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Peer review demystified: part 1

Peer review is at the heart of publishing scientific papers. In this first installment of a two-part Editorial, we explain how we manage the process at *Nature Methods*.

The basic peer review process[1] has remained the same in the near two decades since *Nature Methods* was launched, although we have made many enhancements over the years.

Peer reviewers provide valuable technical advice on manuscripts and also often share their opinions on whether a paper will have a strong impact. However, the decision of whether to offer revision or rejection is made by the editors, all of whom have PhDs in subjects closely related to the fields in which we publish.

A key role of the editors is determining which points raised by the reviewers are crucial to address. Sometime reviewers ask for experiments that we think go beyond the scope of a *Nature Methods* paper, and so we overrule them. If a reviewer raises serious and reasonable technical concerns, however, we may reject the paper or require authors to provide a fix or a strong rebuttal. In cases of disagreements or opposing views, we may discuss the key concerns with the other experts. More generally, we carefully consider the reasons why a particular reviewer is positive or negative, and weigh that against the other reviewers' opinions as well as our own original thoughts about the paper.

We appreciate that the quality of reviewer reports varies widely and despite our best efforts to ensure the process is fair, everyone has their own personal biases. If authors believe that a reviewer is strongly biased or has fundamentally misunderstood their work, we encourage you to reach out to your editor to discuss the situation.

How we choose peer reviewers

We try our best to invite three peer reviewers for every research paper. Sometimes it is difficult to find three or a reviewer may fail to deliver in a timely manner (this happens with unfortunate regularity!), and so we may make a decision on the basis of two reviews if they appear to be competent, fair and detailed.

Authors are welcome to suggest and exclude reviewers. We typically will not assign more than one suggested reviewer, but providing names can be a helpful starting point. Authors should suggest peers with expertise that matches the topic, and whom they believe will be unbiased – that is, not their former advisor, best friend, collaborator or fierce competitor. We always honor exclusions, within reason: as a rule of thumb, authors should exclude no more than five peers, and should not exclude whole institutions or whole fields of research. It is essential for the robustness of the scientific literature that reviewers with appropriate expertise be allowed to give feedback on manuscripts.

We do our best to find reviewers without any real or perceived conflict of interest with the authors. But we are not always aware of past relationships or new collaborations. We ask reviewers to declare these possible conflicts of interest to us before accepting to review a manuscript. If you are unsure of whether your connection to an author represents a conflict, ask the editor!

As a methods journal, we believe it is important for our papers to be assessed both by experts in the techniques used and by potential end users of the technology. For example, we will assign a computational expert in a particular field to review a paper that describes a new software tool for that field, and even ask for their help in evaluating its code[2,3]. But we will also try to invite a reviewer who is a potential user of the tool, who may raise important issues about impact or usability.

We try to minimize the number of rounds of peer review, out of respect for both the authors' and reviewers' time. The majority of papers that we publish have gone through two rounds of peer review. Some papers will need a third round of peer review if serious technical concerns still remain, but this is infrequent. If the editors are able to assess whether the reviewers' concerns have been adequately addressed, we avoid going back to the reviewers.

How we review nonprimary papers

All primary research papers (Articles, Brief Communications, Resources, Analyses and Registered Reports – which have their own specialized review process[4]) are subject to the rigorous process described above. Other types of content also go through peer review, although the process is a bit different.

Reviews and Perspectives are scholarly surveys of the literature and are always peer-reviewed. We ask reviewers to assess the accuracy, comprehensiveness and balance of Reviews. Perspectives may be more narrowly focused or advance the authors' particular opinion, and thus balance is not always essential.

Comments and Correspondences are sometimes, but not always, peer reviewed. If reviewed, there will be a note in the paper; if the note is not present, the reader can assume it was not peer reviewed. Comments are opinion pieces, but experts in the subject often provide feedback on whether the authors' position is well-supported by literature evidence. The Correspondence is a diverse format that we use to publish short reader comments or descriptions of computational tools or platforms. The more technical pieces are always peer reviewed, which often helps authors to optimize their tools or platforms before publication.

Other regular content – such as Points of Significance, Creature Columns, News & Views, and Research Briefings – is not peer reviewed, nor is regular content written by the editorial team (Research Highlights, Editorials, Lab & Life pieces and Technology Features).

Summing up

For a general description of the editorial process, please revisit 'How editors edit'[5]. If you are a reviewer who would like more information about reviewing for *Nature Methods*, please read 'The good referee'[6]. Stay tuned for next month's Editorial, where we will cover topics of reviewer diversity, credit and transparency.

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