

F1000Research – reviewer citation study, May 2024 (#175812)

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

It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

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

Are peer reviewers who are cited in a submitted journal article more likely to recommend the article for acceptance? PICO: P = Journal articles reviewed at F1000Research or Wellcome Open Research, I = Reviewer cited, C = Reviewer not cited, O = Reviewer's recommendation.

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

The dependent variable is the peer reviewers' recommendations of: accept, accept with reservations, and reject. This will be modelled as an ordinal variable, as we are interested in all three categories and the chances of the reviewer selecting a higher category.

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

The journal articles can either cite or not cite the reviewer, however this is not randomly assigned but depends on the articles' authors. Authors can suggest reviewers when they submit their articles at both journals.

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

We will use conditional logistic regression with the dependent variable of reviewer recommendation. The key independent variable will be whether the reviewer was cited or not (binary). The conditional logistic regression will use articles as the strata, this should control for any confounding effects due to the quality of the article. The conditional logistic model requires a binary outcome, so we will fit two related models: one examining the odds of accept and accept with reservations compared with reject, and one examining the odds of accept compared with accept with reservations and reject. As these two models test the same hypothesis we will adjust for multiple testing by using 97.5% confidence intervals instead of 95% intervals (5% significance level divided by two tests).

All analyses will be stratified by the article version, using the first version only in one analysis, and later versions in a second analysis. This is because for the first version the reviewers are unknown to the authors, but from the second version onwards the authors should know the reviewers as both journals use fully open peer review. This knowledge has the potential to alter the authors' behaviour.

Reviewer's experience is a potential confounder as more experienced reviewers may be more cited and more experienced reviewers may be generally more or less strict in their recommendations. We will use the reviewer's number of papers as a proxy for their experience. This association could be non-linear, so we will use fractional polynomials (-2, -1, 0 [log], 1, 2, 3) of the paper numbers and use the AIC to select the best association. Reviewer experience will be examined in a sensitivity analysis.

Reviewer's country is a potential confounder as there may be a bias towards citing research from countries that more often occur in the "top" journals. The reviewer's strictness for accepting papers could also vary by country. We will use a frailty model for the reviewers' countries. Reviewer's country will be examined in a sensitivity analysis.

We will include an independent variable of journal (binary) in all models, we do not think this is a confounder, but it may predict the reviewers' recommendation and hence increase overall precision.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

Papers that were not peer reviewed will be excluded. Papers that do not have a reference list will be excluded. Reviews where the reviewer's publication list could not be sourced will be excluded in the main analysis and examined in a sensitivity analysis using multiple imputation. No outliers will be excluded.

7) 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.

The total available sample size is approximately 5,000 articles and we assumed half were the first version giving a sample size of 2,500 for the analysis using the first version only. In a simulation, this gave an 89.1% power to detect an odds ratio of 1.5 for the reviewer selecting a higher category (accept -> accept with revisions -> reject). We assumed a probability of 0.15 that the reviewer would be cited. There were 2 or 3 reviews per paper for 80 and 20% of papers, respectively. Based on data for the two journals, we assumed a ratio of accept:revise:reject of 70:24:6. We used 1,000 simulations.

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

In a sensitivity analysis we will examine a dose-response association by using the number of times the reviewer was cited (0,1,2,...) in place of the binary exposure of cited or not. This association could be non-linear, and we will use fractional polynomials (-2, -1, 0 [log], 1, 2, 3) of the counts and use the AIC to select the best association.

When reviewers are not found in the OpenAlex data, then we cannot estimate the key exposure of whether they were cited. We will use hot deck

imputation to account for this by selecting another reviewer at random from the same country and journal, and using their exposure. This will be multiple imputation with the number of repeats dependent on the proportion of missing data.

In a sensitivity analysis we will exclude all co-reviewers as the strength of any association may be weaker for co-reviewers.

All analyses will be initially run using a randomly scrambled exposure to test for errors and make any final adjustments to the methods before using the actual exposure.

All models will be fitted in R (version 4.3.1 or higher). The bibliometric data will be sourced from OpenAlex (<https://openalex.org/>). The data have already been downloaded from the two journals and OpenAlex, but no analyses have been made.