Scientific journals must be alert to potential manipulation in citations and referencing

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Abstract
Citation is an essential practice in scientific publishing. However, it is mandatory that citing the sources in a scientific work is performed in a proper manner. Manipulating citations in research articles is one form of academic research misconduct that violates publication ethics. Citation manipulation simply occurs for the purpose of increasing the number of citations of a researcher or a journal. Unfortunately, there has been a growing trend for this type of misconduct recently and this has not received much attention from the science community. The most effective solution to prevent the growth of such unethical practices is for reputable journals to impose stricter rules on reference evaluation criteria in order to emphasize on the appropriateness of the citations.

Keywords
Citation manipulation, research misconduct, publication ethics, research metrics, citation coercion, pay to cite

Topic Piece
Citation is the practice of giving credit in a researcher’s own work (e.g. manuscript) to other researchers’ works by referencing their published material; this is done to recognize these researchers for sharing their results and ideas (National

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Researchers have a duty to cite all relevant sources they utilized in their study. Citing other researchers’ work through references also helps readers to find the original source in order to learn more about the topic and the ideas presented in the manuscript, and also to find out what distinguishes the current research from the previous works (Masic, 2014; National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2009). By providing the relevant literature to the current research, referencing also plays an important role to interpret the significance and originality of a manuscript (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2009). Given this duty, it is of the utmost importance that the references used within academic work are cited properly and accurately (Masic, 2014).

Unfortunately, the academic world is facing several types of scientific misconduct, such as plagiarism, data fabrication, and citation manipulation. Manipulating citations is one of the forms of scientific misconduct with an alarming rate of increasing frequency (Ochsner Journal Blog, 2019) and hitherto has not received adequate attention from the scientific community. This may in part be attributable to unintentional errors in citation that are related to typographical mistakes and that can occur due to the negligence and carelessness of the authors; other times, however, it appears that there are many cases in which the errors in the references are due to academic misconduct (Wren and Georgescu, 2020), which is an unethical practice that involves knowingly and deliberately manipulating citations. Citation manipulation is falsely citing a reference that was never utilized and is only included in the manuscript with the intention of increasing the number of its citations (COPE Council, 2019). In other words, citation manipulation happens when there is no connection between the cited reference and the scholarly content of the manuscript, and the contained reference does not support the information provided in the manuscript (COPE Council, 2019; National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2009). In fact, this unethical citation practice simply occurs in order to increase the author’s or a journal’s prestige, given that the number of citations can play an important role as a research metric in the academic environment, and researchers and journals often are recognized (and rewarded) based on citation counts. These manipulated references can mislead readers. In this Topic Piece, I consider how the research community can reduce if not eliminate this form of academic misconduct.

Manipulation in citation and referencing is not a new incident in the academic world. However, over the past few years, as noted above, there has been a growing trend in citing manipulated references in articles published in international journals, which led COPE (the Committee on Publication Ethics) to release a discussion document about this form of misconduct in July 2019 (COPE Council, 2019; Ochsner Journal Blog, 2019). As well, the publisher Elsevier and Wageningen
University have collaborated on a joint project to develop tools to detect citation manipulation in published articles and to prevent it before publication (Elsevier Press Release, 2019).

One of the main reasons for the rising trend of this phenomenon is because universities and research institutions, especially in developing countries, place considerable emphasis on author-level metrics in the process of hiring, promoting, or awarding research grants (Biagioli, 2016). Through this policy, these institutions could perversely be encouraging researchers to use fraudulent means to increase the number of citations to their own publications (Biagioli, 2016). After all, one of the simplest ways to inflate citation counts is to repeatedly self-cite or refer to the unrelated works of the authors’ academic colleagues. It has to be noted, of course, that there are many instances where citing researchers’ own work or that of colleagues are legitimate. This action becomes unethical only when there is no material relevance between the cited sources and the scholarly content of the manuscript, and the sole intention of including those references in the manuscript is for self-promotion or other non-scholarly reasons.

Citation manipulation for the purpose of increasing researchers’ citation counts also happens when editors or peer reviewers of the manuscript ask researchers to add several unnecessary and unrelated references to the manuscript, which is called “coercive citation” and is unethical (Baas and Fennell, 2019; Van Noorden, 2020). Another dominant cause for this type of misconduct is that citation indexes play an important role in journals’ rankings and, unfortunately, some predatory journals try to use fraudulent measures to boost their impact factor. Citation manipulation with the intention of boosting a journal’s impact factor occurs when an editor or someone affiliated with a journal compels or otherwise influences authors to add spurious citations to the non-relevant articles published in that journal (Fong and Wilhite, 2017; Uzun, 2017). Citing articles in exchange for monetary compensation is also an emerging phenomenon created to manipulate a reference list in order to boost the journals’ impact factor. This can occur, for example, when scam emails are sent by fraudsters to researchers to persuade them to cite several unrelated articles published in a specific journal in their ongoing research works in exchange for a certain amount of money (Sygocki and Korzeniewska, 2019). A historic case of pay-to-cite was displayed by a bioscience company called Cyagen, which offered scientists money to cite their products in their published articles (Bohannon, 2015; Eriksson and Helgesson, 2017; Goldacre, 2015).

Clearly, citation manipulation is an unethical practice that has to be reduced and ultimately, ideally, eliminated from research practice. One of the basic solutions to reduce this unethical practice is for universities and research institutions to adopt new policies that work around author-level metrics when evaluating a researcher for employment, promotion, or funding. Another important way to reduce
This latter solution can be divided into two steps: one for the authors and the other for the peer-review process. As for the authors’ role, it would be appropriate for reputable journals to ask authors to submit a declaration form along with their manuscript at the submission stage, which asks them to agree with the statement that all the referenced documents in their manuscript have been reviewed thoroughly and there is no manipulated citation in the reference list. Authors may also be asked to agree at the end of this declaration form that, if at any stages of peer review process it becomes clear that there is any citation manipulation in their manuscript, the manuscript would be withdrawn immediately, or if this issue becomes apparent after publication, the article would be instantly retracted. Authors are already asked by many journals to provide written statements on other ethical issues such as conflict of interest and co-authorship work allocation when submitting their manuscripts. So, it would be reasonable for journals to expect authors to declare such an ethical statement in order to ensure the absence of any intentional manipulation in referencing. Moreover, this policy may lead researchers to refrain from engaging in such an unethical behavior. The appropriateness of the cited works should also be reviewed thoroughly by editors and invited peer reviewers (McVeigh and Quaderi, 2018). However, due to the high volume of submissions received at many reputable journals and also because of the busy schedules of reviewers, one cannot expect them to check the integrity of each and every referenced source. But, in the case of single-blind peer review journals, the questionable references, including those referring to the published articles of the authors’ or the journal, should be carefully reviewed by editors and invited reviewers so that their relevance to the content of the manuscript can be evaluated. As for journals that follow double-blind peer review procedure, the reviewers should scrutinize the journal self-citations (citations to other articles published in the very same journal) more closely. In these cases, the citations to the authors’ previous publications (authors’ self-citations) should be monitored carefully by the journal’s editorial team.

The above-proposed measures are related to pre-publication process of the manuscripts. Readers of published research articles also have responsibilities toward the scientific community. Namely, they should report to journals any suspected manipulated citations they have noticed when reading an article, so that the journal’s editors may investigate. Finally, and more ideally, the role of regulatory agencies like COPE should not be limited only to advise editors and publishers of scholarly journals by providing guidelines to deal with ethical issues in journal publishing. These organizations should also have strengthened administrative and executive powers to deal with scientific misconduct more effectively. I suggest that they should take even more proactive and effective measures and broader
actions for handling scientific misdeeds in order to minimize such unethical behaviors in an academic environment. In the specific case of citation manipulation, they could penalize (across a scale of sanctions) each person or organization involved in citation manipulation, up to, for instance, by imposing a ban on authors, removing editors from editorial roles, delisting reviewers from journals’ list of reviewers, and blacklisting journals from citation indexes. These organizations could also inform the individuals’ institutions about the unethical behavior so that they could pursue some other sanctions deemed appropriate.

To conclude, all of us—whether authors, editors, reviewers, or readers—have a significant role to play to stop this unethical practice, and all these measures taken together could drive unethical researchers to stop committing this form of research misconduct.

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References
Baas J and Fennell C (2019) When peer reviewers go rogue—estimated prevalence of citation manipulation by reviewers based on the citation patterns of 69,000 reviewers. In: ISSI 2019, 2–5 September 2019, Italy, Rome. Available at: SSRN: https://ssrn.com/abstract=3339568 (accessed 1 September 2021).

Biagioli M (2016) Watch out for cheats in citation game. Nature 535(7611): 201.

Bohannon J (2015) Apparent ‘pay to cite’ offer sparks Internet outrage. Science News. Available at: https://www.science.org/news/2015/08/apparent-pay-cite-offer-sparks-internet-outrage (accessed 3 September 2021).

COPE Council (2019) COPE discussion document: Citation manipulation. July. DOI: 10.24318/cope.2019.3.1. https://publicationethics.org/citation-manipulation-discussion-document

Elsevier Press Release (2019) Elsevier works with Wageningen University to detect and prevent citation manipulation. 5 September. Available at: https://www.elsevier.com/about/press-releases/science-and-technology/elsevier-works-with-wageningen-university-to-detect-and-prevent-citation-manipulation (accessed 3 September 2021).

Eriksson S and Helgesson G (2017) The false academy: Predatory publishing in science and bioethics. Medicine, Health Care and Philosophy 20(2): 163–170.

Fong EA and Wilhite AW (2017) Authorship and citation manipulation in academic research. PLoS ONE 12(12): e0187394.

Goldacre B (2015) So this company Cyagen is paying authors for citations in academic papers. In: Bad Science Blog. Available at: https://www.badscience.net/2015/08/so-this-company-cyagen-is-paying-authors-for-citations-in-academic-papers (accessed 3 September 2021).
Masic I (2014) Plagiarism in scientific research and publications and how to prevent it. *Materia Socio Medica* 26(2): 141–146.

McVeigh ME and Quaderi NA (2018) COPE guest article: Citations: link, locate, discover, connect. 8 August.

National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. (2009) *On Being a Scientist: A Guide to Responsible Conduct in Research*, 5edn. Washington, DC: The National Academies Press.

Ochsner Journal Blog (2019) Citation manipulation is unethical. 27 August. Available at: https://ochsnerjournal.wordpress.com/2019/08/27/citation-manipulation-is-unethical (accessed 3 September 2021).

Sygocki W and Korzeniewska E (2019) How much is Impact Factor worth? In: *2019 applications of electromagnetics in modern engineering and medicine (PTZE)*, Janow Podlaski, Poland, 9–12 June 2019, pp.228–231. New York: IEEE.

Uzun C (2017) Increasing the Impact Factor in the ethical way. *Balkan Medical Journal* 34(6): 482–484.

Van Noorden R (2020) Signs of ‘citation hacking’ flagged in scientific papers. *Nature* 584: 508.

Wren JD and Georgescu C (2020) Detecting potential reference list manipulation within a citation network. *BioRxiv*. DOI: 10.1101/2020.08.12.248369.