Tracing the Secret Life of Scientific Citations in Psychology

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Abstract
While currently questioned, a traditional measure of the quality of research is the journal’s impact factor. A study conducted by Mayor (2010) found interesting patterns in the citation cycles of research articles published in Nature, a generalist journal, and two psychology journals, Psychological Review (a theoretically-oriented journal) and Psychological Science (an empirically-oriented journal). Mayor found that while the average citation number for papers published in Nature grew rapidly, it declined just as rapidly after a few years, as is typical in various disciplines. In contrast, Psychological Review and Psychological Science exhibited progressive growth and a peak followed by a plateau, respectively. The current paper builds upon Mayor’s findings and presents results from the citation patterns of six highly-regarded psychology journals from 2010 to 2022—three more theoretically oriented and three more empirically oriented. The present study shows a dissociation in psychology journals between the citation patterns of theoretical and empirical journals in psychology, with theoretical journals typically exhibiting growth in citations over time and empirical journals experiencing a rapid peak followed by a plateau. Thus, authors should be aware of these different citation patterns in psychology journals when deciding where to aim their research projects.

Keywords: impact factor, citations, journal ranks.

Introduction
Early career researchers are frequently advised to aim for publication in high-impact journals to advance their professional life. This advice is so pervasive that an examination of “high-impact” is in order beyond looking at the indexed impact factor. In recent years, there have been two streams in such examination. One is a timely critique of traditional metrics such as a journal’s impact factor, signaling a shift towards more qualitative measures of research impact (e.g., the San Francisco Declaration on Research Assessment [DORA]). While implementing these guidelines presents an interesting challenge, this paper will not delve into this issue (see Alperin, 2019; Brembs et al., 2012; McKiernan et al., 2018, for discussion). The other option to deeply examine the construct of “impact” is to develop a more fine-grained analysis of the lifetime of a paper’s presence in the literature. To this end, we revisit and build upon Mayor’s (2010) observation regarding the citation cycle of research articles in top-notch psychology journals.

Mayor (2010) conducted an insightful study that examined the citation data from the Web of Science database for three high-impact journals over a span of 15 years (1995-2009). The study included a generalist journal primarily devoted to empirical research (Nature) and two psychology journals, one focused on theoretical research
One et al. (Psychological Review) and the other on empirical research (Psychological Science). Mayor reported an interesting dissociation. The average citation number for papers published in Nature grew quickly and peaked in the first two to three years but declined soon over time. This pattern of citation frequency across years is widespread across diverse academic disciplines (e.g., Physics, Biology, Medicine, Chemistry; see Parolo et al., 2015).

Interestingly, the pattern for the psychology journals was quite different. The average citations in Psychological Review had an initial comparable growth as Nature, but it continued to grow over the 15 years rather than having a sharp peak or decline. Furthermore, Psychological Science showed a growth towards a rapid rise—much less explosive than Nature or Psychological Review—followed by a plateau rather than a decrease. Indeed, at the end of the 15 years, Psychological Science had approximately the same average citation number as Nature (see Figure 1, Panel B in Mayor, 2010).

Mayor’s (2010) study compared the citation patterns between generalist and specialized psychology journals as a collective entity. Ultimately, Mayor determined that psychologists frequently demonstrate a “nearsighted gambler” approach to publishing in Nature, given that such publication did not ensure sustained citation rates. Furthermore, most papers in Nature are not cited in their second year of publication. A subset of exceptionally cited papers drove the high average citation index (see Appendix A for depiction). Notably, Mayor’s (2010) research underscored the disparate citation trajectories of these two types of psychology journals; however, he did not investigate these variations comprehensively. In addition, psychology has changed significantly since 2010 because of the so-called replication crisis and the attempts to make corrections in research practices.

Thus, the present paper aims to build upon the findings of Mayor’s (2010) study on citation cycles in psychology journals and provide further insights. The article is divided into two main parts. In the first part, “Revisiting Mayor”, we aim to expand the time horizon of Mayor’s analysis of Psychological Review and Psychological Science until 2022. In the second part, “Generalizing Mayor”, we aimed to broaden the study of citation data of psychology journals. To do so, we examined the citation data from six highly-regarded psychology journals over 13 years (2010-2022), including three journals focused on theoretical questions and three primarily devoted to empirical research. If the observations of Mayor’s study are generalizable, the citations of the theoretical psychology journals will exhibit progressive growth, while the empirical journals will show an early peak followed by a plateau. Additionally, the paper explores how the examination of individual data might alter the conclusions based on aggregated data based on average citations.

**Revisiting Mayor (2020)**

To achieve our first goal (i.e., determine whether the patterns reported in Mayor’s (2010) study continue until the present day), we analyzed the citation data, from 1995 to 2022, of papers published in 1995 in Psychological Review and Psychological Science from the Web of Science database, using a methodology parallel to Mayor’s. Results are presented in Figure 1, which shows the average number of citations per year.

As depicted in Figure 1, the annual number of citations for papers published in Psychological Review has continued to increase over time, albeit with a declining growth rate. Additionally, the plateau in citations for Psychological Science has persisted for more than 25 years.
By expanding the time frame first presented by Mayor’s (2010) study, we demonstrate a continued dissociation in psychology journals between the citation patterns of theoretical and empirical journals. Whereas theoretical journals exhibit a consistent growth in citations over time, empirical journals tend to experience a rapid peak followed by a plateau—note that this pattern is different from that reported in the life cycle of journals in other disciplines (see Parolo et al., 2015). The key question now is whether this same pattern can be observed across a broader range of journals. In the second part of the study, we focused on papers published more recently (in 2010) in six highly-cited psychology journals. Furthermore, we also examined whether the pattern with aggregated data was confirmed with individual citations.

Generalizing Mayor (2010)

We used the same methodology as in the first part. However, we selected more recent articles (i.e., published in 2010) with a citation span until 2022, and we broadened the selection of journals (six instead of two). Three of these journals are primarily focused on theoretical research (Psychological Review, Psychological Bulletin, and Trends in Cognitive Science), and the other three are more oriented toward empirical research (Psychological Science [Association for Psychological Science], Journal of Experimental Psychology: Learning, Memory, and Cognition [American Psychological Association], and Psychonomic Bulletin and Review [Psychonomic Society]). We initially performed an aggregated analysis to compare our findings with those of the first analysis. Figure 2 displays the average citation data from 2010 to 2022 for the six highly-observed psychology journals of this study.

Figure 1. Average number of citations per year from 1995 to 2022 in papers published in 1995 in Psychological Review and Psychological Science.
The results presented in Figure 2 reveal several interesting findings. First, the research papers published in theoretically-oriented journals tend to have higher citation rates than those published in more empirically-oriented journals. Second, two theoretically-oriented journals (Psychological Bulletin and Psychological Review) show continuous growth over time. For the third one (Trends in Cognitive Science), there is quick growth in the early years, even higher than for Psychological Review, followed by a plateau. In contrast, all three empirical journals show an early peak, followed by a sustained plateau. All in all, these findings extend the results of Mayor’s (2010) study to a different time frame and a broader selection of journals.

It is important to consider methodological issues when analyzing aggregated data. One such concern is that the averages may be unduly influenced by a limited number of highly cited papers (see Appendix A). To address this issue and investigate individual citation data, we utilized raincloud plots. These plots illustrate the individual data points and their distribution over time, as outlined by Allen et al. (2021). In Figure 3, we present the raincloud plots for the three psychology journals guided by theory, and the corresponding plots for the more empirically-based psychology journals are displayed in Figure 4. To enhance the clarity and comprehensibility of the graphs, we limited the focus to the distribution of individual citations for even years.
Figure 3 shows that individual citation data in Psychological Review and Psychological Bulletin show rapid growth followed by a slow increase. In contrast, the citations in Trends in Cognitive Sciences appear to reflect a plateau in recent years. Moreover, the growth observed in the averaged data for Psychological Review (see Figure 2) can be attributed to the exceptional influence of two theoretical papers: a paper focusing on a theory of psychological distance (Trope & Liberman, 2010) and the other on a theory of suicide (Van Orden et al., 2010), which have garnered attention in fields beyond psychology.

Figure 4. Individual citations per year from 2010 to 2022 in papers published in 2010 in three prestigious empirically-oriented psychological journals.

Figure 4 (empirically-based psychology journals) shows that while there were a few changes due to highly cited papers in each journal, the three journals’ basic patterns remained similar. A relatively rapid peak was observed, followed by a plateau.

Conclusions

The present study corroborates and expands upon Mayor’s (2010) previous research by highlighting notable differences in citation trends between publications from theoretical and empirical psychology journals. In turn, both deviate from citation patterns observed in other disciplines (see Parolo et al., 2015).

Notably, papers published in theoretically-oriented psychology journals tend to exhibit a sustained growth in citations over a prolonged period. However, it should be noted that, in some cases, the increase in the aggregated data may be attributed to a small number of highly influential articles (see Figure 3). Conversely, papers published in prestigious empirically-oriented psychology journals show a rapid growth in citations, albeit less pronounced than those in theoretically-driven journals, followed by a stable plateau rather than a decline, at least in the periods examined here (1995-2002 and 2010-2022). Hence, authors must consider these citation patterns in psychology journals when determining the appropriate target for their research endeavors.

We acknowledge that a more systematic analysis would require a larger sample of journals, additional data sets and data frames, a cross-disciplinary comparison, and the introduction of other variables like the characteristics and affiliations of the authors. Nonetheless, we believe that, just as this paper broadened the fundamental observation identified by Mayor (2010), there is no inherent reason why our primary conclusions would be significantly altered. Instead, we hope that our study will inspire further investigation into the citation patterns of psychology publications and encourage researchers to adopt more nuanced and inclusive metrics when evaluating academic success.
Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References


Supplemental materials

The anonymized citation data for the analyses, obtained from the Web of Science database, is available at https://osf.io/jpsza/?view_only=3ae8dc93fcb64ae88a84d4430d06d683

Appendix A

We present a bar plot depicting the number of citations received by the research papers published in Nature in 1995, during 1997. This period showed a surge in the average number of citations. However, as shown in Figure A.1, this was primarily due to a relatively small percentage of highly impactful papers.
Figure A.1. Bar plot and rug plot of the number of individual citations in 1997 of the papers published in 1995 in Nature.