“Does Classical or Techno Music Enhance Concentration” - Statistical Plan

Continuous variables such as age and error rates will be summarized with standard descriptive statistics including means, standard deviations, medians, and ranges. Categorical variables such as gender and groups will be summarized with frequencies and percentages. 95% confidence intervals will be provided for descriptive statistics, as necessary.

An overall alpha-level of 0.05 will be used as a cut-point for statistical significance and all statistical tests will be two-sided. All data will be analysed using JavaScript, with results compared to Python 3.8.1 for reference.

When inferential analyses are conducted for continuous variables, they will primarily be based on parametric statistical test such as one way analysis of variance.

Definition of population for analysis

We will use an intention-to-treat analysis approach, by which none of the participant will be excluded from the analysis and the participants will be analysed according to the randomization scheme. However, pilot testing shows that network issues, or a failure to understand the instructions correctly could cause participants to seemingly make a large number of errors. To ensure these participants will not skew the results, any trial where the participant fails to tap on a digit when they should five times in a row will be automatically excluded from the calculations of descriptive statistics. A count of how many participants this exclusion affects will be displayed on the results page.

Primary endpoint

The null hypothesis is that there is no difference in average concentrations between any of the 3 groups and the two-sided alternative hypothesis is that there is a difference in average concentration measured by SART between any of the 3 music groups.

Handling outliers or extreme values

In the primary analysis we will exclude data from individuals who made more than 5 consecutive errors, which we considered as indicative of either not having understood the test, having stopped doing it altogether before the 3 minutes were up (or potentially a network interruption). We will compare the number of such instances across the three groups to see whether individuals were more likely to drop out of the test mid-way in either of them.

For the analysis of the primary endpoint, the data outliers will be defined as being at least three standard deviations from the mean of its distribution in the variable and will be cross-checked. Outliers will be included in the analysis and a sensitivity analysis will be conducted by setting outliers to be missing.

Model assumptions

The appropriateness of the normality, no outliers, and homogeneity of variances assumptions required for the ANOVA model will be assessed using residual and other diagnostic plots, the Shapiro-Wilk test of normality, and the Levene's test for equality of variances. Where concern is indicated, a transformation and/or a nonparametric method will be used to address gross deviations from the assumptions. It is unlikely that the primary outcome will need to be transformed in order to make use of methods assuming normality.

MULTIPLE COMPARISONS AND MULTIPLICITY:

A pairwise comparison will be done after adjusting for multiplicity effect for primary endpoint between Group A vs. Group B, Group A vs. control and Group B vs control.

SUBGROUP ANALYSES

We will conduct exploratory analysis by gender, age group (<30 years, 30-50 years, 51 -70 and >70 years)