

Examining the effect of Parkinson disease on clear speech using utterance-level vowel space metrics

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Abstract

The current study utilized vowel space metrics based on continuously sampled formant traces to examine clear speech in speakers with and without Parkinson disease (PD). First and second formant frequency traces were extracted from full-length paragraphs that were produced using both habitual and clear speech styles. All vowel space metrics were sensitive to style-related changes in articulation. Only the Articulatory-Acoustic Vowel Space (AAVS) and Vowel Space Density, and not the Vowel Space Hull Area, reflected group differences in vowel acoustics. Results revealed that, while all speakers increased vowel space between the habitual and clear styles, the clear speech effect was significantly reduced for speakers with PD compared to controls. These results indicate that speakers with PD may not modulate the articulatory system to the same extent as controls when given a clear speech cue. Additionally, the AAVS was used to examine changes in vowel space across the reading task. In the habitual style, participants with PD exhibited a decrease in the AAVS across the passage that was not observed for control speakers. The observed decrease in vowel space across the passage for the PD group may possibly result from worsening hypokinesia across the speaking task.