Results: DBS induced a statistically significant improvement in motor symptoms (-38.5%, according to the Unified Parkinson's Disease Rating Scale part III), in anxiety (-29% according to the Hamilton Anxiety Rating Scale), with the strongest reduction in the physiological anxiety subscore (-36.26%). A mild worsening of impulsivity was detected at the Barratt Impulsiveness scale (+9%) with the greatest increase in the attentional impulsiveness subscore (+13.60%). No significant differences were found for the other scales. While the positioning of the stimulating electrodes was shown to considerably influence the outcome, with more anterior and/or medial lead position in the STN negatively influencing psychiatric symptoms, no correlation was found between TEED and clinical scales score (Table 1).

Conclusions: STN-DBS reduced anxiety and slightly increased impulsivity in PD patients after one year of DBS targeting the STN. While TEED did not correlate with any clinical scale score, leads' placement significantly impacted on psychiatric symptoms.

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THE EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION ON EPISODIC FUTURE THINKING FOLLOWING ACUTE PSYCHOSOCIAL STRESS

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Introduction: Research on stress-related disorders and brain imaging suggests that (acute) stress might impact the capacity to mentally simulate specific episodic future events (EFT) through the effects of cortisol on brain regions supporting this cognitive function, such as the prefrontal cortices. This study aims to examine the mechanisms underlying this link, using bifrontal transcranial Direct Current Stimulation (tDCS).

Methods: 60 healthy participants were subjected to the Montreal Imaging Stress Task (MIST), followed by either active or sham tDCS. After stimulation, the EFT task was administered. Salivary cortisol was measured throughout the protocol.

Results: Higher cortisol AUCi values were linked to less specific episodic future thoughts. Moreover, active tDCS enhanced EFT specificity irrespective of cortisol, especially in high trait ruminators. We did not observe an effect from active tDCS on cortisol AUCi, and equally there was no interaction effect between cortisol AUCi and stimulation condition predictive for EFT specificity.

Conclusion: Although we did not find evidence for the effects of tDCS on the HPA-system, our data reveal a crucial link between two critical predictors of mental health for the first time, and provide a solution to help rehabilitate EFT deficits.

Keywords: *transcranial direct current stimulation - trait rumination – cortisol - Montreal Imaging Stress Task - episodic future thinking*

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OPTIMIZED RESTING-STATE fMRI ACQUISITION STRATEGY FOR RELIABLE DLPFC TARGETING

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Introduction: The sgACC resting-state network is highly relevant in clinical applications for determining brain stimulation targets in the left DLPFC. However, the effects of changes in resting-state fMRI acquisition parameters on the reliability and reproducibility of these functionally derived targets are largely unknown. Here, we quantify the effect of echo time choice and preprocessing strategies on the reliability of the resulting functional connectivity maps.

Methods: In a group of 15 healthy subjects, we performed single-session scanning at 3T acquiring six runs of rs-fMRI (three with TE=30 ms; three with TE=38 ms) each. Functional connectivity maps were calculated for each run, and correlations to a seed in the sgACC were computed. Smoothing kernel size (FWHM) was varied from 4 mm to 12 mm in steps of 2 mm. Intraclass Correlation Coefficients (ICC) were calculated for each run and for each smoothing kernel. Values below 0.5, between 0.5 and 0.75, 0.75 and 0.90, and greater than 0.90 are considered to indicate poor, moderate, good and excellent reliability, respectively.

Results: Overall, functional connectivity networks showed comparable distribution for both TE choices. However, connectivity maps acquired with TE=38 ms showed much higher ICC values within the DLPFC region. Specifically, the peak within the left DLPFC had a reliability value of 0.95 for TE=38 ms compared to 0.54 for TE=30 ms. Figure 1 shows the ICC reliability maps for both TEs using different smoothing kernels.

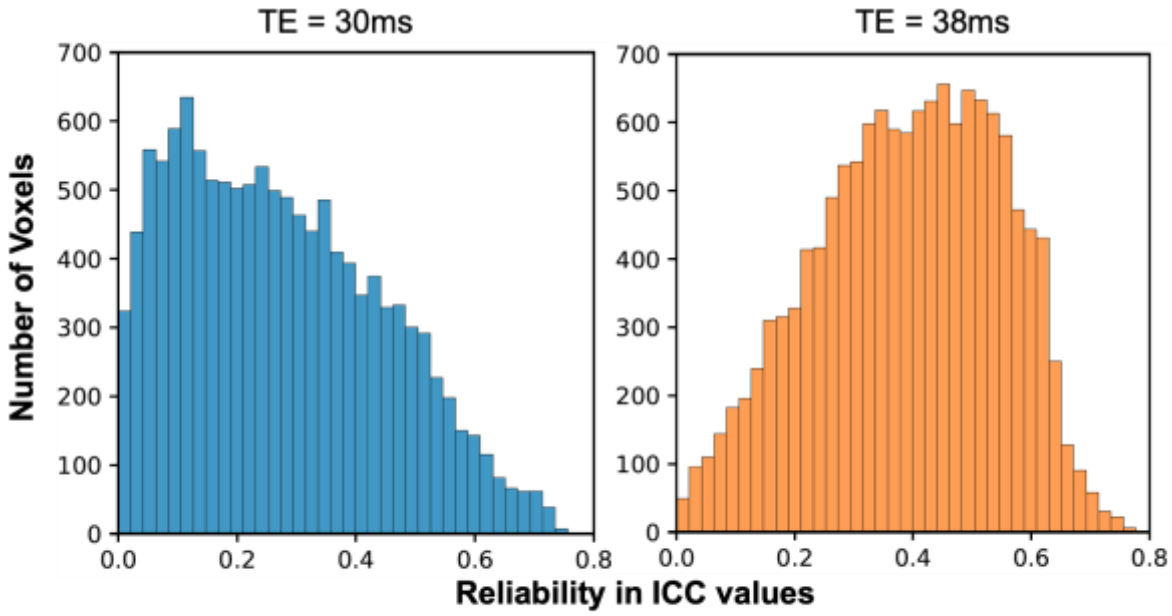

Figure 1. Histogram of test-retest reliability of voxels within the left DLPFC for TE = 38ms and TE = 30ms. On the y-axis the number of voxels for each bin is depicted. For TE = 30ms most voxels within the DLPFC have an ICC value below 0.5, which indicates poor reliability. For TE = 38ms, more voxels have an ICC value above 0.5, indicating moderate to good reliability.

Discussion: The choice of echo time has drastic effects on the reliability of the resulting functional connectivity maps. In addition, wider smoothing kernels could reduce the influence of local maxima within the correlation maps and increase the reproducibility. These findings highlight the value of exploring different acquisition and pre-processing strategies. Improved reliability of resting-state connectivity maps is important for improved outcome in clinical applications and for the optimization of data acquisition and multi-center data analysis in these resting-state networks.

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