Noninvasive neurostimulation of sensorimotor adaptation in speech production

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tDCS Methods

High-definition transcranial direct current stimulation (HD-tDCS): 6 electrodes (2 anodes, 4 cathodes) were placed at designated locations on the scalp targeting left ventral premotor / motor cortex. Participants received 2 mA of anodal stimulation during the task (≤ 20 minutes). Resistance at each channel was < 10 Ω.

Results

F1 Adaptation to Perturbation During Anodal vs. Sham tDCS

▲ Mixed-effects linear models revealed that Anodal stimulation resulted in significantly greater F1 adaptation magnitude compared to Sham during the perturbation phase [t = -6.53, p ≪ 0.001], and a greater increase in adaptation over time [t = -2.48, p = 0.013].

▼ There was no effect of stimulation on F1 recovery or recovery time [both p ≥ 0.22].

F2 Adaptation to Perturbation During Anodal vs. Sham tDCS

▲ There was no effect of stimulation on F2 during perturbation [both p ≥ 0.50], but withdrawal of perturbation resulted in instabilities in F2 during sham, but not anodal stimulation: [t = -3.55, p < 0.001].

Acknowledgments

The Audapter software was developed by Shanqing Cai. We thank Andrea Chang, Jennifer Golditch, Cecilia Cheng, Elly Hu, Ja Young Choi, Terri Scott, and Jason Tourville for their help. This work was supported by NIH NIDCD R03DC014045 to T.P.