

## Scientific Life

Equity in science:  
advocating for a  
triple-blind review  
system

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We propose 'triple-blind review' for peer-reviewed journals – a process that keeps author identities and affiliations blind to manuscript editors until after first appraisal. Blinded appraisal will help to reduce the biases that negatively affect under-represented and minority scientists, ultimately better supporting equity in scientific publishing.

## Scientific publishing is biased

Scientific publications not only play a key role in advancing and communicating science but are also the primary metric to evaluate the performance of researchers and institutions. Despite the essential value of peer-reviewed publications to science as a whole, and to a research career in particular, there has been increasing recognition that a lack of diversity in the publication process may result in biases that undermine equity in scientific publishing (e.g., [1,2]). Indeed, geographic, gender, and language biases at the editorial and peer-review stages can impact manuscript acceptance rates and negatively influence under-represented researchers [3,4]. These biases help to perpetuate a

scientific publishing forum that is dominated by a fairly homogeneous group – mostly male, originating from or based in rich and developed countries or institutions, native English speakers or with strong fluency in English, and primarily white [1,5,6]. Solutions to reduce the negative impact of biases in scientific publishing are urgently needed and will ultimately benefit science by encouraging diverse scientific teams and improving scientific innovation [7].

The scientific publication process, from initial submission to final publication, involves many steps in communication between editors, reviewers, and authors. At every decision point, conscious and unconscious biases are present and have the capacity to negatively affect the outcome of a manuscript and disadvantage particular groups [2–4,8]. For example, **single-blind review** (see [Glossary](#)) is biased against female authors [8], less well known authors [9,10], authors from less prestigious institutions [9], and authors from outside industrialized, rich, English-speaking, and developed countries [7]. We also argue that early-career researchers would be similarly disadvantaged because they have not yet had time to develop a research track record and professional networks, and can thus be subject to similar biases as less well known authors – in addition to any gender, geographic, or language bias [9,10]. In addition to peer-review, editorial appraisal is also subject to bias and is likely to disadvantage the same groups as seen in single-blind review [3–6,11]. Actions to reduce bias in the publication process will help to create equitable scientific spaces where under-represented voices are promoted, respected, and acknowledged.

## Existing actions to reduce bias

Several diverse actions are currently aiming to reduce and offset bias in different facets of the scientific publication process. For reducing biases during peer review, **double-blind review** is considered to be the most effective, but is not widely

## Glossary

**Double-blind review:** when the identities of the authors and reviewers are hidden from each other. The editor is aware of the identities of all parties.

**First decision:** the editorial decision of whether to reject a manuscript or send it to peer-review.

**Single-blind review:** when reviewers and editors are aware of the names of the authors and their affiliations, but authors do not know the names of the reviewers. The name of the editor is known to all.

**Triple-blind review:** a process that keeps the editors blind to author identities and affiliations until after the first decision.

implemented [2]. Publishing companies, societies, journals, and editors also do much to try to understand biases and improve equity in scientific publishing (e.g., [12]). For example, one such approach is to increase the size and diversity of editorial boards, and this has arisen in response to several articles highlighting the lack of gender balance and international representation on editorial boards [5,6,11,12]. Another complementary solution is to create educational resources for unconscious bias to help train editors (e.g., Project Implicit: [www.projectimplicit.net/](http://www.projectimplicit.net/)), as well as to develop journal policies to support under-represented groups. Additional solutions include reducing publication fees, free copy-editing services, and early-career mentorship programs and awards. Although these are all commendable actions, editors have recognized that improving diversity in science will be an ongoing and dynamic process, and will require new and provocative ideas from the scientific community [12,13].

## Triple-blind review: reducing editorial bias

Editors are human, and are thus subject to bias. We focus here on the **first decision** of the editors – whether to reject a manuscript or to send it for peer-review. We argue that first decisions should be based on the scientific quality, novelty, or significance of the work set within the broader context of the discipline and journal goals, rather than on author or institutional prestige, or any other factor that might be

inferred. By allowing editors to see authors and affiliations before the first decision, it likely disadvantages the same groups that are disadvantaged during single-blind review (e.g., females, less well known authors, authors from less prestigious institutions, and those from outside industrialized, rich, English-speaking, and developed countries). This form of review, termed **triple-blind review**, has been proposed previously [2,14] and implemented at a few academic journals (e.g., *Science Matters*; *BMJ Quality and Safety*; *British Journal for the Philosophy of Science*; *Philosophy and Phenomenological Research*), but no formal assessment of its effectiveness has been conducted. Given the power of double-blind review to reduce the impact of biases [2], it is likely that wider implementation of triple-blind review by scientific journals will help to create a fairer system for under-represented scientists.

Implementation of triple-blind review likely brings with it a series of practical barriers that would need to be overcome to effectively reduce bias in the scientific

publication process (Figure 1). We outline these barriers and potential solutions below.

**(i) Conflicts of interest: triple-blind review is a separate step from peer-review**

Our proposal is that, only after an editor agrees to forward a manuscript for peer-review, are the authors and their affiliations revealed to the editor. This framework allows any conflicts of interest to be resolved after the first decision, including transferring editorial responsibilities and selecting reviewers. If the first decision of an editor is to reject, then we believe the authors and their affiliations should remain anonymous.

**(ii) E-structural changes**

Changing online submission portals to implement a triple-blind review will likely require software modification, additional work for editorial assistants, support from publishing companies, and changes in journal policies. For example, presubmission enquiries often involve e-mailing editors directly. This system could be revised to

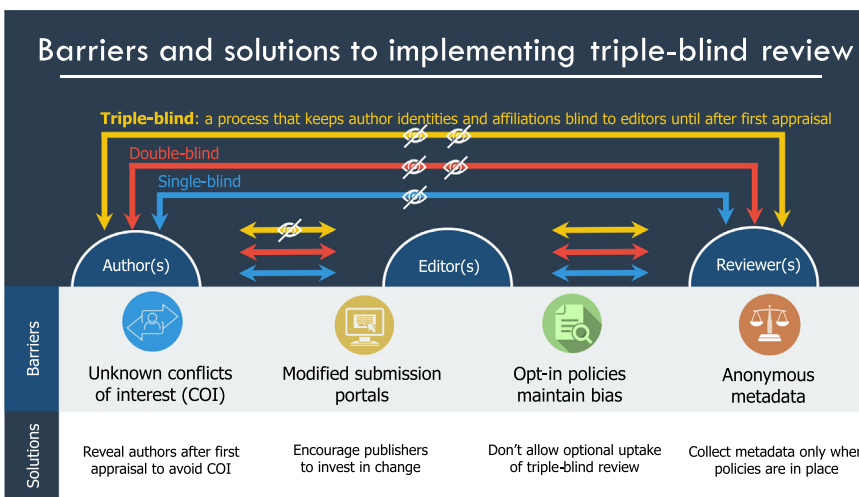
allow enquiries and proposals to be submitted through an online portal that allows blinding. The required changes, although not trivial, are comparable to those implemented when switching from single- to double-blind review. We believe that any costs to the journal are necessary to support a more inclusive and equitable scientific publishing forum.

**(iii) Do not allow optional triple-blind review**

We argue that tasking authors to select the option of whether to keep editors blind undermines the process. We lean on analysis of double-blind review to support our argument here. Although some journals have made double-blind review optional, authors who stand to have an advantage by being well-known will not opt for double-blind review, and conversely less well known authors from less-prestigious institutions are more likely to opt for double-blind review but are ultimately less likely to have their work accepted for publication [11].

**(iv) Collect anonymous metadata**

Many journals and editors strongly support equity and take direct action in promoting diversity in scientific publishing. In some cases, direct action (i.e., promoting manuscripts submitted by under-represented groups) requires information on author identity and affiliations. Sampling pertinent metadata during the submission process may permit direct action while still maintaining triple-blind review. For example, journals could allow check boxes at submission in which the first author(s) can anonymously self-identify whether English is a foreign language. However, collecting anonymous metadata should only occur when a journal has formal policies on how this information is treated by editors, and these policies should be published online.



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**Figure 1. Conceptual summary of the barriers and solutions to implementing triple-blind review.** Arrows highlight the pathways in which authors, editors, and reviewers interact in scientific peer-review systems. Eye icons indicate whether a pathway is anonymous. This perspective piece focuses on the utility of triple-blind review to reduce biases in scientific publication, where editors are blind to authors and their affiliations until after the first decision.

**Triple-blind review is not fail-safe**

This perspective highlights how triple-blind review could be an effective step to reduce the impact of bias in the scientific

publication process, and subsequently move towards better representation and equity in scientific publishing. We acknowledge that triple-blind review is not fail-safe for removing biases in the publication process, and that publishing companies, editors, journals, and reviewers should encourage dialogue and training about biases, in addition to building a culture of care, so as to ensure effective change [12,13]. For example, editors should be required to undertake bias training, and this information should be made available on journal websites together with equal opportunity policies. Journals can also join diversity, equity, and inclusion organizations and signatories (e.g., <https://www.rsc.org/new-perspectives/talent/joint-commitment-for-action-inclusion-and-diversity-in-publishing/>). In addition, other facets of the publication process that are known to have bias, such as editorial board membership, editor homophily, and reviewer selection, should continue to be assessed for their impact on acceptance rates, and solutions proposed. Many journals and editors strongly support equity and take direct action in supporting diversity in scientific publishing. However, without appropriate standards that are quantitatively informed, available online, and fairly applied across journals and disciplines there is a risk that direct action will not have a wide impact, nor encourage the broader scientific community to adopt strategies to improve equity. Finally, we acknowledge that triple-blind review moves towards a more opaque publication process despite calls to increase transparency in editorial decisions, but until triple-blind review is trialed and assessed we will not fully understand the impact it might have on giving under-represented authors fairer opportunities.

Finally, the impact of human bias is not restricted to scientific publishing, and is

present across all scientific spaces including employment, education, retention, and communication. Other areas of science need to be examined for their biases and barriers that prevent equal representation, such as a sense of belonging, article processing fees, and the dominance of the English language [13,15]. Recognizing the influence of bias and other barriers in science will help to create and advance solutions towards a fairer scientific process in general. Ultimately, more inclusive practices to support equitable scientific practices will only benefit the advancement and integrity of science and our societies.

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#### Declaration of interests

No interests are declared.

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