

# Effects of tDCS on spoken and written production in Primary Progressive Aphasia

<https://neurodegenerationresearch.eu/survey/effects-of-tdcs-on-spoken-and-written-production-in-primary-progressive-aphasia/>

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### Country

USA

## Title of project or programme

Effects of tDCS on spoken and written production in Primary Progressive Aphasia

## Source of funding information

NIH (NIA)

## Total sum awarded (Euro)

€ 3,362,682.57

## Start date of award

02/04/2015

## Total duration of award in years

1

## The project/programme is most relevant to:

Alzheimer's disease & other dementias

## Keywords

Primary Progressive Aphasia, Language Therapy, Writing, Language, spelling

## Research Abstract

? DESCRIPTION (provided by applicant): Primary progressive aphasia (PPA) is a relatively common clinical neurodegenerative syndrome that first and foremost affects language abilities.

PPA usually has an early onset (50-60 years of age), detrimentally affecting work and family life. Spoken and written word production deficits are the earliest affected language skills with significant prognostic and diagnostic value for its course. There is no available treatment for affected individuals. Behavioral language therapy and naming and spelling interventions in particular have shown modest but encouraging gains, which, however, do not generalize to untrained items and do not sustain over time. Transcranial Direct Current Stimulation (tDCS) is a relatively new, safe, non-invasive, non-painful electrical stimulation of the brain; it has been shown to improve language and cognitive abilities in healthy controls and individuals with stroke and dementia when administered during language therapy. Repetitive and consecutive sessions of tDCS are thought to induce a type of long-term potentiation in the brain that affects synaptic connectivity. There is only one published study (by our group) supporting that tDCS coupled with spelling therapy has beneficial effects in people with PPA. In this project we propose to investigate the behavioral and neuromodulatory effects of tDCS during a combination of spoken and written word production therapy in PPA participants over time. In Specific Aim 1, we will test the hypothesis that anodal tDCS, when administered in combination with spoken and written word production therapy, will improve performance of individuals with PPA more than behavioral spoken and written word production therapy alone. We also hypothesize that improvements will be sustained over time and generalize to other language and cognitive functions subserved by the stimulated brain areas and will positively affect the quality of life of participants. In Specific Aim 2, we test the hypothesis that changes in functional connectivity as measured by resting-state fMRI are greater after tDCS coupled with spoken and written word production intervention than after behavioral spoken and written word production intervention alone while controlling for gray matter volume and white matter tract loss as measured by volumetric and diffusion tensor imaging (DTI). Study results may help optimize future interventions in individuals with PPA or other neurodegenerative disease by providing novel treatment alternatives in a neurodegenerative syndrome with no proven effective treatment. A better understanding of the behavioral as well as functional connectivity changes due to tDCS will offer insights into ways of impeding neurodegeneration that may improve quality of life for individuals with PPA and other dementias.

### **Lay Summary**

**PUBLIC HEALTH RELEVANCE:** Project Narrative PPA is a clinical neurodegenerative syndrome that is mainly characterized by language deficits for which there is no treatment available. Spoken and written word production deficits are the earliest affected language functions with great prognostic and diagnostic value for the progress of the disease. In this project we will evaluate the effectiveness of transcranial direct current stimulation (tDCS)-a relatively new technique of brain stimulation-coupled to a language intervention that combines treatment for both the spoken and written word production; we will also monitor the effects of interventions and neuromodulation in the brain by studying changes in functional connectivity using resting-state fMRI while controlling for gray matter volume and white matter loss.

### **Further information available at:**

#### **Types:**

Investments > €500k

#### **Member States:**

United States of America

#### **Diseases:**

Alzheimer's disease & other dementias

**Years:**

2016

**Database Categories:**

N/A

**Database Tags:**

N/A