# Register

## Study Information

**Title**:
*Provide the working title of your study. It is helpful if this is the same title that you submit for publication of your final manuscript, but it is not a requirement.*

Testing the Tesseract 1

**Authors**:
*The author who submits the preregistration is the recipient of the award money and must also be an author of the published manuscript. Additional authors may be added or removed at any time.*

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**Research Questions**:
*Please list each research question included in this study.*

Do means of the RAA determinants and their intercorrelations with each other and behavior differ depending on intensity and specificity of the formulation of the target behavior in RAA measurements?
Does the TACT principle hold when tested empirically?

**Hypotheses**:
*For each of the research questions listed in the previous section, provide one or multiple specific and testable hypotheses. Please state if the hypotheses are directional or non-directional. If directional, state the direction. A predicted effect is also appropriate here.*

The means of the RAA determinants differ as a function of intensity and specificity of the formulation of the target behavior in RAA measurements.
The intercorrelations between the RAA determinants, and between the determinants and behavior, differ as a function of intensity and specificity of the formulation of the target behavior in RAA measurements.
As predicted by the TACT principle, correlations between measurements with formulations with similar intensity and specificity are higher than with measurements with different intensity and specificity.

## Sampling Plan

**Existing Data**:

*Preregistration is designed to make clear the distinction between confirmatory tests, specified prior to seeing the data, and exploratory analyses conducted after observing the data. Therefore, creating a research plan in which existing data will be used presents unique challenges. Please select the description that best describes your situation. Please do not hesitate to contact us if you have questions about how to answer this question (prereg@cos.io).*

Registration prior to creation of data

**Explanation of existing data**:

*If you indicate that you will be using some data that already exist in this study, please describe the steps you have taken to assure that you are unaware of any patterns or summary statistics in the data. This may include an explanation of how access to the data has been limited, who has observed the data, or how you have avoided observing any analysis of the specific data you will use in your study. The purpose of this question is to assure that the line between confirmatory and exploratory analysis is clear.*

Not applicable: we register prior to data collection.

**Data collection procedures**:

*Please describe the process by which you will collect your data. If you are using human subjects, this should include the population from which you obtain subjects, recruitment efforts, payment for participation, how subjects will be selected for eligibility from the initial pool (e.g. inclusion and exclusion rules), and your study timeline. For studies that don't include human subjects, include information about how you will collect samples, duration of data gathering efforts, source or location of samples, or batch numbers you will use.*

We will use an online survey to collect data in the general population (students of the Dutch Open University). No payment for participation is awarded, but participants can earn course credit. The only selection criterion is that participants need to be at least 18 years of age. Data collection starts in December 2018, and we expect to finish data collection somewhere in 2020.

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**Sample size**:

*Describe the sample size of your study. How many units will be analyzed in the study? This could be the number of people, birds, classrooms, plots, interactions, or countries included. If the units are not individuals, then describe the size requirements for each unit. If you are using a clustered or multilevel design, how many units are you collecting at each level of the analysis?*

We aim to collect data from 651 participants.

**Sample size rationale**:

*This could include a power analysis or an arbitrary constraint such as time, money, or personnel.*

For our null hypothesis significance tests, we want to achieve 95% power. We will test the hypotheses

relating to the means using the paired samples t-test (that is, we will also use anova, but we will eventually want to compare pairs of two groups). To achieve 95% power for a paired samples t-test, we require 651 participants (as computed using `pwr::pwr.t.test(d=.2, power=.95)`).

We will test our hypotheses relating to differences between correlations using the Q effect size for the difference between correlations. Failing available methods for power analysis for this effect size, we will aim to obtain reasonably accurate estimates of the population correlation coefficients, with a margin of error (confidence interval half-with) of .1. Even for a correlation as low as r = .1, 383 participants suffice, which we will easily obtain given our requirement for the tests of differences between the means.

**Stopping rule**:
*If your data collection procedures do not give you full control over your exact sample size, specify how you will decide when to terminate your data collection.*

We will stop data collection when we have collected data from 651 participants.

# Variables

**Manipulated variables**:
*Describe all variables you plan to manipulate and the levels or treatment arms of each variable. For observational studies and meta-analyses, simply state that this is not applicable.*

We will manipulate, factorially and within-participants:
- behavior type (exercise versus alcohol use)
- intensity (10 minutes versus 60 minutes & none versus at most 10 glasses)
- specificity (running versus exercise & beer versus alcohol)

Thus, this is a 2x2x2 within-participants design.

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**Measured variables**:
*Describe each variable that you will measure. This will include outcome measures, as well as any predictors or covariates that you will measure. You do not need to include any variables that you plan on collecting if they are not going to be included in the confirmatory analyses of this study.*

We will measure eight behaviors dichotomously, and for each behavior, we will measure the CIBERlite measures of intention, attitude, perceived norm, and perceived behavioral control using five-point scales:
- Drinking no alcohol in the next week;
- Drinking no beer in the next week;
- Drinking at most ten glasses of alcohol in the next week;

- Drinking at most ten glasses of beer in the next week;
- Exercising for at least ten minutes in the next week;
- Running for at least ten minutes in the next week;
- Exercising for at least one hour in the next week;
- Running for at least one hour in the next week.

For more information on these measures, see https://ciberlite.com.

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**Indices**:
*If any measurements are  going to be combined into an index (or even a mean), what measures will you use and how will they be combined? Include either a formula or a precise description of your method. If your are using a more complicated statistical method to combine measures (e.g. a factor analysis), you can note that here but describe the exact method in the analysis plan section.*

We use no indices (although it could be argued the two-item CIBERlite measures we use for the RAA constructs are indices).

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# Design Plan

**Study type**:
*Please check one of the following statements*

Experiment - A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.

**Blinding**:
*Blinding describes who is aware of the experimental manipulations within a study. Mark all that apply.*

No blinding is involved in this study.

**Study design**:
*Describe your study design. Examples include two-group, factorial, randomized block, and repeated measures. Is it a between (unpaired), within-subject (paired), or mixed design? Describe any counterbalancing required. Typical study designs for observation studies include cohort, cross sectional, and case-control studies.*

2x2x2 factorial within-subjects design.

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**Randomization**:
*If you are doing a randomized study, how will you randomize, and at what level?*

We will randomize group order (i.e. the eight behavior formulations).

# Analysis Plan

**Statistical models**:
*What statistical model will you use to test each hypothesis? Please include the type of model (e.g. ANOVA, multiple regression, SEM, etc) and the specification of the model (this includes each variable that will be included as predictors, outcomes, or covariates). Please specify any interactions that will be tested and remember that any test not included here must be noted as an exploratory test in your final article.*

We will test the differences between the means using the paired samples t-test. We will test the difference between correlations using Q, the effect size for differences between correlation (see the GitHub preview at the CIBERlite Convergent Validity repository for an example: https://osf.io/pemfz/).

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**Transformations**:
*If you plan on transforming, centering, recoding the data, or will require a coding scheme for categorical variables, please describe that process.*

We will not conduct transformations.

**Follow-up analyses**:
*If not specified previously, will you be conducting any confirmatory analyses to follow up on effects in your statistical model, such as subgroup analyses, pairwise or complex contrasts, or follow-up tests from interactions? Remember that any analyses not specified in this research plan must be noted as exploratory.*

We have not planned any follow-up analyses.

**Inference criteria**:
*What criteria will you use to make inferences? Please describe the information you'll use (e.g. specify the p-values, Bayes*

*factors, specific model fit indices), as well as cut-off criterion, where appropriate. Will you be using one or two tailed tests for each of your analyses? If you are comparing multiple conditions or testing multiple hypotheses, will you account for this?*

We will use p-values of .05 to test the null hypotheses and to draw conclusions as to whether:
- specificity and intensity have an influence on the means of the RAA determinants;
- 'inter-specificity' and 'inter-intensity' correlations are lower than 'intra-specificity' and 'intra-intensity'

**Data exclusion**:
*How will you determine which data points or samples (if any) to exclude from your analyses? How will outliers be handled?*

We use an online survey with restricted answer options; we do not expect any outliers or datapoints that should be excluded for another reason. Because the study will be completed as part of a course, participants can indicate that hey want their data to be deleted, in which case that will be done of course.

**Missing data**:
*How will you deal with incomplete or missing data?*

Missing data is not possible (online survey, mandatory questions).

**Exploratory analysis**:
*If you plan to explore your data set to look for unexpected differences or relationships, you may describe those tests here. An exploratory test is any test where a prediction is not made up front, or there are multiple possible tests that you are going to use. A statistically significant finding in an exploratory test is a great way to form a new confirmatory hypothesis, which could be registered at a later time.*

We do not have any exploratory analyses planned.

# Scripts

**Upload an analysis script with clear comments**:
*This optional step is helpful in order to create a process that is completely transparent and increase the likelihood that your analysis can be replicated. We recommend that you run the code on a simulated dataset in order to check that it will run without errors.*

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# Other

**Other**:
*If there is any additional information that you feel needs to be included in your preregistration, please enter it here.*

 (http://twitter.com/OSFramework)  (https://www.facebook.com/CenterForOpenScience/) 
(https://groups.google.com/forum/#!forum/opensciencefr amework)  (https://www.github.com/centerforopenscience)