

# World view



By Mario Malički

## Structure peer review to make it more robust

**Everyone who reviews a manuscript should answer a transparent set of questions to ensure that scientific literature is subject to reliable quality control.**

In February, I received two peer-review reports for a manuscript I'd submitted to a journal. One report contained 3 comments, the other 11. Apart from one point, all the feedback was different. It focused on expanding the discussion and some methodological details – there were no remarks about the study's objectives, analyses or limitations.

My co-authors and I duly replied, working under two assumptions that are common in scholarly publishing: first, that anything the reviewers didn't comment on they had found acceptable for publication; second, that they had the expertise to assess all aspects of our manuscript. But, as history has shown, those assumptions are not always accurate (see *Lancet* 396, 1056; 2020). And through the cracks, inaccurate, sloppy and falsified research can slip.

As co-editor-in-chief of the journal *Research Integrity and Peer Review* (an open-access journal published by BMC, which is part of Springer Nature), I'm invested in ensuring that the scholarly peer-review system is as trustworthy as possible. And I think that to be robust, peer review needs to be more structured. By that, I mean that journals should provide reviewers with a transparent set of questions to answer that focus on methodological, analytical and interpretative aspects of a paper.

For example, editors might ask peer reviewers to consider whether the methods are described in sufficient detail to allow another researcher to reproduce the work, whether extra statistical analyses are needed, and whether the authors' interpretation of the results is supported by the data and the study methods. Should a reviewer find anything unsatisfactory, they should provide constructive criticism to the authors. And if reviewers lack the expertise to assess any part of the manuscript, they should be asked to declare this.

Other aspects of a study, such as novelty, potential impact, language and formatting, should be handled by editors, journal staff or even machines, reducing the workload for reviewers.

The list of questions reviewers will be asked should be published on the journal's website, allowing authors to prepare their manuscripts with this process in mind. And, as others have argued before, review reports should be published in full. This would allow readers to judge for themselves how a paper was assessed, and would enable researchers to study peer-review practices.

**Scientists should view quality control of the scientific literature in the same way as quality control in other sectors."**

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To see how this works in practice, since 2022 I've been working with the publisher Elsevier on a pilot study of structured peer review in 23 of its journals, covering the health, life, physical and social sciences. The preliminary results indicate that, when guided by the same questions, reviewers made the same initial recommendation about whether to accept, revise or reject a paper 41% of the time, compared with 31% before these journals implemented structured peer review. Moreover, reviewers' comments were in agreement about specific parts of a manuscript up to 72% of the time (M. Malički and B. Mehmani Preprint at bioRxiv <https://doi.org/mrdv>; 2024). In my opinion, reaching such agreement is important for science, which proceeds mainly through consensus.

I invite editors and publishers to follow in our footsteps and experiment with structured peer reviews. Anyone can trial our template questions (see [go.nature.com/4ab2ppc](https://go.nature.com/4ab2ppc)), or tailor them to suit specific fields or study types. For instance, mathematics journals might also ask whether referees agree with the logic or completeness of a proof. Some journals might ask reviewers if they have checked the raw data or the study code. Publications that employ editors who are less embedded in the research they handle than are academics might need to include questions about a paper's novelty or impact.

Scientists can also use these questions, either as a checklist when writing papers or when they are reviewing for journals that don't apply structured peer review.

Some journals – including *Proceedings of the National Academy of Sciences*, the PLOS family of journals, F1000 journals and some Springer Nature journals – already have their own sets of structured questions for peer reviewers. But, in general, these journals do not disclose the questions they ask, and do not make their questions consistent. This means that core peer-review checks are still not standardized, and reviewers are tasked with different questions when working for different journals.

Some might argue that, because different journals have different thresholds for publication, they should adhere to different standards of quality control. I disagree. Not every study is groundbreaking, but scientists should view quality control of the scientific literature in the same way as quality control in other sectors: as a way to ensure that a product is safe for use by the public. People should be able to see what types of check were done, and when, before an aeroplane was approved as safe for flying. We should apply the same rigour to scientific research.

Ultimately, I hope for a future in which all journals use the same core set of questions for specific study types and make all of their review reports public. I fear that a lack of standard practice in this area is delaying the progress of science.