



## Peer review: single-blind, double-blind, or all the way-blind?

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### Abstract

A scholarly peer review is the process whereby referees scrutinize research work or a manuscript within their field of expertise and decide on its acceptability for publication in a journal or scientific proceeding. Ideally, peer review is impartial. Among the many models of peer review, the single blind is currently the most adopted model in scientific journals. The double-blind model has been claimed to decrease bias, despite some difficulty in implementation.

**Keywords** Peer review · Single-blind · Double-blind · Research · Publication · International

The Merriam-Webster dictionary defines peer review as “a process by which a scholarly work is checked by a group of experts in the same field to make sure it meets the necessary standards before it is published or accepted” [1]. Peer review can be traced back to the eighteenth century [2].

In the open-peer review system, the identities of authors and reviewers are known to each other. The system has many advantages including increased transparency and presumably more constructive comments from reviewers. Despite its limited uptake by medical journals, the open peer review has been adopted by *The British Medical Journal (BMJ)* for the last 2 decades. The closed-peer (or blinded) review system can have several levels of “blinding.” When single blind, the authors’ names and affiliations are revealed to the reviewers whose identities remain unknown to authors. When double blind, identities of authors and reviewers are hidden from each other. Recently, further tiers of blinding (to include the Editors) are being tried by some journals, thus enabling the manuscript to undergo an entirely blinded review from submission to publication [2].

In a recent study evaluating distribution of authorship in *International Urogynecology Journal* and *Neurourology and Urodynamics*, 40% of respondent authors belonging to economically disadvantaged countries believed there could be a bias against manuscripts originating from their countries, which could be remedied by adopting a double-blind review

system [3]. While the single-blind review system is currently the most adopted, there seems to be some shift in policies. As of March 2015, all *Nature* journals have started offering their authors the double-blind review process. In the Editorial announcing the new policy, the simple yet elegant statement reads: “(...) by definition, unconscious biases may be difficult to identify and to control” [4].

Advocates of the single-blind system often refer to three randomized controlled trials published in the same issue in the *Journal of American Medical Association (JAMA)* in 1998 [5–7]. These studies randomized reviewers of different medical journals to the single- or double-blind system, with the primary objective to assess the “quality” of review. Results were consistent in that the “quality of review” was not affected by the blinding process. Nevertheless, in one study there was a trend for blinded reviewers not to recommend rejection (OR 0.5; CI 0.3–1) [6], while in another there was no difference in the recommendation for publication [5]. Notably, in two of these studies, masking was not successful more than half of the time, i.e., > 50% of blinded reviewers continued to “guess” the authors’ identities [5, 7]. Obviously, such results are either not pertinent or not strong enough to prove the non-inferiority of the single-blind review system. Testing the double-blind review system was evaluated in two separate studies by two journals which had traditionally used the single-blind system: “*The British Journal of Dermatology*” and “*Plastic and Reconstructive Surgery Journal*” [8, 9]. In both, reviewers agreed to take part of the “trial” where the identities of the authors of manuscripts under review were masked. There was no difference in the reviewers’ recommendations and the disposition of manuscripts. A possible

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Hawthorn effect (reviewers changing their behavior while under study observation) could pose a limitation to the applicability of these results, as was acknowledged by the authors of one of these two studies [8].

On the other hand, there is abundant evidence for the potential of bias, positive or negative, in the single-blind review system.

As of 2002, the American Heart Association started implementing the double-blind review process for selection of abstracts to be presented during the annual meeting. Data analysis for the 3 years following this change compared with the 2 preceding years (mean number of yearly abstracts =13,455) revealed a higher acceptance rate from non-USA institutions ( $p < 0.001$ ) and from non-English speaking countries ( $p < 0.001$ ). Within the USA, the acceptance rate of abstracts originating from “non- prestigious institutions” was also higher ( $p < 0.001$ ) [10]. Similar results were reached in a study conducted in the field of computer science, where research typically appears in conferences rather than in journals. During the 10th Association for Computing Machinery International Conference on Web Search and Data mining (15.6% abstract acceptance rate), non-blinded reviewers were significantly more likely to recommend for acceptance, presentations from top companies, top universities, and famous authors compared with their blinded counterparts [11].

In a well-designed experiment run by “*Clinical Orthopedics and related research*” (2015 impact factor 3.1), a fabricated manuscript containing an error in the conclusion, but presumably authored by two past presidents of the American Academy of Orthopedic surgeons, was randomly sent to two sets of reviewers: one exposed to and one blinded to the prestigious authors’ names. Exposed reviewers gave the manuscript higher overall scores ( $p < 0.001$ ) and were more likely to recommend acceptance [12].

In addition to author and institution, geographic region as the origin of the manuscript can also be the target of bias. In an interesting study published in 1994, Scandinavian referees randomized to review the same manuscript in English or the national language were more likely to accept the English version manuscript [13]. It is safe to assume that the manuscript language in this study (non-English) is a proxy for the geographical region. It is not certain whether the same results can be replicated nowadays in Scandinavia or other parts of the world.

There is an argument that blinded reviewers may continue to guess the identity of the author or the institution especially in narrow subspecialties, and consequently this poses a limitation to the benefits of double-blind review [5, 7, 9]. This argument carries within it an admission of potential reviewers’ bias and paradoxically highlights the need for double-blind review. The practical translation of this argument is: While double blind-review is not perfect, it remains far superior to single-blind review.

Another argument used to resist the implementation of double-blind review is that such a system could pose a burden on the journal and possibly on the authors as well. The process does not only involve masking the authors’ names and institutions, but also avoiding any reference to the IRB identity, funding, and any hint in the manuscript that could give away the authors’ identity by using personal pronouns such as “we found in previous studies...” Upon acceptance for publication, all these modifications have to be reconciled with the original version. While some journals assert that it is the authors’ responsibility to submit two manuscripts (one blinded and one un-blinded), other journals undertake the task of blinding submitted manuscripts. This task, however, is far from crippling in this era of advanced technology [14]. In fact, turnaround times were not affected when journals moved to the double-blind review process.

The appointment of “globally balanced” editorial boards is always a welcome policy, especially in International Journals [15]. The Editor-in-Chief, in all good intention, could assign manuscript reviews to Associate Editors or reviewers of the same region or same “background” as the authors. This however is not the remedy for the ills of a single-blind review system and can actually be counterproductive. While the potential for positive bias now exists, the possibility of negative bias by some reviewers towards their compatriot authors is an established observation [16]. The reasons behind this phenomenon are not clear. Theoretically, rivalry within the same subspecialty in a specific geographic region could lead to conscious or unconscious negative bias. Another theoretically possible scenario is an exaggerated guarding reflex to protect oneself against favoritism, resulting in a more scrutinizing review than is customary for this particular reviewer. In peer reviews of proposals for grants and project funding, it is conceivable to evaluate—among others—the institution at which the project is being conducted, as this is intimately linked to the “feasibility of the study”: the availability of human resources, equipment, and other factors affecting execution. The same argument, however, does not hold in submitted manuscripts. Misconduct and data falsification seem to be the exception, and prejudice should not guide the level of suspicion.

Nowadays, having the authors sign a Conflict of Interest disclosure form is universal. A declared Conflict of Interest is not synonymous with bias. It only means that the “risk of bias” exists, a fact that the reader should be aware of [17]. When the authors’ identities, geographic region, or any of their affiliations are known to the reviewer, a “conflict of interest” ensues, and the potential of bias exists.

In conclusion, what is under review is the study, the content, and the manuscript. The identity should have zero influence on evaluation. As a reviewer for many journals, I have yet to fill an evaluation sheet for a manuscript that includes a score for my opinion regarding the integrity or the fame of the

author or her institution. Consequently, the “identity factor” is outside the equation. The mere potential for bias, as minimal as it is, should be eliminated.

### Compliance with ethical standards

**Conflicts of interest** None.

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