

Replication of Reeck et al 2017

“Search predicts and changes patience in intertemporal choice”

PNAS 114(45), 11890-11895.

<http://www.pnas.org/content/114/45/11890>

The original paper includes two studies but only experiment 2 meets our inclusion criteria. In this between-subject experiment, participants are randomized to one of two search strategy conditions (easy comparative or easy integrative) in which the ease of search strategies is manipulated. On each trial, participants choose between a smaller monetary reward that will be paid to them sooner and a larger monetary reward that will be paid to them later – this serves as a measure of patience. Participants in the easy comparative condition are more patient than those in the easy integrative condition, meaning that participants in this condition are more likely to choose the larger monetary rewards which is delivered at a later point in time.

Hypothesis to replicate and bet on: Comparative searchers make more patient choices (i.e., choose a larger monetary reward which is delivered later) than integrative searchers. The authors test the above hypothesis in a hierarchical logistic regression ($\beta = -0.23$, $SE = 0.10$, $p = 0.027$); pp. 11892–11893.

Criteria for replication: The criteria for replication are an effect in the same direction as the original study and a p -value < 0.05 in a hierarchical logistic regression.

Power analysis: The original study had 207 participants after exclusion. The standardized effect size (Cohen’s d) was $d = 0.307$. To have 90% power to detect 67% of the original effect size, a sample size of $n = 1004$ is required.

Sample: The original study excluded 37 participants who did not attend to any of the information about the options presented on more than 20% of trials from all analyses. Participants who chose the objectively inferior (i.e., dominated) option on both catch trials were also excluded. Finally, the original study also excluded trials on which participants did not review any information related to the options. We will use the same exclusion criteria. We will make sure that participants can only participate once from the same account in this specific study, and we will only recruit participants with a HIT approval rate of 95% or higher. We will also check all IP addresses via <https://www.ipqualityscore.com/>; and we will remove any participants where one or more of the following is true: fraud score ≥ 85 ; TOR = True; VPN = True; Bot = True; abuse velocity = high. The replication sample size is the sample size after any exclusions of participants.

Materials: We will use the same material as in the original study, kindly provided by the original authors. In particular, the experiment will be conducted using the original *MouselabWEB* file.

Procedure: We will closely follow the procedure of the original experiment. The following summary of the experimental procedure is therefore largely based on the description of the experiment in the “Materials and Methods” section (pp. 11894 - 11895) and the Supplementary Information (p. 41).

Participants will first be shown a Captcha, and will thereafter provide informed consent. After this we will include an attention check that participants will need to pass to continue to the

study. This attention check is in addition to any other potential attention check(s) used in the original study. Participants will repeatedly be given the choice between two alternatives of receiving a smaller monetary reward sooner or receiving a larger monetary reward later by reviewing information about the sum and the disbursement date. Participants will be randomly assigned to be either in the easy comparative search strategy condition or in the easy integrative search strategy condition. In the easy comparative search strategy condition, reviewing information that compares the two alternatives will be facilitated, whereas in the easy integrative search strategy condition, reviewing information that compares properties within one alternative will be facilitated.

In both conditions, there will be a 1,000-ms delay between the time when a participant's cursor enters a box and the time when the information in that box is revealed. All other transitions cause the box to open immediately. This means that for those in the easy comparative condition, there will be a delay in the display of information whenever they transition between the attributes of an option, while there will no delay when they transition between attributes of different options. For those in the easy integrative condition, there will be a delay in the display of information whenever participants transition between attributes of different options, while there is no delay when they transition between attributes of an option.

Participants will also be presented with two catch trials, in which one of the options is objectively better than the other. One trial favors the sooner option (as both options are for identical monetary amounts) while the other trial favors the larger option (as both options are delivered after identical delays). As there is an objectively better option on each of these trials, differences in search should not influence the choice made, and participants who choose the objectively inferior option on trials will be excluded (as in the original study).

We will also use the same manipulation check as the original authors to verify that participants in the easy comparative condition have lower Payne indices than those in the easy integrative condition. The conclusion about whether the study replicates or not will only be based on the main replication test (i.e., the result of the manipulation check does not affect this conclusion). The manipulation check is mainly relevant for understanding why the study failed to replicate if it should fail to replicate.

Analysis: The analysis code was kindly provided by the original authors. The analysis will be performed as in the original paper. That is, we will use the same preprocessing of the data and apply a hierarchical logistic regression in the main analysis. All hierarchical logistic regressions will be conducted using contrast coding.

Subject payments: We are standardizing payments across all replications so that studies have a certain show-up fee depending on the expected length of the study, with an hourly wage from the show-up fee of \$8 and a minimum payment of \$1 (for studies with incentive payment we use the same incentive payment as in the original study; and this payment is paid in addition to the show-up fee). If we have problems recruiting, we will increase the show-up fee.