Modulating categorization skills: The impact of transcranial Direct Current Stimulation (tDCS) on the Prototype Effect

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Abstract

We present two studies utilizing tDCS to investigate the impact of anodal stimulation at the Fp3 site on categorization learning indexed by the prototype effect. This phenomenon is characterized by superior categorization for unseen category prototypes compared to both seen and unseen category exemplars. In our double-blind experimental design, participants were randomly assigned to one of two groups: anodal tDCS or sham/control. In Experiment 1a, we observed a pronounced prototype effect in sham/control, demonstrating significantly enhanced categorization performance for unseen category prototypes over 'old' (previously seen) exemplars. Critically, the application of anodal tDCS diminished this effect, hindering performance on prototype stimuli. Experiment 1b provided further validation of this finding, indicating that anodal tDCS disrupts the prototype effect concerning old exemplars. Interestingly, this significant reduction in the prototype effect was not replicated with 'new' (unseen) category exemplars. We contextualize our results within the framework of the tDCS and perceptual learning literature.

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