

# Rolling out Registered Reports



**Nature Ecology & Evolution is now open to submissions of Registered Reports, a format that aims to reduce publication bias by reviewing study design and results in two separate stages.**

The scientific literature is biased towards statistically significant, usually positive results. This publication bias can occur if researchers choose to present only the strongest of the results from their studies or if journals select for the flashiest of findings. It can also come about in more insidious ways, such as *P* hacking (massaging datasets or collecting more data until results become significant), hypothesizing after results are known ('HARKing') and other problematic research practices (H. Fraser et al. *PLoS ONE* **13**, e0200303; 2018). The pre-registration of clinical trials has long been standard practice in medicine, and when the field of psychology recognized publication bias as one element of the broader crisis of research reproducibility, registered reports were initiated as a partial remedy (C. D. Chambers & L. Tzavella. *Nat. Hum. Behav.* **6**, 29–42; 2022). In this publication format, editors and reviewers initially evaluate the potential impact of the proposed question or questions, study design and analysis, and decide whether to eventually publish the paper regardless of the direction and significance of research results. When the plan is agreed upon, it is published as an initial paper that is known in this journal, and elsewhere, as a 'Stage 1' Registered Report. Later, once the research is conducted and written up, the final paper ('Stage 2') will be published in the journal regardless of the direction and significance of research results – as long as the researchers adhered to the agreed plan.

Although over 300 journals now publish registered reports, uptake has been slower in ecology, evolution and conservation, in which only a handful of field-specific journals offer the format. In a recent Q&A in *Nature Communications* (*Nat. Commun.* **13**, 7266; 2022), some leading proponents of registered reports discussed why they feel that researchers in ecology and evolution are warier of the idea. Relative to laboratory-based studies with model organisms, studies in ecology and evolution often require much longer data collection and it is difficult to wait for the approval of an initial analysis plan before beginning data collection. Similarly, many studies in our area are conducted in field conditions in which it is often necessary to adjust plans to account for unexpected conditions, and it can be less clear at the outset which variables may need to be included in the eventual analyses. Fortunately, papers published under the registered reports model can indeed present the results of unexpected, post hoc analyses if they are clearly acknowledged as exploratory.

In other fields with higher adoption of registered reports (such as psychology and medicine), the most common variety of pre-registration is of tightly controlled experiments that often have large sample sizes. Although this type of study is perhaps more amenable to registered reports, other study types are certainly eligible. As explained in the *Nature Communications* Q&A, the criteria for a successful registered report are a strong study rationale, well-developed methods and time to wait for in-principle acceptance before starting data collection. We will welcome submissions of Registered Reports for field-based studies, analyses of secondary data (that is, published databases) and meta-analyses, all of which are common

approaches in ecology and evolution. This is not to say that those study types will not present some specific challenges. For example, a tenet of pre-registration is that the researchers have not seen any data, which is difficult to achieve in analyses of published databases. To deal with this, others have outlined the various levels of self-attestation and robustness checks that can offset potential biases in these types of registered reports.

Registered reports require considerable statistical expertise, both to write and to review. In the laboratory sciences, statistical approaches can be simpler (such as ANOVAs on fixed experimental effects) and easier to commit to in advance. Further, power analyses to justify the sample size are a more accepted standard in other fields and may involve a learning curve in ecology and evolution, or may not even be appropriate in some cases. To ensure that the most rigorous study design and analysis plans are agreed upon, we will need to rely on reviewers with strong statistical expertise. If you are skilled in statistics and passionate about this movement in reproducible science, please contact us if you would like to serve as a reviewer of our Registered Reports.

*Nature Ecology & Evolution* is happy to be joining other Nature Portfolio journals in publishing Registered Reports. We look forward to receiving submissions of Stage 1 papers that ask novel and timely questions whose answers will be of interest to our readership regardless of the outcome. The nature of our field will mean that our Registered Reports may look different to those in other disciplines. We will engage with authors, reviewers and other open science experts to develop the format as we receive submissions.

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