

Are prestigious academic journals becoming less impactful?

New research shows an increasing disconnect between the number of times a scientific paper is cited and the impact factor (IF) of the journal in which it appears, pointing to a shift in how scientists consume and consider research. *Radha Chitale reports.*

Impact factor (IF) was conceived in the 1960s as a way to guide academic library purchases and evolved into an overall journal ranking system (zero is the lowest impact). A scientific journal's IF is the average number of citations per published item in the 2 years preceding.

Historically, papers from journals with a high IF could be counted on to be cited more often than papers from journals with a low IF.

However, IF has become a controversial metric because determination criteria may not accurately reflect importance in the IF score. Greater free online access to individual papers is also subverting prestigious subscription-based journals' corner on rigorous peer-reviewed literature.

"I think that there are plenty of ways to evaluate journals," said lead researcher Dr. Vincent Lariviere of the University of Montreal's School of Library and Information Sciences in Montreal, Quebec, Canada. "The IF is one of these – not the only one – [and] I think the digital era is breaking this."

In an analysis of nearly 820 million citations and 30 million papers published between 1902 and 2009, Lariviere and colleagues found that "the relationship between the IF and citation rates has been weakening." [*J Am Soc Inf Sci* 2012;63:2140-2145]

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The researchers identified the break at about 1990, when they note that scientific information began to be disseminated electronically.

"In 1990, 45 percent of the top 5 percent most cited articles were published in the top 5 percent highest impact factor journals. In 2009, this rate was only 36 percent," Lariviere said. "This means that the most cited articles are published less exclusively in high impact factor journals."

The researchers said IF is imperfect for a number of reasons. Cited letters and commentaries count towards citations but not as "papers", which can inflate the IF. Journal inclusion for scoring is at the discretion of a private data company. A niche journal or a new journal also has a lower chance of receiving a high IF, no matter the importance of the content.

"Even more troubling is the three-step approach of using the IF to infer journal quality, extend it to the papers therein, and then use it to evaluate researchers," they said.

The IF was developed by an information scientist named Dr. Eugene Garfield for a citation index that was later acquired by what is now the media and financial data firm Thomson Reuters, the company that continues to curate the IF journal inclusion list.

On a few occasions, including a 2006 article in the *Journal of the American Medical Association*, Garfield allowed that the system is flawed.

"Impact Factor is not a perfect tool to measure the quality of articles but there is

nothing better and it has the advantage of already being in existence and is, therefore, a good technique for scientific evaluation... Experience has shown that in each specialty the best journals are those in which it is most

difficult to have an article accepted, and these are the journals that have a high impact factor." [*JAMA* 2006;295:90-93]

Some scientists echo the sentiment that a high IF journal is synonymous with a more rigorous standard of evaluation or the most important or cutting-edge research.

"I will automatically read and cite the journals with the highest IF and I submit to the highest IF journals," said Assistant Pro-

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fessor Carolyn Lam of the National University Heart Centre, Singapore. "It is part prestige, and how we are graded as academics, but research is more likely to get cited if it is published in a high impact journal."

Professor Teo Eng Kiong, editor-in-chief of the *Singapore Medical Journal*, said IF is important because "it serves as a composite measure of the relevance of the journal to the scientific committee."

As a peer reviewer, Dr. Juliana Chan, a post-doctoral researcher at the Molecular Engineering Lab, Science and Engineering Institutes at Singapore's Agency for Science Technology And Research (A*STAR), said that IF might help her predict what to expect from a piece of research.

"For example, if the IF of a journal is 1

versus 10, I would place equal scrutiny on the data but I would have a different set of expectations when giving my review."

Chan said she does consider a journal's IF when choosing what to read or where to publish, and skews towards high IF journals.

But scientists maintain the parallel view that open access research is just as important as publishing in high impact journals for getting cited, particularly in resource-poor countries.

As the Editor-In-Chief of the new *ASEAN Heart Journal* – which has no IF as yet – Lam noted the need for availability.

"Here you see me take a different stance. Our audiences are Southeast Asian nations who may not be subscribed to big publishing houses. We have to find a niche and have open access papers that are the best available online.... it impacts how often articles get cited, which in turn impacts the journal's IF."

Recognizing this, many big name journals and publishers have developed ways to free up content after a certain period of time.

Research supported by the US National Institutes of Health, for example, must be made free to the public within 12 months of publication, no matter where it appears.

"There used to be a strong difference between open and closed access, but not anymore," Chan said. "Closed access is semi-open already."

Prioritizing important subject matter may also be a more beneficial model for readers who find material outside of large journals.

"Going forward, it may be the publishing pattern of authors to decrease the emphasis mainly on IF rather than the relevance of the

journal to their article," Teo said. "Eg, choosing to publish in the *Journal of Gastroenterology and Hepatology* rather than *Gastroenterology* for Asian patients – lower impact, but more geographical relevance."

Although scientists acknowledge that IF is not perfect, they maintain that it will likely persist as there will always be a place for a ranking system in academic publishing. The results from Lariviere and colleagues may show that the correlation between citations and high IF is weakening but the historical assumption that research from a high IF journal is of a certain standard remains.

"It's possible to read extremely good research in low impact journals and to read bad research in high impact journals," Chan said. "But it's a trend that a high impact journal will lead to a better paper." **MI**

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