

How to stop the errors and retain the real

Researchers need transparency, better indexing, and a willingness to look again at the paper they intend to cite

Papers are cited for years after they are retracted, usually without any indication that they are no longer officially part of the scientific literature. Bibliometric studies that have tracked citations after retraction have focused on authors, such as Scott Rueben (<https://link.springer.com/article/10.1007/s11948-015-9680-y>) who have fabricated data in multiple papers, meaning both that the work is highly unreliable and that this unreliability should have received due publicity. One study looked at papers by German physicist Jan Hendrik Schön, and found that over time the retracted papers were cited about as frequently as the non-retracted papers. [STI2018_Luwel-The Schön case Analyzing in-text citations to papers before and after retraction.pdf <https://hdl.handle.net/1887/64521>] The situation may well be worse when a single paper from an author rather than a large body of work is retracted, as the retraction would draw less attention.

Many people citing these works likely do not know about the retractions: once a citation is recorded in researchers' reference-tracking software, they may never look at it again. After all, even if a paper hasn't been retracted, people can mischaracterize its message. A culture of having researchers update their software and reread (at least the abstracts) of their most common citations might keep discredited papers from being cited as if their findings still stood.

However, researchers' good faith efforts would still not completely correct the problem. Journals and indices need to do a better job of flagging papers that have been retracted or corrected, and abstracts, indexing and related surveys need to do a better job propagating that information. The nonprofit organization CrossRef has developed a standardized button, called CrossMark [<https://www.crossref.org/services/crossmark/>], that works across publishers and can be used to show readers if they are looking at the most recent version of a paper and whether there have been major updates, corrections, or a retraction, but I am unaware of whether citation software interacts with publisher platforms to catch these updates—certainly there is a delay between when a journal retracts an article and that retraction is noted on Scopus. Not all universities communicate frequently with abstracting and indexing resources, which means that even if a journal attaches a correction or retraction notice to a particular paper, a researcher is unlikely to find out.

Once a researcher does find a flag, it is not always clear what to do. A retraction does not really mean that an article has disappeared, and often retracted papers do contain some legitimate data or analyses, even if some is flawed beyond any credibility. Even a paper with falsified data might have inspired an idea. While deciding not to cite a retracted paper might make sense overall, portions of a paper may still provide valuable thinking or valuable data. To accommodate this fact, journals have introduced practices like retract-and-replace where a flawed dataset is replaced with a sound one, using data available at the time a research paper was submitted. Other journals, such as EMBO, get more granular: a “partial retraction” retracts specific tables and figures within a single paper, but this practice can be confusing.

One potential solution is for journals to include a recommendation within a retraction notice about whether and how it should be cited. This sometimes happens with preprint servers. For instance, a withdrawn preprint on hydroxychloroquine includes the statement, “The authors have withdrawn this manuscript and do not wish it to be cited.”

[<https://www.medrxiv.org/content/10.1101/2020.05.05.20088757v2>] However, getting to a clear recommendation would likely be more complicated for journals, as the process will involve

authors and editors and sometimes other members of the scientific community. Authors may well be more reluctant to have a paper retracted than to withdraw a preprint, and the retraction process often includes getting authors or their institution to agree to a retraction, and disagreements abound.

The ideal solution is to provide a much transparency around a retraction as possible, including the cause, whether there is consensus between authors and between authors and editors, who initiated the retraction, and the role of any post-publication review. Vuong, Q. H-. *Nature* **582**, 149 (2020) <https://www.nature.com/articles/d41586-020-01694-x>

Of course, the value of such transparency still depends on researchers' ability to find retraction notices and their willingness to read them.

Monya Baker, senior editor, comment team, Nature. (essay reflects personal views)