

Taking up TOP

Nearly 1 year ago, a group of researchers boldly suggested that the standards for research quality, transparency, and trustworthiness could be improved if journals banded together to adopt eight standards called TOP (Transparency and Openness Promotion).^{*} Since that time, more than 500 journals have been working toward their implementation of TOP. The editors at *Science* have held additional retreats and workshops to determine how best to adapt TOP to a general science journal and are now ready to announce our new standards, effective 1 January 2017.[†]

In implementing TOP, *Science* strives to find the right balance between encouraging better transparency about the evidence behind the authors' conclusions and respecting the broad array of norms and cultures across the many disciplines published in the journal. For example, we recognize that pre-registration of studies and analysis plans is becoming commonplace in a few fields, such as clinical trials, and that many more studies would benefit from such practices. Pre-registration of studies can help to avoid the "file drawer effect," in which investigations with null or inconclusive results are not disseminated, leading to a bias in the published literature toward positive, conclusive, and possibly spurious effects. Pre-registration of analysis plans reduces author bias in the interpretation of data. However, until more disciplines are ready to accept these approaches for hypothesis-testing research, it is premature for *Science* to insist that they be submitted. In terms of replications, *Science* will continue to publish such studies, holding them to the same standards as other content submitted to the journal.

On the other hand, we believe the benefits of requiring the availability of data, code, and samples on which the authors' interpretations rest are worth the effort in compliance (and in some cases in adjusting data ownership expectations), while acknowledging that some special circumstances will require exemptions. This

practice increases transparency, enables reproducibility, promotes data reuse, and is increasingly in line with funder mandates. We are also requiring the citation of all data, program code, and other methods not contained in the paper, using DOIs (digital object identifiers), journal citations, or other persistent identifiers, for the same reason. Citations reward those who originated the data, samples, or code and deposited them for reuse. Such a policy also allows accurate accounting for exactly which specific data, samples, or code were used in a given study.

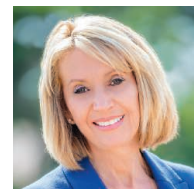
These guidelines also apply to our open-access journal *Science Advances*. The specialized journals that we publish—*Science Translational Medicine*, *Science Signaling*, *Science Immunology*, and *Science Robotics*—may have more specific expectations for design and analysis standards for those disciplines. Our editors are currently working out the fine print before posting detailed standards online.

I have heard that some boards are struggling with how to implement TOP for

their journals. They fear getting too far ahead of their communities in aspects such as requiring data availability from their authors. As part of the team that originally drafted the TOP guidelines, I encourage all journals to consider the flexibility of the TOP guidelines. For example, a journal need not require that all data be publicly available, but simply ask authors to declare whether the data are available. This information is very helpful for reviewers in terms of determining whether the study is likely to be replicable by a third party. Transparency, even without mandates, is a powerful tool.

The benefits of implementing TOP extend well beyond the original goal of facilitating the replicability of published research. TOP creates a framework for sharing not just the findings of a study, but also the data, samples, code, and methods, which in many cases can outlive the findings in making durable contributions to science.

— Marcia McNutt



Marcia McNutt
Editor-in-Chief
Science Journals



*"The editors at Science...
are now ready to announce
our new standards..."*

^{*}B. Nosek et al., *Science* **348**, 1422 (2015). [†]See the supplementary materials for "Implementation of TOP Guidelines for Science."

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Marcia McNutt

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