

Official Title: Application of Transcranial Alternating Current Stimulation for Modulation of Sleep and Cognitive Performance

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Statistical Analysis Plan: For each arm, we will perform a three-arm cross-over design to determine whether there is a significant group difference between each tES condition as measured in EEG power in 0.5-2 Hz frequency following tES using repeated measures ANOVA. Recruitment of 15 subjects, with cross-over intervention (*sample size* 15) will allow us to detect differences between groups with an effect size of Cohen's  $d = 1.2$ , power of 80%, and significance of 0.05. This is based on sample sizes and effect sizes reported with motor network tES. Planned secondary analyses of each arm will include scores of slow wave EEG coherence, slow and fast spindle numbers, total duration of each sleep stage, changes in slow wave coherence, changes in slow wave power, self reported sleep timing changes, changes in anxiety and depression (measured by HADS), changes in clinical global impression of change (CGIC), and cognitive performance data, including assessment of procedural memory, verbal (declarative) memory encoding, attention/working memory/visuospatial processing using repeated measures ANOVA of the data.