

Understanding the Voice Control System in Parkinsons Disease

<https://www.neurodegenerationresearch.eu/survey/understanding-the-voice-control-system-in-parkinsons-disease-2/>

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Contact information of lead PI Country

USA

Title of project or programme

Understanding the Voice Control System in Parkinsons Disease

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NIH (NINDS)

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351484.4037

Start date of award

01/07/2014

Total duration of award in years

1

Keywords

Voice, Parkinson Disease, Event-Related Potentials, auditory feedback, causal model

Research Abstract

DESCRIPTION (provided by applicant): This proposal describes a 3 year research translational project program to obtain data that can serve as pilot data in a subsequent submission for a research project grant (R01) by the early stage investigator. The PI is a speech scientist with training in speech signal processing, emotional prosody and prosodic processing, acoustic modeling, and EEG/ERP techniques and is currently working in the area of voice control and motor speech disorders as a postdoctoral fellow at Northwestern University. She will now apply

these skills to modeling the neural mechanisms underlying voice control in Parkinson's disease (PD). Environment: The Communication Sciences and Disorders Department at Northwestern University, a research-intensive university and department. As a postdoctoral fellow, the PI will be housed in her mentor's laboratory and has access to space, equipment, and a network of world-renowned scientists. Research: The long-term goal of this research is to understand the neural mechanisms controlling the voice and to extend these findings to people with neurogenic disorders of voice production. The short-term objective is to identify the neurological substrates of impaired vocal control in PD, specifically by testing for abnormal function of the efference copy mechanisms, model the underlying neural circuitry, and compare the results with healthy controls and with a clinical group having diffuse cortical impairment ("impaired controls"). The Specific Aims of the project are: 1) Identify the role of efference copy during voice source identification and error detection/correction in PD and model the neural circuitry and 2) Identify effects of pitch perturbations on volitional F0 modulation and differences in the neural pathways and EEG microstate characteristics. In this experiment, the vocalizations and brain activity (EEG/ERP, microstates) of individuals with Parkinson's disease will be examined when given small perturbations to the auditory feedback of their voice, specifically for the purpose of examining the control system wherein an efference copy of the intended vocal output is compared with the actual sensory feedback. This behavioral-neurological measurement strategy in addition to the sophisticated neurological modeling proposed-including dynamic causal modeling, coherence analysis, and EEG microstate analysis-is a novel approach to examining motor control. Also, the neural mechanisms of voice control that contribute to the voice disorder in PD, including feed forward (fast and automatic control) and feedback control (slow and reliant on sensory feedback) will be defined using a highly innovative paradigm that requires subjects to dynamically change their voice pitch to follow (or shadow) or oppose a pitch shift. Our preliminary data in PD compared to young adults support our hypotheses and warrant further experimentation. The results of these experiments will significantly advance our understanding of auditory feedback on voice control and vocal impairments in PD.

Further information available at:

Types:

Investments < €500k

Member States:

United States of America

Diseases:

N/A

Years:

2016

Database Categories:

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