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Title: Using speech as a biomarker for detecting and measuring cognitive impairment

Abstract: Subtle changes in speech patterns may serve as early indicators of cognitive decline, even before clinical impairment is detected through traditional assessments. By leveraging advanced natural language processing techniques, distinctive linguistic features have been identified in individuals with preclinical Alzheimer's disease compared to those exhibiting healthy aging. These markers span lexical, syntactic, and acoustic domains, capturing nuanced changes in language production that mirror underlying neurological processes. Notably, metrics such as decreased lexical diversity, increased pause frequency, and alterations in vocal characteristics have shown promise in distinguishing between pathological and normal cognitive aging trajectories. The automated analysis of speech samples offers a scalable and non-invasive approach to screening for early signs of cognitive decline, potentially enabling timely intervention and tracking of response to emerging therapies. As research continues to unravel the complex interplay between language and cognition, speech markers hold significant potential as valuable tools in the early detection and management of Alzheimer's disease.

Bio: Dr. Kleiman is a Research Assistant Professor and the Assistant Director of Data Science and Technology at CCBH. He received his PhD in Experimental Psychology from Florida Atlantic University. Dr. Kleiman's research focuses on the ability of "neurobehavioral markers", markers of non-intentional behavior within gaze and speech, to measure cognitive decline in healthy brain aging and early-stage cognitive impairment. His overall research explores the intersection between neurology, cognitive psychology, and data science. He has developed tools and machine learning models that use neurobehavioral markers as well as health records, cognitive exam scores, and neuroimaging data for assessing current impairment and predicting future risk of impairment. He has been awarded grants from the Alzheimer's Association, the McKnight Brain Research Foundation, and the Florida Department of Health.