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NHMRC REMOVES JOURNAL IMPACT FACTORS FROM PEER REVIEW OF INDIVIDUAL RESEARCH GRANT AND FELLOWSHIP APPLICATIONS

On the advice of Research Committee, NHMRC will no longer request Journal Impact Factors (JIF) as part of any applications for funding nor use these in peer review of individual applications.

Journal Impact Factor is not a sound basis upon which to judge the impact of individual papers.

The JIF of any journal does not describe the impact, importance or quality of any individual paper. Instead, it describes the average citations for *all* papers in that journal over a two year period and thus is not a description of the impact of each paper.

Citations of individual papers in any journal range from zero to many hundreds, even thousands for a landmark or methodological paper. Regardless of the JIF of the journal, whether high or low, the range and variance of citations to individual papers is very large.

It is therefore not logically sound to equate the "impact" of the journal, with the "impact" of each paper in that journal.

The simplistic example below may help to illustrate this point. Let's compare two imaginary journals that each published 20 articles in the years 2007 and 2008. The 2009 impact factor for each of the two journals is calculated by taking the average of all 2009 citations to those articles published in 2007 and 2008.

Individual papers for period 2007-2008	**Number of citations in 2009 for each article in the *Journal of AAA***	**Number of citations in 2009 for each article in the *Journal of BBB***
1	1	0
2	5	9
3	0	14
4	25	0
5	3	17
6	11	16
7	0	2
8	0	0
9	1	0
10	13	23
11	0	12
12	4	14
13	2	18
14	6	0
15	0	18
16	35	6
17	11	21
18	1	19
19	3	4
20	10	0
Total citations	131	193
Journal Impact Factor for 2009	**6.55**	**9.65**

In this hypothetical example, two articles in the *Journal of AAA* were cited more than any article was cited in the *Journal of BBB*. It is reasonable to conclude that these two articles in the *Journal of AAA* gained more recognition from other researchers than any article in the *Journal of BBB*. But if only the overall impact factor for the journals is considered, then reviewers are making the assumption that ***all*** the papers in *Journal BBB* are more "impactful" than ***any*** in *Journal AAA*.

I am sure that peer reviewers understand that, though *Nature* has a higher JIF than, say, *Journal of Biochemistry* and the *Medical Journal of Australia*, nevertheless a paper in the *Journal of Biochemistry* with 100 citations, or in the *Medical Journal of Australia* with 50 citations, has achieved more "impact" in terms of citations that a *Nature* paper with, say, 20 citations (See comment in *Nature* editorial below).

Is the impact of an individual paper better assessed by the citation rate of the individual paper?

Here too there are complications that make the application of simplistic interpretation fraught with bias and error.

First and most importantly, there is not of course a 1:1 relationship between the citation rate of a paper and either its quality or impact.

Secondly, some papers come and go while others have enduring citation patterns.

Thirdly, different disciplines have different citation practices and ethos. Trained expert bibliometrics professionals are able to factor this into analysis, whereas most peer reviewers are either not aware of this, or do not have access to the information.[1] A further complication is that many journals often do not publish within a single discipline. Furthermore, reviews are often more highly cited than individual papers, but the latter are the truly creative end of publications and the former are reliant on them.

The quality and importance of a journal article is, in the end, a peer review judgment. That judgment needs to take into account many factors, including but not limited to the ambition of the research (small salami publication or *magnum opus*), the quality of the methodology, how much the field is advanced by the research, whether there is a direct outcome of its publication, the relative contribution of the authors (e.g. a small team, or a large multi-authored paper with each author just contributing a small slice), and so on. To try to address such matters, some peer review systems restrict the assessment of publication output to just five papers, which each reviewer is expected to have read and evaluated.

High impact journals themselves do not support use of the JIF in judging individuals

A *Nature* editorial in 2005 pointed out that 89% of the 2004 impact factor was generated by just 25% of all published papers in *Nature* that year.[2] The mouse genome published that year had already generated over 1000 citations but, as the *Nature* editorial pointed out, this paper is "an important point of reference rather than an expression of unusually deep mechanistic insight". They point out that "the great majority of our papers received fewer than 20 citations", and that "the citation rate… varies sharply between disciplines". Finally, they conclude that "the net result of all these variables is that impact factors don't tell us as much as some people may think about the respective quality of the science that journals are publishing. …None of this would really matter very much, were it not for the unhealthy reliance on impact factors by administrators and researchers' employers worldwide to assess the scientific quality of nations and institutions, and often even to judge individuals".

[1] NHMRC is considering whether such information could be embedded within our new RGMS system to assist peer reviewers.
[2] Not-so-deep impact. Nature 2005 vol 435 pp 1003-1004.

The organisation that produces the Journal Impact Factor (Thomson Reuters) also opposes its use for individual papers. To quote:

> "The JIF is a journal-level metric designed for one purpose—to compare the citation impact of one journal with other journals. Regarding the use of the JIF in research evaluation, it can take one of two main forms:
>
> - An indicator of success achieved in having an article accepted by a prestigious journal.
> - A surrogate for a more carefully derived direct measure of citation impact.
>
> While the first use may have some utility, the second appears difficult to justify. The first use has some justification. There is a hierarchy of journals within subject areas. This hierarchy broadly corresponds to impact rankings, and, in a formal communication system based on peer review, acceptance of an article for publication in one of these journals is an important scholarly achievement. Rewards based on this achievement can be seen as encouraging scholars to aim high in their publishing goals. The data is thus appropriate to the question being asked.
>
> It is not recommended to use the JIF as a surrogate for more direct measures in such concepts as a "total impact factor" or other calculations in which the JIF stands in for article performance, and further calculations are performed on lists of JIFs. It is very hard to see how such data, so manipulated, are appropriate for any question related to evaluation or comparison. We must remember that publication in journals with a high impact factor does not necessarily indicate a high citation count for one's articles. A small group of very highly cited papers in a journal can cause a high impact factor".[3]

NHMRC Conclusion:

A peer review system that gives prime consideration to the impact factor of journals for peer review of individual applications is unfair and unscholarly.[4]

Its use in this way is supported neither by high impact journals themselves, nor by the originators of the impact factor.

Therefore, NHMRC will no longer call for inclusion of impact factors in applications nor use journal impact factors in peer reviewed evaluations.

[3] Thomson Reuters. Using bibliometrics: a guide to evaluating research performance with citation data. 2008
[4] This is not to argue that we should not encourage our grantees to publish in high impact journals.

Further reading: - for those interested in reading more about bibliometrics and related matters.

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