Culture and Well-being: Art as Prescription Therapy ("Art on Prescription") (AoP)

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Statistical analysis plan

This analysis plan pertains to the results up to 12 weeks from baseline. Linear mixed effects (LME) model with random intercepts was used for each of the three primary outcomes using restricted maximum likelihood estimation, which provides unbiased estimates for model parameters under the missing at random (MAR) assumption. Models were constructed, using participant id as random intercept that is of the general type: outcome_variable ~ time + trial_arm + time* trial_arm + (1 | participant_id) with inference being made on the coefficient of the interaction using the threshold $p < 0.05$. Model-based estimated marginal means were calculated in addition to raw scores for each of the three time points.

A series of sensitivity analyses was conducted, fitting models: a) with time as a continuous variable; b) with random slopes in addition to random intercepts; c) with more complex predictor matrices that include as covariates age at intake, art type that patient participated in, place of residence and whether they lived with others; c) using an ANCOVA approach of the form outcome_variable_at_T3 ~ group + outcome_variable_at_T1 + covariates, as this model specification that is common in pharmacological trials. e) based on Last Observation Carried Forward (LOCF) dataset for analysis and applied LME models with random intercept as per the main analysis. d) by generating 40 datasets (20 iterations) under MAR assumptions in the R package mice using the mice.impute.2l.norm function for multilevel imputation on which the LME model was fitted, as above; e) models with a more complex random effects structure were constructed, that allowed for nesting of participants in art types. Two deviations were necessary from the original power calculation: first, due to resource constraints 3 rather than 4 time points of repeated observations were available; by repeating the original power calculation for three time points, this did not impact the initial sample size predictions in any substantial way. Second, the LME approach was prioritized over the anova approach, as LMEs are more flexible (e.g. in terms of group balance), better handle missing data in the outcome variable by maximizing the likelihood based on the available data under the MAR assumption, and account for random effects in repeated observations, as in this case.

For the analyses of binary data (reliable change and deterioration for PHQ-9 and GAD-7), logistic regression in a generalised linear model was used, mirroring the linear analyses for the primary outcomes. As cutoffs, the standard 6 and 4 points for PHQ-9 and GAD-7 were used, respectively.

For the moderation analyses, separate LMEs were fitted, testing for moderations between time, group (Art+CAU vs CAU) with each of the variables of interest, which included characteristics of the person (gender, age), past engagement with the arts, the degree of their engagement with the arts (operationalised as number of sessions attended), whether or not they received the first preferences, as well as whether the maximum number of sessions offered by the art type they participated in (3 vs 6, vs 12 sessions). The inferential p-value was adjusted to $p < 0.0021$ to account for multiple testing (Bonferroni adjustment for six variables with four models each).