Statistical Analyses

All analyses will be conducted using the R software and BESA software or MATLAB's EEGLAB toolbox (for EEG).

The main outcomes will be:

a) Behavioral "cognitive" effect – reaction times change and error count in Stroop task before and after the stimulation.
b) EEG and ERP effect – change in theta-band, error-related negativity (ERN) amplitude, P3, and N2 amplitude before and after the stimulation.

Demographic and clinical characteristics among groups will be compared by one-way analysis of variance (ANOVA) or by a chi-square test. The behavioral outcomes will be analyzed using the mixed model for repeated measures (MMRM) with baseline score as a covariate, treatment, time, and treatment and time interaction as fixed effects, and subject as a random effect.

EEG analyses: Quantitative evaluation of EEG (qEEG) will include: state analysis of the EEG signal, spatially localized analysis of EEG oscillations, theta amplitude, and power. Functional connectivity and EEG oscillations (FC) will be quantified and analyzed based on eLORETA and the algorithm in MATLAB, which allow quantification of cortical FC between different brain regions. ERP's (ERN, N2, and P3) analyses will be conducted using the R-analysis software and BESA software. The tests will be two-sided and $p < 0.05$ will be regarded as being statistically significant. Differences in the effect of treatment conditions on electrophysiological changes will be analyzed in MMRM. In the model treatment will be entered as a fixed effect, baseline performance as a continuous covariate, subject as a random effect, and covariance structure as unstructured. Additionally, post hoc differences in least-square means (and 95% confidence intervals) between treatment conditions with multiple testing adjustments will be obtained.

Groups (active and sham) will be analyzed among themselves.