Statistical Analysis Plan

This document reproduces the statistical analysis plan exactly as specified in the preregistration deposited on the Open Science Framework (OSF) prior to data collection (doi:10.17605/OSF.IO/TWQUX).

Statistical models

A 2 (stimulation type) x 3 (timepoint of measurement) within-subject ANOVA will be run for each dependent variable (secondary hyperalgesia and affective state). Stimulation type consists of two levels: taVNS vs sham stimulation. Timepoint of measurement contains three levels which slightly differ depending on the dependent variable of interest. When investigating effects on hyperalgesia, the time points of measurement are: baseline, after HFS and taVNS or sham stimulation, and 20 minutes after taVNS or sham stimulation. When measuring affective state these levels are: baseline, directly after HFS, and 20 minutes after HFS. To test our hypotheses, we are mainly interested in whether the ANOVAs yield an interaction effect. If this is the case, we will follow up the interaction effects with planned contrasts. We hypothesise a smaller increase in secondary hyperalgesia (as measured by pain intensity and unpleasantness to pinpricks after HSF) in the taVNS compared to the sham condition. We also hypothesise a larger decrease in unpleasant arousal / larger increase in pleasant arousal in the taVNS compared to sham condition when measured 20 minutes after HFS occurred. Furthermore, Bayes factors (BFs) will be computed for non-significant findings that were crucial for our hypotheses to investigate whether there is evidence in favor of the H0 relative to H1. All Bayesian analyses will be performed with default Cauchy priors.

No files selected

Transformations

No data

Inference criteria

We will use a p-value of 0.05 to determine whether or not the main or interaction effects of the ANOVAs are significant, as well as the follow-up contrasts. Holm corrections will be applied to correct for the multiple post-hoc tests. 95% confidence intervals will be reported. BFs will be interpreted based on a classification scheme proposed by Jeffreys (Jarosz & Wiley, 2014).

Data exclusion

Participants who failed to complete both stages of the experiment (i.e. part 1 and 2) will be excluded.

Missing data

As mentioned above, if data is only obtained for one part of the experiment, this data will be excluded. If participant’s data is missing concerning the dependent variables of interest (i.e. secondary hyperalgesia and/or affective state) they will be excluded in the analysis dealing with that variable if interest. If data is missing concerning other factors like, for example, ECG measurements, data of the other measurements will not be excluded.

Exploratory analysis

On an exploratory basis, we will investigate the relationship between changes in affective state, secondary hyperalgesia and heart rate variability. Furthermore, we will investigate whether or not taVNS effects heart rate variability (HRV). Considering Wolf et al.’s (2021) meta-analysis, we expect no effect of taVNS on HRV.