) produced more autocorrect errors (e.g., saying point instead of paint) than those below the biomarker threshold, and autocorrection errors showed potential for discriminating individuals with higher AD risk from controls (AUC=.76; 95%CI .62-.90).

Conclusions: Difficulty stopping automatic translation of language switch words and autocorrection during reading aloud reveals promise as a diagnostic tool. Reading aloud elicits rapid production of hundreds of words while maintaining tight experimental control over the content of speech and harnessing the power and complexity of language to enable detection of very subtle cognitive changes through simple analysis of critical targets. I will discuss the theoretical implications of this work for understanding how bilinguals choose a single language for production, the nature of cognitive impairments in early AD and areas of need for further research to maximize the potential utility of reading aloud for detection of cognitive impairment.

Categories: Dementia (Alzheimer's Disease)

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3 Ethnoracial Differences in Anchor Agreement and MCID Estimation in Alzheimer's Disease

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