



Hey, it's only my opinion

## Impact factor manipulation

by Diana Epstein

In the early 1960s Irving H. Sher and Eugene Garfield created the Science Citation Index for peer reviewed scientific journals. They realised that if journals were selected for the index solely based on total publications or citation counts small journals which specialise in certain topics may not qualify for inclusion, which would be unfair. So they came up with a simple calculation for journal selection: the number of citations a journal receives in a given year to all articles published in the previous two years divided by the number of substantive articles the journal published in those previous two years = the impact factor (IF) [1]. The Box on the next page gives an example of an impact factor calculation.

The IF is currently used not only to measure a journal's scientific influence but has become increasingly important as a basis for awards of research funding, grants, and authors' academic advancement—a development which has been heavily criticised<sup>1</sup>.

Every year a discussion is held at one of the journals I manage to agree a topic for the annual editorial. Last year there was a slight drop in the journal's IF and we decided to address the impact factor. First we compared the current ranking with rankings of previous years. While doing so we noticed that there were two other journals in our journal's subject classification which had mysteriously increased their ranking within one year, causing our ranking to drop. We investigated further and brought to light a serious manipulation of these journals' impact factors, brought about by self-citation. One journal's IF was boosted 18 ranks by one paper containing 303 self-citations. Both journals involved were given a severe warning and the next IFs published in June 2007 showed a decrease in their ranking. The editorial addressing the IF, which should have been published in our January issue, did not appear in print until the July issue. Competitor publishers, editors in chief and societies did all they could to block publication of our editorial. Under this pressure it was carefully rewritten and eventually turned into a position statement on impact factors from one of the societies affiliated with the journal [2]. The political ramification of our discovery was immense and even today the seismic sensations are being felt in certain learned scientific societies.

How easy is it to manipulate the IF? Amazingly, it is incredibly easy. Indeed all that we came up with that might

stop a journal from manipulating its IF was the editor's own integrity. The 'impact game' may be played in a number of ways [3] as set out in the paragraphs below.

- **Self-citation.** Self-citation refers to a paper being submitted to a specific journal in which papers that have been published during the previous 2 years in that same journal are cited in the reference list. While self-citation of relevant papers is legitimate, excessive self-citation can indicate a manipulation. Thomson Scientific, the company which now lists journal impact factors, considers self-citation to be acceptable up to a rate of 20%, anything over that is considered suspect.

High self-citation rates may not always be unethical. They can arise because the journal provides a unique publication forum for a new or specific topic or because the journal receives a low number of citations and few incoming citations from other journals. For such small journals a small increase in self-citations causes a large shift in its IF. However, an unethical editorial practice that encourages authors to add citations to papers from the journal to the reference list or remove citations from competing journals with a view to bumping up the journal's IF can lead to a distorted view of the journal's participation [4].

- **Increasing non-source items in the journal.** Not all articles published in a journal qualify as substantive source articles for inclusion in the denominator of the IF ratio calculation—but all citations of these non-source articles are eligible for inclusion in the numerator. A more subtle manipulation is therefore to include articles in the journal that do not count as source items for the denominator. It is not always clear how Thomson Scientific distinguish source from non-source articles but a general guide is given in Table 1. Interestingly the ratio of pages in *Nature* devoted to

Table 1: Types of articles counted and not counted as source items

Counted	Not counted
Original Papers	Editorials
Review articles	Letters to the editor
Case Reports	News items
Proceedings papers	Abstracts
Short reports (communications)	Commentaries

<sup>1</sup> The European Association of Science Editors (EASE) has posted a draft statement of its stand point on the inappropriate use of the impact factor on its website [www.ease.org.uk](http://www.ease.org.uk). The statement recommends that journal impact factors are used only—and cautiously—for measuring the value of journals.

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source to those devoted to non-source material more than halved from 3:5 in 1977 to 1:6 in 1997, while the number of pages in the journal remained about the same.

- **Review articles.** Another strategy for increasing IFs is to publish as many review articles as possible because they are more likely to be cited. Hence, journals that only publish review articles generally have high impact factors.
- **Timing.** The timing of publication can also affect the IF. Considering the sample period of 2 years, a good paper published in January has 11 months longer to be cited than one published in December of the same year!

Fortunately, the majority of journals do not use these questionable ways to bump up their IF but in subspecialties where there are a limited number of journals which do not overlap they may be vulnerable.

Are there legitimate steps that journals can take to increase their IF, by increasing the content of review articles, juggling their non-source:source content, asking authors to cite relevant articles from their journal? Are all these practices fair in love and war in the impact factor game? Could a better manipulation-proof way be devised to rank journals? I am not so sure but until a better way is found I do believe we are stuck with it and the manipulation debate. After all we all like numbers!

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### Example of IF calculation for 2005

Cites in 2005 to articles published in:

2004	188
2003	272
Sum	460

Number of articles published in:

2004	152
2003	155
Sum	307

Calculation:

$$\frac{\text{Cites to recent articles}}{\text{Number of recent articles}} = \frac{460}{307} = 1.498$$

## More ways editors can improve impact factors

The 17 March 2007 issue of *BMJ* with its theme 'Finding your way around the impact factor' is a useful resource for finding out more about current thinking on the impact factor.

One delightful banter is Christopher Martyn's 'Advice to a new editor' in which, posing as an experienced editor, he writes a letter to a colleague who is about to take over the reins as the new editor of a journal. He warns that the first thing potential authors will ask her about the journal will be "What's the impact factor?" Forget all your good intentions about serving readers and improving quality it's raising the journal's impact factor that an editor needs to concentrate on. In which way can enterprising editors increase citations to papers in their journal?

Write an introductory article under the title 'Editor's choice' making a few banal remarks about the articles in the issue and—give citations to these articles

Commission commentaries on articles in the issue—which cite the articles

Encourage correspondence about articles in the journal—which cite the articles

Publish papers in a well-researched area that contain a serious mistake—people will refer to it in their papers, write refutations and cite the articles.

What editors should certainly not do is become social minded and publish papers on unfashionable conditions (e.g. itching) with little research being undertaken and few researchers to cite it in their publications or case reports which might be popular with readers but are rarely cited.

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## Risky business

*At-risk patients should be screened monthly.* Is it really necessary to say *at-risk* here? *Patients at risk should be ...* is OK, of course. But many writers do not seem to be able to resist adding '*at-*' when they use *risk* adjectivally as a modifier before *patient*. *Risk* on its own seemed to do us very well until about the mid-1990s (*Risk patients should be screened monthly*); and also: the same writers do not seem to need to talk about *at-risk groups*, but seem happy to use just *risk groups*. Health economists have tried to tell me that this is a technical term in their area (but why should patients be accorded an *at* and groups not?). I suspect this is yet another example of the insidious spread of a term we do not need. Or can anyone give me a cogent explanation of the difference between a *risk patient* and an *at-risk patient*?

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