Replication of Atir and Ferguson, 2018
"How gender determines the way we speak about professionals"
PNAS 115(28), 7278-7283.
https://www.pnas.org/content/115/28/7278

The original paper includes several studies. We randomly chose study 8 for replication. In this within-subject experiment, participants are shown two pairs of one-paragraph summaries of research findings by researchers referred to by either full name or surname. Participants are asked which of two researchers is more eminent, who should be given a (fictitious) NSF award, and how to allocate the price money to the two researchers if it could be distributed to more than one person. Researchers referred to by surname are thought of as more eminent, more deserving of the NSF award, and are allocated a larger share of the prize money. We focus on the comparison of the allocated share of prize money between researchers referred to by surname or full name.

Hypothesis to replicate and bet on: Researchers referred to by surname are allocated a larger share of the award money compared to researchers who are referred to by their full name. To evaluate this hypothesis, the authors use a test of fixed effects in a mixed-effects model controlling for the specific proposal and researcher name: $F(1,551) = 4.61$, $p = 0.032$ (Fig. 3); p. 7281.

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 test of fixed effects in a mixed-effects model (controlling for the specific proposal and researcher name).

Power analysis: The original study had 554 participants. The standardized effect size (Cohen's d) was $d = 0.091$. To have 90% power to detect 67% of the original effect size, a sample size of $n = 2842$ is required.

Sample: Only participants from the US over 18 years of age were allowed to participate in the original study. Participants who did not complete the entire study or failed the attention check, were excluded from all analyses. The replication experiment will implement the same exclusion criteria. Moreover, 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, kindly provided by the original authors. In particular, we will use the original *Qualtrics* survey, the same set of first and surnames, the same research proposals, and the same attention checks.

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 (p. 7281) and the Materials and Methods section (pp. 7282–7283).

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 then be asked to imagine themselves as an employee of a funding agency evaluating research proposals by academics. They then read two pairs of one-paragraph summaries of fictional research proposals. The critical difference in the proposals is that in one of the proposals in each pair, the researcher is referred to by surname (Boland, Hastings, Wiggins, and Hirst), whereas in the other, the researcher is referred to by full name with a gender neutral first name (Jamie and Casey). The assignment of reference type (i.e., full name vs. surname) to any given proposal within a pair will be counterbalanced between participants.

Participants will be asked three questions about the researchers within each pair: who was more eminent, who should receive the prestigious and lucrative career award, given to the most eminent scientists in the country, and how much of the $500,000 award money they would allocate to each researcher if they did not have to give the award to just one person. The replication will focus on the last question, i.e., the dependent variable of interest is the share awarded to each of the two researchers.

Analysis: The analysis will be performed as in the original paper. In particular, we will compare the share of prize money awarded to the researcher referred to by surname to the share of prize money awarded to the researcher referred to by full name using a two-sided test of fixed effects in a mixed-effects model (controlling for the specific proposal and researcher name).

Note that in the original paper, the authors state that the results are based on Generalized Estimating Equations: "We used Generalized Estimating Equations to determine the effect of type of reference on target evaluations with repeated measures (each participant chose between two pairs of proposals). In all analyses, we controlled for the specific proposal and researcher name." (p. 7283). Yet, in personal communications, the original authors explained that this only holds for the other dependent variables in study 8, whereas the result selected for replication is actually based on a test of fixed effects in a mixed-effects model. In the replication, we will thus also use a test of fixed effects in a mixed-effects model.

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.