The Use of Citation Speed to Understand the Effects of a Multi-institutional Science Center

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The extent to which an article attracts citations has long been of interest. However, recent research has emphasized not just the receipt but also the pacing of citation. Bornmann and Daniel observe that articles accepted to one of the most prestigious chemistry journals are more quickly cited than those rejected by the journal and published elsewhere.[1] On the other hand, Rogers finds in the nanotechnology domain over a nearly 20 year period, that highly cited articles encompass both those receiving quick first citation as well as those receiving lagged first citation.[2] Thus the question of what quick citation means in terms of diffusing research remains.

Amidst these viewpoints, this paper explores the role of timing in citation of publications to assess the effects of research organization. Specifically, the paper examines the influence of a multi-institutional, multi-disciplinary research center's authored-articles in terms of speed of article citation. Centers may provide an institutional framework for faster research diffusion[3] although contrasting findings suggest that centers are important because they involve excellent researchers, rather than because of their organizational resources per se.[4] This work posits that center-affiliated authors' articles are more likely to be cited within a year of publication than a comparison group of articles written by authors not located in a given center.

Citation distributions over time of 87 articles authored by members of a science of learning research center are contrasted with 88 articles authored by a comparison group. The comparison group is selected at random from publications in the same journal subject categories and years as those of the more than 80% of center publications.[5] The analysis controls for field effects given that the center is comprised of

[1] Bornmann, L., Daniel, H-D. 2010. Citation speed as a measure to predict the attention an article receives: An investigation of the validity of editorial decisions at Angewandte Chemie International Edition. Journal of Infometrics 4(1): 83-88.

[2] Rogers, J, 2010. Citation analysis of nanotechnology at the field level: implications of R&D evaluation. Research Evaluation 19(4): 281-290.

[3] Youtie, J., Kay, L., Melkers, J. 2012. Bibliographic Coupling and Network Analysis to Assess Knowledge Coalescence in a Research Center Environment, White paper.

[4] Rogers, J. (2012). Is the difference in research center productivity real?: The effect of concentration of human resources in centers. Presentation at the Innovative Methods for Innovation Management and Policy Conference, Beijing, China.

[5] Eighteen percent of center publications are distributed across eight different journal subject categories not in the three main subject categories that comprise more than 80% of center articles: education, neuroscience, and psychology.

three main fields: psychology, neuroscience, and educational research. It also controls for the number of authors and year of publication. In addition, self-citations are considered given previous work on the role of self-citation in quick first citations.[6]

An initial examination of the citation patterns of the center and comparison group suggest that the latter forms a reasonable comparison group for assessing citations of center publications. Plots of the citation distributions for the center and comparison group appear similar (Mann-Whitney U test, $p>.10$). Small distributional differences in citation patterns are evidenced in that the center has somewhat more papers that have attracted at least 50 citations whereas the comparison group has slightly fewer zero-cited papers.

Focusing the analysis on quick citation, self-citation becomes important. The publications in the comparison group have significantly more self-citations (21%) than does the center (16%). Given that the focus of this article is on quick citations, consideration is given only to self-citations in the first year.

A model conceptualizes quick citations as a function of center-related authorship, along with the number of authors, year of publication, and field dummy variables. This model is also applied to a dependent variable that accounts for quick self-citations. The results indicate that articles by authors affiliated with the center are significantly more likely to have early-cited papers within the year of publication than the comparison group. The controls are also significant. This relationship is not diminished by taking quick self-citations into consideration. Nearly all of these quick citations are by non-center authored papers. These results suggest that centers can be used to accelerate signals of noteworthy publications.

[6] Aksnes, Dag. (2003). A macro study of self-citation. Scientometrics, 56(2), 235–246. Rousseau, R. (1999). Temporal differences in self-citation rates of scientific journals. Scientometrics, 44(3), 521–531.