Statistical Analysis Plan

Title: Optimizing transcranial direct current stimulation (tDCS) to improve dual task gait and balance in older adults

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Principal Investigator: Bradley Manor, Ph.D. BradManor@hsl.harvard.edu

Organization: Marcus Institute for Aging Research Address: 1200 Centre Street, Boston, MA 02131-1101

Phone: 617-971-5332

Sponsor: National Institute on Aging - NIA/NIH: 31 Center Drive, MSC 2292, Bethesda, MD 20892

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Statistical analysis

Statistical analyses will be performed using JMP 16 software (SAS Institute, Cary NC). Significance level will be set to 0.05 for all analyses. Descriptive statistics (i.e., mean, standard deviation (SD)) will be used to summarize demographic characteristics of participants and study outcomes. Shapiro-Wilk tests will be used to examine if the data was normally distributed.

Primary analyses will utilize two-way repeated-measures ANOVAs to examine the effects of tDCS on dual-task cost to standing and sway outcomes. The dependent variable of each model is the primary outcomes of standing (i.e., dual task cost to sway speed and area) and walking (i.e., dual task cost to walking speed). Similar analyses will be applied to the secondary outcomes such as (dual task cost to gait stride time variability, and the walking speed and stride time variability within each condition). Model effects will include stimulation condition (i.e., gel-tDCS, sponge-tDCS, gel-sham and sponge-sham), time (pre-, post-stimulation), and their interaction. Age, sex, and BMI will be included as covariates because each is associated with one or more metrics of standing or walking. Tukey's post-hoc testing will be used to compare factor means of significant models.

A secondary exploratory analysis using one-way ANOVAs to compare the effects of the stimulation conditions on the percent changes of the standing and walking outcomes will be performed. Model effect will be stimulation condition.