

**Replication of KC et al. 2018,
“The influence of a competition on noncompetitors”
PNAS 115(1), 2716-2721.**

<https://www.pnas.org/content/115/11/2716>

The original paper includes several studies. We randomly chose study 3. In this between-subject experiment, participants perform four rounds of a slider task and are assigned to various treatments. We focus on the competition treatments where participants depending on the treatment earn either \$0, \$0.5 or \$10 if they win the competition (have the highest total performance score in the slider task over the four rounds). Participants are randomly chosen to be competitors or noncompetitors, they are informed that approximately one-third of them are assigned to be competitors, and all participants receive the competition payment information. While non-competitors perform poorly compared to competitors when competition rewards are \$0 and \$10, they perform better when rewards are \$0.5. We focus on the comparison between \$0 and \$0.5.

Hypothesis to replicate and bet on: As the competition reward increases from zero to a low level, social comparison motivation increases among non-competitors and therefore their performance increases. The authors test the above hypothesis in an independent samples *t*-test ($t(169) = 2.37, p = 0.019$); p. 2719. This test was randomly picked among the main tests in the competition treatments.

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 two-sided independent samples *t*-test.

Power analysis: The original study had 171 participants ($n = 88$ in the \$0, and $n = 83$ in the \$0.5 treatment) in the two competition treatments \$0 and \$0.5. The standardized effect size (Cohen's *d*) was $d = 0.362$. To have 90% power to detect 67% of the original effect size, a total sample size of $n = 720$ is required in the non-competition groups. In addition, the replication involves collecting data for additional 360 participants who are competitors, but these are not included in the test.

Sample: Participants were excluded using four attention and honesty checks (“*Were you competing with other participants for a cash reward in the slider task?*” (Yes, No, Not sure); We will exclude those who answer incorrectly or “*Not sure*”, “*I DID NOT respond to the questions carefully or accurately, and my answers should not be included in the analysis*” (Agree, Disagree); We will exclude those who answer “*Agree*”, “*Have you participated in this exact survey before?*” (Yes, No, Not sure); We will exclude those who answer “*Yes*”, where the two latter questions are preceded by a statement that the answers will not affect participant payment or reputation, and finally “*This question is to make sure you are paying attention*”. Please select “*I disagree strongly*” (On a 5 point ‘I agree strongly’ to ‘I disagree strongly’); We will exclude those who do not answer “*I disagree strongly*”). 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 above. 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 – the instructions have kindly been provided to us by the original authors. A sample of the task interface for the \$10-reward/noncompetitor treatment in Study 3 is available in the Supplementary Information.

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 article (pp. 2718–2719) and the section “Materials and Methods” (p. 2721).

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. Competition roles will be assigned in the beginning of the study, thus from round 1 onward participants will either be competitors or non-competitors. The competition will be based on the total performance score in the slider task over all four rounds. In the slider task all participants will be presented with 60 identical sliders on their computer screen and asked to position as many sliders as possible at the midpoint of the sliders’ scale within 1 min and 15 s. All participants will receive a participation fee, but depending on the treatment, competitors but not non-competitors can earn more if they win the competition (have the highest total performance score in the slider task over the four rounds). All participants (competitors and non-competitors) will be informed about the payment scheme and that one-third of participants are assigned to be competitors.

In the beginning of the study, participants will answer questions about their age, gender and country they grew up in.

Analysis: The analysis will be performed as in the original paper. In particular, the replication focuses on the *t*-test comparing the performance of non-competitors in the low reward treatment with those in the no-reward treatment.

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.