**DATA MANAGEMENT AND STATISTICAL ANALYSIS**

Upon inclusion in the study, each participant will be assigned a random number, which will be used to conceal the subject's identity. This number will be used in all the collected data, as well as in the statistical datasets.

All statistical analyses will be performed using Jamovi (The Jamovi project, 2023), a R-based software. Linear mixed effects regression models will be used to test for changes in the cognitive outcomes over time (beginning of phase A1 [baseline], beginning of Phase B [pre-exercise], post-phase B [post-exercise], and post-phase A2 [follow-up]). Mixed effects models are the recommended statistical technique for analyzing outcomes measured at repeated timepoints as they can properly account for correlation between repeated measures within subjects. Importantly, these models are suitable for small-N studies. Separate models will include each cognitive outcome as the response variable, assessment time (four repeated measures) as a fixed effect and a participant specific random intercept. Age and years of education will be included as covariates in the model. Model assumptions will be checked using Q-Q plots and residual vs fitted plots. Three planned comparisons will be performed to test the effect of both introducing the intervention during phase B and removing it for Phase A2. These comparisons were 1) Pre-exercise phase B compared to baseline beginning of Phase A1 (to minimize and test for practice effects), 2) post-exercise phase B compared to pre-exercise phase B (main effect of the intervention) and 3) post-phase A2 (follow-up) compared to post-exercise phase B (the effect of removing the intervention). These planned comparisons allow one to test the effect of the addition of the Phase B intervention, whereby if the intervention has an

effect, significant changes in outcomes would only be observed in the pre-to-post phase B comparison. Full model effect sizes will be presented as marginal R squared. Planned comparisons of the mean change in the raw scores will be presented with 95% confidence intervals and Bonferroni-corrected p-values, with significance set at $p<=0.05$. To test for changes in voluntary physical activity and inactivity, data will be analysed at the group level using similar linear mixed effects models as previously described with assessment times being reduced to the three (during phase A, during phase B and during phase A2) assessment time points when Actigraph data will be collected. Two planned comparisons per the study design to test for changes in PA as a function of Phase B will be conducted testing Phase B to Phase A1 and Phase B to Phase A2. Changes in heart rate variability will be examined based on single-case research analyses by means of Tau-U. Individual variations in physical activity will also be examined using Tau-U analyses (which will also be analyzed at group level, using linear mixed model).