QUALITATIVE ASPECTS OF THE BRADFORD DISTRIBUTION

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(Received January 14, 1985)

A study was performed to determine whether the quality of journal articles declines as one moves through successively less productive Bradford zones. Two measures of quality — rate of citation and expert judgement — were used. It was found that articles in the least productive zone were cited significantly less than those in the most productive zone. However, experts did not judge them to be of lesser quality.

Introduction

It was Bradford1 who first observed that articles on a particular subject tend to be scattered through successively less productive "zones" of periodicals; while the number of articles in the various zones remains roughly the same, the number of periodicals generating these articles increases from zone to zone according to an approximately geometric series.

In the fifty years since this observation, the "Bradford distribution" or "Bradford's Law of Scattering" has generated a substantial body of literature. Most of this appears to fall into two categories: (1) confirmation that the phenomenon holds in a particular subject area, and (2) discussions or even arguments on how the law is best expressed mathematically. Oddly enough, the qualitative aspects of the distribution seem to have received little attention.

When journals are ranked by decreasing numbers of articles published on some subject, all one can reasonably claim is that the journals lower down the list are less likely to produce articles on this topic than those in the higher positions. This does not necessarily imply that the less productive journals are of lower quality or that the articles they publish are less significant contributions to the subject under consideration. Indeed, to conclude this would be illogical because it would imply that specialized journals are inherently of higher quality than those more general in scope. To use but one example, the New England Journal of Medicine may contribute infrequently to the literature on...
some tropical disease but these rare contributions may be the most important items published on the subject.

The *Journal Citation Reports* of the Institute for Scientific Information consistently show that journals with high "impact factors" (i.e., those earning most citations per article published) are not necessarily the ones that contribute most articles in a particular subject area. If one accepts that number of citations earned is a legitimate indicator of "quality," one can conclude that the journals that publish the most on some topic are not necessarily the ones that make the "best" contributions. Hawkins\(^2\) has produced further evidence that tends to support this point: the ranking of journals by productivity is not the same as a ranking by "exclusivity." For example, the journal whose content deals almost exclusively with crystallography is not the one that publishes most articles on the subject.

A few investigators have looked at qualitative aspects of the Bradford distribution. Magyar,\(^3\) dealing with the literature of dye lasers, found that 60% of the articles most cited did indeed appear in the nucleus (most productive) journals. Nevertheless, he points out, the other 40% (coming from the less productive zones) cannot be considered a negligible amount. Lawam \(^4\) produces evidence to suggest that articles on cancer research that are of higher quality tend to be less scattered than those drawn at random from the cancer research literature as a whole.

Using the literature of mathematics, Lamb\(^5\) claimed to have demonstrated a correlation between quantitative and qualitative attributes. This claim was based on the fact that rankings of journals by productivity were similar whether the data were derived from a "quality" bibliography or from a comprehensive bibliography. For example, four of the six most productive journals in the "comprehensive" ranking were among the six most productive in the "quality" ranking. The quality bibliography consisted exclusively of mathematics papers emanating from a single institution, the Institute for Advanced Study at Princeton.

Boyce and Funk,\(^6\) on the other hand, were unable to find a relationship between quantity and quality in a subfield of psychology. Using citation as a measure of quality, they reported that no significant correlation exists between the most productive journals and those with the greatest "quality weight" (a type of impact factor—number of citations earned per paper published—but restricted to the papers contributed by these journals to the subfield, in this case experimental extinction).

In a later study, Boyce and Pollens\(^7\) reworked Lamb's data. They reported an insignificant level of correlation between Lamb's "comprehensive" ranking and three rankings based on various citation measures of quality (total number of citations, impact factor and quality weight).

These correlations did not improve even when the journals of low productivity were removed from consideration. On the other hand, they achieved somewhat