The prisoners' dilemmas

Authorship guidelines and impact factors: between a rock and a hard place

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Every academic working in science, medicine, or elsewhere is familiar with authorship guidelines and impact factors (IFs). Most journals now have strict guidelines in place that govern precisely who can and cannot be named as an author on a paper. However, even honest researchers can sometimes find it difficult to adhere to authorship guidelines. The ranking of journals is normally based on the IF, which is calculated by the number of citations during the past 2 years divided by the number of articles, yet it is now widely recognized that IFs are generally not an appropriate measure for the quality of the individual articles published in a journal.

These two facts create problems for researchers, trapping them in a prisoner's dilemma in which rational self-interest results in worse outcomes for each than mutually advantageous cooperation. Academics know that they should adhere to authorship guidelines and that they should not attribute too much importance to IFs, but they continue to do so because they fear the consequences of acting otherwise.

One of the main reasons that journals introduced authorship guidelines was to combat the phenomena of guest and ghost authorship. For decades, researchers who did not contribute to papers at all have been named as authors (guests) and junior researchers who did much of the work have not been credited at all (ghosts) [1]. Authorship guidelines aim to stop this by providing strict criteria for authorship and requiring authors to sign a statement that they adhere to these criteria (see Sidebar A for example criteria from the International Committee of Medical Journal Editors). However, institutional pressure, whether from the university or academic

tradition, sometimes makes it difficult for researchers to adhere to authorship guidelines. For example, in particular disciplines and countries, it is customary to name the head of the laboratory or institute, principal investigator or grantholder as last author, regardless of whether they contributed to the paper. Senior university administrators—and sometimes lab leaders themselves—can make it difficult for researchers to ignore these customs, with the result that many researchers end up signing deceptive authorship declarations. This, in turn, leads readers to falsely believe that someone was involved in a study when he or she was not or that this person contributed more than he or she actually did.

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This leads on to the issue of IFs. Senior scientists and administrators are keen to continue the practice of ‘guest’ authorship because authorship generally increases the chance of funding for both researchers and their universities. Therefore, they seek to maximize funding opportunities by publishing in high-impact journals, and IFs are used to measure this impact. The highest-impact journals, such as *Science*, *Nature*, *JAMA*, the *NEJM*, and *The Lancet*, are accorded the highest prestige largely because of their high IFs. Yet the IF is not a reliable measure to determine the quality of individual articles

published in a certain journal. Many journals' IFs are based on a few highly cited papers, which means that most papers in prestigious journals are actually ‘piggybacking’ on the success of these few publications. The UK House of Commons Science and Technology Select Committee specifically warned assessment panels in the UK's funding allocation exercise not to use IFs to assess the quality of individual papers [2]. Despite these warnings and a growing understanding of the inappropriate use of the IF, funding continues to be allocated based in large part on the IF of the journals in which scientists published.

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Sidebar A: ICMJE authorship guidelines

Authorship credit should be based on: 1) substantial contributions to the conception or design of the work, or the acquisition, analysis, or interpretation of data for the work; 2) drafting the work or revising it critically for important intellectual content; 3) final approval of the version to be published; and 4) agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Authors should meet conditions 1, 2, 3 and 4 (<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html#two>).

Everyone knows that authorship guidelines ought to be respected, as doing so is fair, respects the rights of researchers, and does not deceive readers. Similarly, everyone knows funding mechanisms should be fair and should not be based on inappropriate application of IFs. But these practices continue, undermining the integrity of the publication process and of scientific and academic endeavor in general.

This situation essentially traps researchers and universities in a prisoner's dilemma, in which following their rational self-interests generates a situation that is worse for everyone than mutual cooperation [3] (see Sidebar B). In the original prisoner's dilemma, both prisoners are left worse off if they individually choose what looks like the best option to them (confession); nonetheless, they tend to do so because each one fears that the other prisoner cannot be trusted to collaborate in denial. The same applies to researchers who

are faced with the choice between using corrupt systems of authorship misattribution and IF dependency, and trying to act ethically. They know they ought to stop misattributing authorship and stop using IFs to decide which journal to submit to, but they also know that if they do so, other researchers and universities would gain a competitive advantage over them.

Here is a fictitious example to illustrate the point. Joan is a researcher at the University of Dorne. She has conducted some excellent research and wants to publish it in the *Journal of Medical Injuries*, the best match in terms of content and readership. However, her boss John tells her that she must put him as second and last author because he is head of the institute and that she must submit to the *Journal of the American Injury Association* instead because it has a higher IF. John actually does not want to tell Joan to do either of these things, but he is obliged to enforce the university's unwritten policies in this regard. Even the

Sidebar B: The original prisoner's dilemma (from reference [3])

Two members of a criminal gang are arrested and imprisoned. Each prisoner is in solitary confinement with no means of speaking to or exchanging messages with the other. The police admit they don't have enough evidence to convict the pair on the principal charge. They plan to sentence both to a year in prison on a lesser charge. Simultaneously, the police offer each prisoner a Faustian bargain. Here's how it goes:

- If A and B both confess the crime, each of them serves 2 years in prison.
- If A confesses but B denies the crime, A will be set free, whereas B will serve 3 years in prison (and vice versa).
- If A and B both deny the crime, both of them will only serve 1 year in prison.

university's research committee knows that authorship guidelines should be respected and that IFs should not, but they know that

funding agencies and other universities ignore this.

So we actually have a prisoner's dilemma complicated by multiple conflicts of interest. Joan wants to do the right thing but is ordered not to by her boss; if she disagrees, her job might be at risk. John too wants to do the right thing but is ordered not to by his bosses; if he disagrees, his job might be at risk. The university's research committee may be aware of the ethical dilemma but knows that future funding could be threatened if they do—and losing future funding could also threaten John's and Joan's jobs. This situation is the same at universities all over the world: they are afraid of losing out if they do the right thing, so they continue to do the wrong thing, at great cost to everyone involved.

It has also been suggested that IFs create a different type of prisoner's dilemma, with publishers and journal editors on one side and researchers on the other working against each other rather than cooperating [4]. However, it is questionable whether this asymmetrical scenario is really a prisoner's dilemma: journals and editors can do whatever they want with no risk of penalty, while researchers are relatively powerless. A more symmetrical situation arises when researchers are pitted against each other, which constitutes a true prisoner's dilemma.

Just as it would be better for the prisoners to cooperate, it would be better for everyone if all universities agreed to stop using IFs—at least as they are currently used

—and agreed to let researchers respect authorship guidelines. How could this be accomplished? One potential solution would be for funding agencies to stop using IFs for funding decisions. Some major agencies, notably the Wellcome Trust and the DFG, already require applicants to list their most relevant publications and not just the ones published in high-IF journals; many other actors and journals have also signed the DORA declaration to assess research on its own merits rather than journal IFs (<http://am.ascb.org/dora/>). While this is a start, it is not sufficient to bring about the change needed to escape the prisoners' dilemmas.

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A more radical approach would be an international agreement between universities to act for the common good. If all these institutions agreed that researchers must always respect the authorship guidelines of the journals they are submitting to, and that IFs would be used, if at all, only in an evidence-based, appropriate manner,

then Joan, John and everyone else would be free to do as their consciences dictate. Equally, if universities fail to do so, a similar agreement could be reached between researchers. In fact, the very best solution would be to have researchers, lab leaders, and institutions all signed up to such an agreement.

However, there is a distinct chance that even if any such agreements were made and everyone signed up to them, universities would still ignore them and continue with the old unethical practices in order to gain a competitive advantage over those universities stupid enough to act ethically. Sadly, that is the nature of the prisoner's dilemma: it will always penalize those who attempt to escape it.

Conflict of interest

The author declares that he has no conflict of interest.

References

1. Shaw D (2011) The ICMJE's definition of authorship is illogical and unethical. *BMJ* 343: d7192. doi:10.1136/bmj.d7192
2. UK Government Select Committee on Science and Technology (2004) Tenth report. <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/399/39912.htm>
3. Poundstone W (1993) *Prisoner's Dilemma*. New York, NY: Anchor Books
4. Svensson G (2010) SSCI and its impact factors: a “prisoner's dilemma”? *Eur J Mark* 44: 23–33