The Role of Semantic Monitoring in Speech for Parkinson's Patients

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Current models of speech error monitoring, like the commonly used DIVA model, generally only account for articulation and phonology. They don’t account for semantic monitoring, or the meaning of words and how the brain is able to process the logic of sentences. We believe that semantic monitoring also plays an important role in error monitoring. This distinction is particularly important for people with Parkinson’s disease, who experience greater difficulty in speech than healthy adults. Disfluencies in PD patients are generally assumed to be motor based, but we believe that semantic processing and prediction also plays a crucial role. If individuals with PD use semantic prediction to monitor for speech errors, then we predict that they will generate more speech disfluencies in a semantically anomalous reading passage compared to a semantically plausible reading passage when all other linguistic and articulation factors are held constant. To test this, we had patients read 2 passages, one semantically plausible and one semantically anomalous, and analyzed the rate of disfluencies. Our data did show a significant difference in certain disfluencies. The levels of medium and long pauses (which indicate a speech error that is caught and rectified prior to speech) were both shown to increase when semantic support was removed, and our statistical analysis confirmed that these values were statistically significant. The rate of phrase-level disfluencies (which indicate a speech error that is caught very late) was also shown to increase in the anomalous paragraph; however, statistical analysis showed that further testing is needed to confirm the significance of these data. These results show that semantic monitoring does play a role in the speech of Parkinson’s patients.

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