

A replication of the behavioral paradigm from Wimber et al. (2015) (#676)

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1) What's the main question being asked or hypothesis being tested in this study?

Subjects will be trained to associate two different images (a target and a competitor) with the same cue word. During a selective retrieval phase, when presented with the cue word, subjects will have to visualize the target image only, and then recall its category (was it a face, object, or scene). As a baseline, a subset of images will not be included during this selective retrieval stage. The main hypothesis is that during a subsequent recognition memory task, accuracy performance for correctly picking the studied images instead of a similar looking lure will be significantly lower for competitor images involved in the selective retrieval stage relative to the 3 other conditions.

2) Describe the key dependent variable(s) specifying how they will be measured.

The key dependent variable is a subject's accuracy in the final recognition memory task.

3) How many and which conditions will participants be assigned to?

For the critical task (the final recognition memory task) there are 4 conditions. First, there are two sets of 54 images (targets and competitors) whose same cue was shown during the selective retrieval stage. Finally, there are 18 target images and 18 competitor images whose cue was not shown during the selective retrieval stage. The design is completely within-subjects.

4) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

We will use a generalized linear model with a logit link function in which the data follow a Bernoulli distribution. We will include two random intercepts; one for subjects and one for the 144 images. The fixed effects will be a single intercept for overall performance across the 2 baseline conditions and the selective retrieval condition with target images, and an additional coefficient measuring the change in accuracy performance for the selective retrieval condition with competitor images. The model will be estimated in a Bayesian fashion, with a Normal(1.76, 0.11) prior on the intercept and a Normal(-.29, .09) prior on the coefficient (based on the posteriors of the previous experiment we're trying to replicate). Based on the policy of Nature Neuroscience, the replication will be deemed successful if the posterior mean for the coefficient is less than -0.11 (the upper bound of the credible interval from the original study).

5) Any secondary analyses?

A categorical logit model will be fit to the data from the selective retrieval stage to assess whether the replicate sample identified the category of the target images to a similar degree as that of the original study. We will assess how much posterior mass lies above the values of the original study. Furthermore, a linear trend analysis will be carried out to see if the number of times subjects correctly picked the category of the target increases with cue repetition, and the number of times the competitor category was chosen decreases.

6) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

A power analysis using a frequentist version of the model specified in (5) indicated that with 48 subjects, we would have a power of ~.99 to detect an effect of 4% (the size of the effect in the original study). We would still have a power of ~.90 to detect an effect of 3% as well. If time and resources permit, we will run up to 12 additional subjects for a cross-validation sample.

7) Anything else you would like to pre-register? (e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)

The code for the experimental design and for the analyses is freely available for download at http://github.com/rettopnivek/Wimber_et_al_replication_3.

8) Have any data been collected for this study already?

No, no data have been collected for this study yet