Effects of aging, and other bad behaviors

Peter D. Wagner

Department of Medicine, University of California, San Diego, La Jolla, California

EVERY YEAR, THOMSON-REUTERS PUBLISHES JOURNAL IMPACT FACTORS, which equal the number of citations in a given calendar year to papers published in a journal the prior 2 yr divided by that number of papers. The term “papers” includes anything Thomson-Reuters considers citable. They also provide several additional statistical citation parameters, and each tells a different story. In the July 2011 issue of the Journal of Applied Physiology, this problem was addressed (6), and it was shown that where a journal ranked among its peers depended on which citation parameter you chose. This is not the only reason why the standard impact factor should not be the sole determinant of individual author evaluation or even of journal standing.

Within-journal variance in citation numbers across the spectrum of published articles is a further limitation to use of the impact factor, and that is the subject of this editorial. In this issue of the Journal of Applied Physiology, an analysis of one cause of within-journal citation variance is presented by Araujo et al. (1). This is the “aging effect.” With the impact factor being a number based on average citations to papers published over 12 calendar months, the authors showed that those papers published early in the calendar year receive more citations than those published later in the year. Linear regression of their data (1) shows the decrease in citations is linear month by month from a high of 6.7 in January to a low of 4.8 in December. The reason given is that the longer a paper has been in print, the more likely it is to have garnered citations, all other factors equal. From this decline one can calculate that the relative dispersion (SD/mean) of the aging effect is 0.13.

If one now examines all of the 747 articles (512 research articles, plus 235 editorials, reviews, point:counterpoint debates, viewpoints, and letters) published in the Journal of Applied Physiology in 2007 [one of the years covered by the analysis of Araujo et al. (1)], the frequency distribution of citations to each paper is astonishing, as shown in Fig. 1. In Fig. 1, top, all 747 articles were first ordered, left to right, from least to most citations lifetime since appearing and then divided into deciles (i.e., of ~75 articles each). The least-cited 75 (first decile, leftmost bar) were not cited at all. The most-cited 75 (10th decile, rightmost bar) were cited an average of 38.6 times in all. The relative dispersion of the distribution in Fig. 1 comes to 1.14. In Fig. 1, bottom, the same relationship is shown for just the 512 research papers, and whereas the pattern is clearly similar, as expected, the relative dispersion is a little less, at 0.84. Therefore, although the age effect is significant, the majority of the variance in citations to different papers in the journal is not due to this but most likely to inherent interest in the fields of the highly cited papers and those papers’ content.

This analysis is presented to make a single point—one that has previously been made well by my predecessor, Jerry Dempsey, and his colleagues (3) among others (4)—but a point that cannot be overemphasized: To judge individual authors for academic promotion or research funding by the average impact factor of the journal carrying their papers is ludicrous. Was the author in question in the first, the 10th, or another decile of citations? Surely that is important if impact factor is to be used as the pass/fail criterion in their judgment.

So once again, we echo the conclusions of the International Respiratory Journal Editors Roundtable (3) and plead with those charged with evaluating faculty for promotion or research funding to do away with journal impact factors in making these critical, life-changing decisions. The impact factor is just one of several parameters of a journal’s influence, with the different parameters each leading to different journal ranking (6). But more importantly for the candidate up for promotion or research funding, citation variance among papers within a journal is huge. By all means check the individual’s personal citation record [such as the H-index (2, 5)], but do not use the journal impact factor to evaluate the candidate when it is the average of a citation distribution likely as uneven as shown in Fig. 1.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the author.
REFERENCES


