ICSU Committee on Freedom and Responsibility in the conduct of Science (CFRS)

Advisory Note[i] "Bias in Science Publishing"

The foundation for science is published evidence. While researchers, editors and peer reviewers must all exercise careful judgment in determining what is published, to maintain the integrity of the scientific literature, bias must conscientiously be avoided, or, at least, recognized and acknowledged. To that end, researchers have a responsibility to strive to be objective when they gather and interpret data, and submit papers to journals. Similarly, editors and publishers have responsibilities to avoid undue bias in selecting papers for publication, and reviewers must remain disinterested.

Inappropriate bias can enter the literature when factors other than quality and scientific content influence a researcher's selection of what to submit for publication, or a journal's decision whether to publish a paper.

What factors contribute to bias in scientific publications?

Bias from researchers

Because it is impossible to publish all novel information, and not all results are interesting, researchers need to select the data that they interpret, and the results they submit for publication, as well as choose the journal they send it to. This necessarily requires making subjective judgments.

Unacceptable bias arises when authors ignore data that does not fit a particular point of view (for example, instances of drug side effects), submit only positive results, or only include results that agree with the opinions of an editor or publisher.

Researchers may determine whom to list as an author on their publications in an effort to influence the editors' or reviewers' decisions. For example, "honorary authors", who have not made a significant contribution to a publication, might be added. Alternatively, "ghost authors", who would qualify for authorship, might have their names omitted to hide potential conflicts of interest.

Bias from editors and reviewers

The decision by a journal on whether to send a paper out for review, and/or whether to publish it can also be subject to bias. Editors must make decisions on what is suitable for the scope of their journal, and what will be of interest to their readers, which prevents complete objectivity. Because positive results are more likely to be submitted for publication, and are more likely to be accepted, bias towards positive but at times spurious results is inevitable.

Unacceptable bias occurs when the decision to send a paper for review, or the decision to accept it, is influenced by factors other than the scientific content of the paper or its fit with the scope of the journal. For example, reviewers, editors, and publishers might have bias for or against papers from a particular country, institution, or the authors' affiliations, language or gender.

During the review process, reviewers can exercise bias not only in the decision whether to recommend acceptance or rejection of a paper, but they can also delay its publication. They might reject or delay acceptance of papers that do not accord with their own beliefs, or they might be more likely to accept, or not critically judge, a paper that supports one of their previous findings, or one that cites them extensively.

Because some journals reject most submitted papers without independent review, receiving

editors can be biased in selecting which papers to send out to reviewers. Anecdotal evidence suggests that in some cases editors are more likely to send papers out for review if they have met the authors, are already familiar with their work, or the authors come from an institution that is known to the editors. Editors can choose reviewers who they think will be "soft" or "hard", in attempts to influence whether a paper is accepted or rejected. Editorial decisions might be influenced by conflicts of interest, such as if they carry advertising from or serve on the boards of certain companies.

How can publication bias be minimised?

Authors, researchers, editors, reviewers and publishers should put in place procedures to minimise publication bias, and take corrective action if it is discovered.

Editors should be fastidious in avoiding bias and remaining independent from the commercial interests of their journals.

Authors and publishers should strive to make complete datasets accessible to reduce bias against negative results. Institutions, journals, and research associations should make use of shared databases so that they can be readily accessed and calculations can be verified. For clinical trials, journals should make prior registration mandatory, as this can reduce the likelihood of negative trial data being "lost", or the hypotheses being changed in retrospect. Ultimately, all data from clinical trials should be made available.

Publishers and editors should be encouraged to join the Committee on Publication Ethics (COPE) and to share advice on ethical practices.

Publications should explicitly state in their guidelines to authors what qualifies for authorship, in order to reduce the incidence of honorary and ghost authorship. When they receive a manuscript, the journal should alert all authors that a paper has been submitted, and confirm that all authors have agreed to be listed. Published papers should indicate the nature of author contributions.

Journals should consider implementing "double blind" reviewing. Here, the reviewers – and possibly the editors who decide whether a paper is sent for review – are not told the names of the authors, or their addresses or affiliations.

Journals should request and publish funding sources and list potential and real conflicts of interest of authors, reviewers, and editors. In this way, some conflicts of interest can be avoided, and readers can take them into account when interpreting a paper.

Journals should set a low threshold for publishing corrections and rebuttals, and establish protocols for handling author appeals. When a paper is retracted, publishers should provide an explanation. Corrections, rebuttals and retractions should be indexed and linked so that readers find the most reliable version of a paper when they search the literature.

Further reading

Singapore Statement on Research Integrity: http://www.singaporestatement.org/statement.html

Committee on Publication Ethics (COPE): http://www.publicationethics.org

International Clinical Trials Registry Platform (ICTRP): http://www.who.int/ictrp/en

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[i] This Advisory Note is the responsibility of the CFRS, which is a policy committee of the International Council for Science (ICSU). It does not necessarily reflect the views of individual ICSU Member organisations.