Atherosclerosis 230 (2013) 275–277

Contents lists available at ScienceDirect

Atherosclerosis

journal homepage: www.elsevier.com/locate/atherosclerosis

Journal bibliometrics indicators and citation ethics: A discussion of current issues

Sarah Huggett*

The Boulevard, Langford Lane, Kidlington, Oxford, OX5 1AL, UK

ARTICLE INFO

Article history:
Received 8 February 2013
Received in revised form
30 July 2013
Accepted 30 July 2013
Available online 7 August 2013

ABSTRACT

Science has recently been accelerating at a fast rate, resulting in what has been called "information overload" and more recently "filter failure". In this perspective, journal performance indicators can play an important role in journal evaluation. Opinions on the appropriate use of journal-level bibliometrics indicators can be divided but they have now long been used as measures in research evaluation, and many editors see it as part of their editorial duty to try and improve bibliometrics indicators and rankings for their journal. There are various techniques through which this can be attempted, some more ethical than others. Some editors may try to boost the bibliometrics performance of their journals through gratuitous citations. This is problematic because citations are meant to provide useful references, scientifically justifiable, to previously published literature. As such citations can be used as widely accepted measures of scientific impact. Therefore, superfluous citations can distort the validity of bibliometrics indicators. It might be tempting to try to improve a journal's bibliometrics rankings at all costs, but these are only as meaningful as the data that feed into them. Exceedingly inflated indicators due to unethical behaviours can damage the reputation of a journal and its editors, and can lead to a loss of quality manuscript submissions, which in turn is likely to affect the journal's future citation impact.

1. Recent bibliometrics developments

Science has recently been accelerating at a fast rate (~3.5% per year Compound Annual Growth Rate in scholarly papers published in journals according to Scopus; see Fig. 1), resulting in what has been called "information overload" and more recently "filter failure". There are now more researchers and more scholarly communications than ever before, which has led to the heightened importance of bibliometrics indicators as measures of research evaluation. Bibliometrics or Scientometrics are the main terms employed to name the "science of science", the quantitative study of science and technology [1]. There is evidence of such techniques being applied to the law field as early as the beginning of the 19th century, and to psychology a century later [2]. Scientometrics as a field matured through the 20th century, with the first mentions of a bibliometric indicator in 1955. In the latter part of the 20th century, the field grew with the developments of citation indices and the launch of the first journal devoted to the field. In recent years, advances in computation and data storage, which have improved the accessibility and ease of use of bibliometrics measures, have led to further propagation and growth of the discipline. Bibliometrics are being increasingly used as a way to systematically compare diverse entities (authors, research groups, institutions, cities, countries, disciplines, articles, journals, etc.) in a variety of contexts: journal-level performance indicators are used by authors deciding where to submit manuscripts or by editors benchmarking their title against competitors, author- or institute-level metrics are used in research evaluation (e.g. UK Research Excellence Framework, Agence d'évaluation de la recherche et de l'enseignement supérieur in France, etc.), country-level data are used by governments to help shape research policy.

2. Journal performance metrics

In this perspective, journal performance indicators can play an important role in journal evaluation. There are many different metrics available based on various data: some of them are created from the relatively traditional counts of articles and citations, while others are derived from the more recently available web usage or downloads. Altmetrics [3] even make use, amongst other sources, of social media mentions, aiming to capture several flavours of impact. Using a variety of indicators helps yield a picture that is as thorough as possible, providing insights on the diverse strengths and weaknesses of any given journal [4,5]. Opinions on the appropriate use of journal-level bibliometrics indicators can be divided, as recently demonstrated by DORA [6], but they have now

* Tel.: +44 1865 84 3459; fax: +44 (0) 1865 84 3982.
E-mail address: s.huggett@elsevier.com.

0021-9150/$ – see front matter © 2013 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.atherosclerosis.2013.07.051

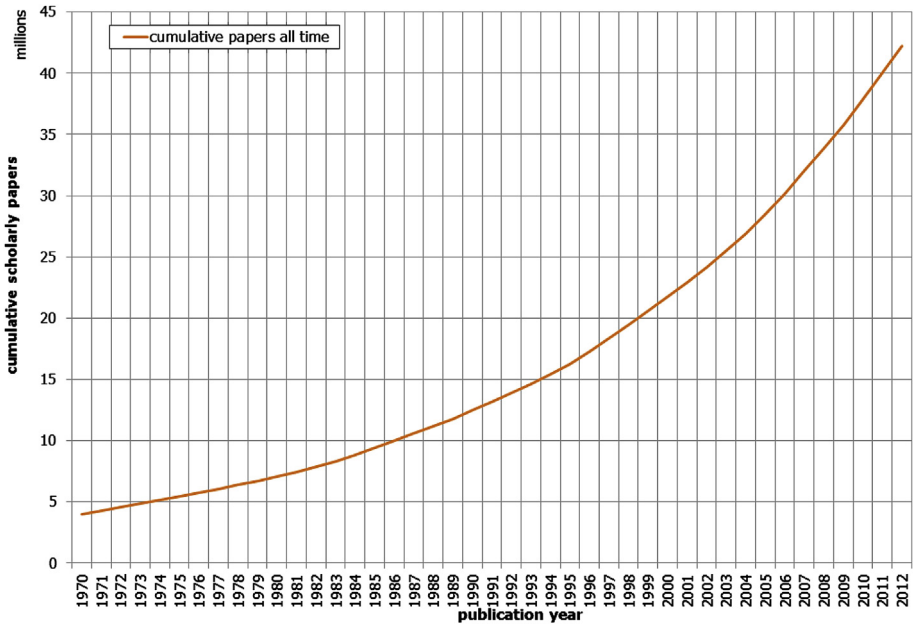

Fig. 1. growth of scholarly papers (articles, reviews, conference papers) 1970–2012; source Scopus.

long been used as prime measures in research evaluation, and many editors see it as part of their editorial duty to try and improve bibliometrics indicators and rankings for their journal [7].

3. An ethical dilemma

There are various techniques through which journal rankings and bibliometric indicators can be raised, some more ethical than others, but ethical boundaries and considerations may diverge between different countries, cultures, fields, or even people. As a consequence, a diversity of strategies and behaviours, particularly regarding journal self-citations (observed when a paper published in a journal cites content previously published in that same journal), can be observed.

For instance, the results of a recent survey [8] draw attention to the frequency of one particularly unethical editorial activity in business journals: coercive citations requests (editors demanding authors cite their journal as a condition of manuscript acceptance). This issue has already received some attention within the scholarly community in the form of an editorial in the *Journal of the American Society for Information Science and Technology* [9].

Some editors may attempt to boost the bibliometrics performance of their journals by publishing an annual editorial referencing numerous articles published in the same journal in recent years. Others have even tried similar techniques across several journals [10].

This is problematic because citations are meant to provide useful references, scientifically justifiable, to previously published literature. They should intend to acknowledge sources and guide readers, and as such are widely accepted as measures of scientific impact used in the calculation of several bibliometrics indicators. Therefore, superfluous citations can distort the validity of these metrics, and are thus unethical.

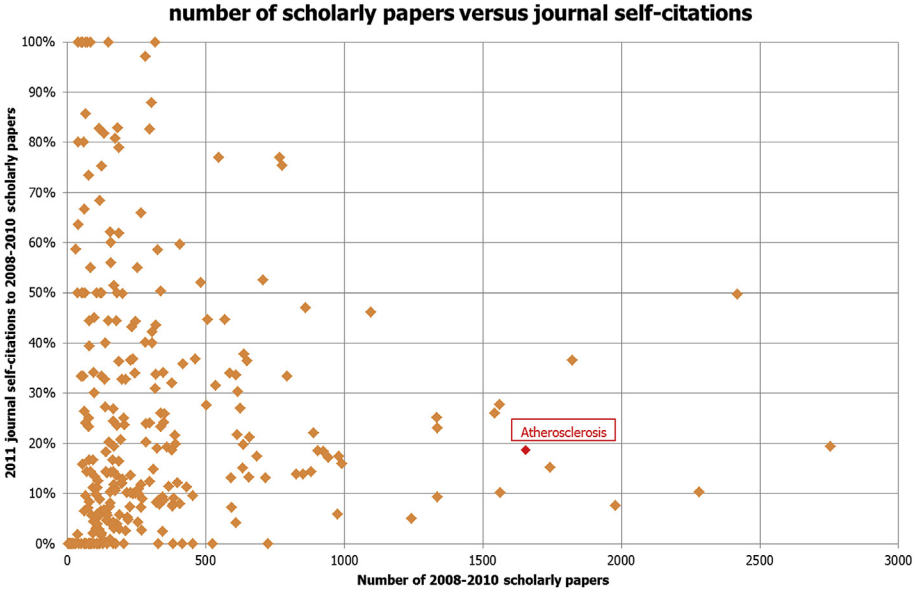

Fig. 2. Number of scholarly papers (articles, reviews, conference papers) compared to journal self-citations; source Scopus.

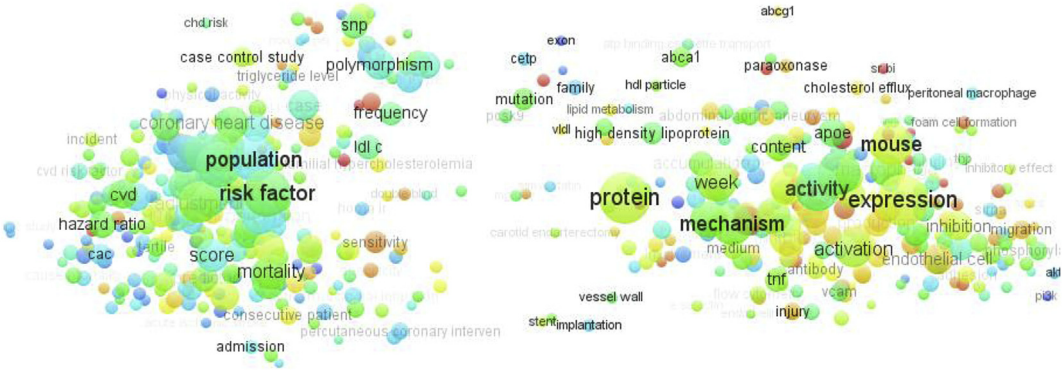

Fig. 3. Citation impact map (2012 citations to 2010–2011 scholarly papers (articles, reviews, conference papers)) for *Atherosclerosis*; source Scopus and VOSviewer.

4. An ethically acceptable level of journal self-citations

There are probably as many ethically acceptable levels of journal self-citations as there are journals. Journal self-citation rates differ between scientific fields, and a highly specialised journal is likely to have a larger proportion of journal self-citations than a journal of broader scope. A new journal is also prone to a higher journal self-citation rate as it needs time to grow in awareness within the relevant scholarly communities [11].

Within the Scopus Cardiology & Cardiovascular Medicine subject area, about 19% of 2011 citations to content published in the three preceding years were journal self-citations. The proportion is the same for *Atherosclerosis* (19%), which can therefore be perceived as having a typical self-citation percentage for its field. However, across all titles in this subject area, variations in self-citations spanned 0–100%, with most journals showing fewer than 20% journal self-citations (see Fig. 2). For the subject category, the proportion of journal self-citations drops to around 10% for 2011 citations to content published in the two previous years, versus fewer than 7% for *Atherosclerosis*.

5. *Atherosclerosis's* 2012 Impact Factor

The Impact Factor is a ratio of citations to articles published in recent years; for instance, *Atherosclerosis*'s 2012 Impact Factor is 3.706 [12] (4095 citations to the journal's 2010–2011 content in 2012, divided by 1105 citable items [13] published in 2010–2011). Using Scopus and the VOSviewer software developed by the CWTS group at the University of Leiden reveals what is driving 2012 citations to the 1105 scholarly papers published in the journal in 2010–2011 (see Fig. 3).

Each frequent term found in the titles and abstracts of the papers is represented by a node whose size is proportional to its number of occurrences. The nodes' positions are determined by their co-occurrence in the titles and abstracts of the papers included in the analysis. The colour of each item represents the average citation impact of the papers containing that term relative to the average citation impact of all papers included in the analysis, with hot colours indicating above average citation impact, green representing average citation impact, and cold colours embodying below average citation impact.

This map reveals two main poles of activity for the journal, with basic research on the right and clinical research on the left. For instance, on the right hand side of the map there are several relatively highly cited clusters relating to genetic studies, while on the left hand side there are relatively lowly cited clusters relating to patients. The effect of article type can also be seen, for example terms related to meta-analyses or reviews are relatively highly cited.

6. Take care of the journal and the indicators will take care of themselves

A high quality journal targeted at the right audience should enjoy respectable performance indicators in its field, which should be a sign of its value rather being an end in themselves. It might be tempting to try to improve a journal's bibliometrics rankings at all costs, but these rankings are only as meaningful as the data that feed into them [14]: if a bibliometrics indicator is exceedingly inflated as a result of a high proportion of gratuitous journal self-citations, it will not take long for the community to identify this (especially in an online age of easily accessible citation data). This realisation can be damaging to the reputation of a journal and its editors, and might lead to a loss of quality manuscript submissions, which in turn is likely to affect the journal's future citation impact.

Note: The general basis for this piece has appeared in *Elsevier Connect* and *Editors' Update*.

References

[1] Diodato V. Dictionary of bibliometrics. 1st ed. New York: Haworth Press; 1994.
[2] Scientometrics from past to present. Research Trends September 2007;(1).
[3] Priem J, Groth P, Taraborelli D. The altmetrics collection. PLoS ONE 2012;7(11):e48753. http://dx.doi.org/10.1371/journal.pone.0048753.
[4] Amin M, Mabe M. Impact factors: use and abuseIn Perspectives in publishing; 2000 number 1.
[5] Bollen J, Van de Sompel H, Hagberg A, Chute R. A principal component analysis of 39 scientific impact measures. PLoS ONE 2009;4(6):e6022. http://dx.doi.org/10.1371/journal.pone.0006022.
[6] San Francisco declaration on research assessment http://am.ascb.org/dora/ and Elsevier's view http://elsevierconnect.com/san-francisco-declaration-on-research-assessment-dora-elseviers-view/.
[7] Krell FK. Should editors influence journal impact factors? Learned Publishing 2010;23(1):59–62. http://dx.doi.org/10.1087/20100110.
[8] Wilhite AW, Fong EA. Coercive citation in academic publishing. Science 2012;335(6068):542–3. http://dx.doi.org/10.1126/science.1212540.
[9] Cronin B. Do me a favor. Journal of the American Society for Information Science and Technology 2012;63(7):1281. http://dx.doi.org/10.1002/asi.22716.
[10] Davis P. Citation Cartel journals denied 2011 impact factorIn Scholarly kitchen blog, 29 June 2012; 2012.
[11] McVeigh ME. Journal self-citation in the journal citation reports – science edition; 2002.
[12] 2013 Release of journal citation reports® source: Thomson Reuters 2012 citation data.
[13] McVeigh ME, Mann SJ. The journal impact factor denominator defining citable (counted) items. JAMA 302(10):1107–9, doi:10.1001/jama.2009.1301.
[14] Reedijk J, Moed HF. Is the impact of journal impact factors decreasing? Journal of Documentation 2008;64(2):183–92. http://dx.doi.org/10.1108/00220410810858001.