Laterality, the journal: Some bibliometry

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Abstract

The *Zeitgeist* is working in favour of bibliometric work and the first twelve volumes of *Laterality* afford ample material of this kind. They are described in terms of number of pages, of references and their age and of citations to them. The age of the references does not conform to Price's model of different fields of learning. It does, however, predict citations, as does (weakly) the length of the article. The most productive authors in the journal are tabulated, along with nationalities in order. Text analysis of article titles makes clearer the actual, as opposed to prescriptive scope of *Laterality*.

It is a commonplace that a a new research front can be defined by a new journal. The field of neuropsychology, construed broadly, has witnessed the founding of a considerable number of journals in recent years, though some, such as *Brain* itself, are much older. Some would question the relevance to the brain of a good deal of the work published in these journals, such as behavioural studies of neurologically intact participants. It may be better to leave the question open and that is exactly what *Laterality* does through its very name. (It puzzles me, in view of the large corpus of research, that none of the neuropsychology journals specialises in hemispheric asymmetry and one such, say for work using direct techniques such as fMRI, remains a gap in the provision.) It may help those with some power to address these issues to know more about the first years of *Laterality.* There are already twelve complete volumes of it – enough to be able to hope for some reliable bibliometric conclusions, while I am personally at sufficient arms' length from the journal to avoid the charge of partisanship.

Such work seems timely to me. English universities are in competition with each other for the element of research funding that is generic. Until now decisions have been taken on the traditional basis of peer review but in the coming round this will be supplemented by "metrics". And of the latter it is information on how published research is *cited* that most promises to shed new light or even upset applecarts. Such information has been available for sciences since the 1960s, but it is also there, from a little more recently, for social sciences and humanities. For these latter there is a widespread feeling that citation metrics are a less appropriate ingredient in evaluation than for sciences. But in the research assessment exercise metrics will still count somewhat even for these. The Thomson ISI Web of Knowledge product, with its better coverage of American and more generally English-language journals, is no longer the sole source of information. Scopus, from Elsevier, is a worthy rival; and a lot can be gleaned too from the freely available Google Scholar, Google Books and Google Web.

In the past this bibliometric sort of work has required error-elimination or "cleaning-up" of the provider's datafiles, but it was my impression in the work that I am to describe below that this is no longer necessary. Substantially higher levels of accuracy have been achieved by the data providers. Some figures for *Laterality* as it has progressed through its first years are assembled as Table 1.

Table 1. Main bibliometric data for *Laterality*

Year	# issues	# articles	Ave # pages / article	# refs	Ave # refs / article	# old refs	# "recent" [1] refs	% of refs that are "recent" [1]	times cited [2]	Ave / article
1996	4	16	15.3	744	47	552	192	26%		
1997	4	19	13.9	743	39	480	263	35%		
1998	4	24	12.8	863	36	642	221	26%		
1999	4	23	14.3	932	41	720	212	23%		
2000	4	22	14	811	37	635	176	22%		
2001	4	28	13.1	976	35	753	223	23%		
2002	4	26	13.5	963	37	622	341	35%		
2003	4	23	14.9	828	36	638	190	23%		
2004	4	27	15.2	1108	41	917	191	17%		
2005	6	39	13.8	1487	38	1172	315	21%		
2006	6	40	14.4	1555	39	1201	354	23%		
2007	6	39	13.7	1450	37	1070	380	26%		
ALL YEARS	54	326	14.0	12460	38	9402	3058	25%	1849	5.7
"animal"		56	13.6	2194	39				471	8.4

Note 1. A "recent" reference is defined as one published in the 5 complete
   calendar years preceding the year of publication of the citing article
Note 2. Includes self-citations

Table 1 concerns mainly the number of references cited *by* each *Laterality* article. Merely as global totals and averages there is also the more interesting information for citations *to* these same *Laterality* articles. Most of these figures were easily retrievable from Scopus or the Web of Knowledge (the latter did not begin its coverage of *Laterality* volumes until the year 2000). The expansion of the journal in 2005 - from quarterly to bimonthly - is shown; it has had no discernible effect upon the length of articles.

As a grand average a *Laterality* article cites 38 supporting references. This looks high in the context of the general bibliometric literature. It is possible that there is a secular trend going on, particularly in science, towards more citing, for example for the very reason of citation metrics starting to be used in research evaluation. The interquartile range (middle half of the articles) is from 24 to 49 references in the bibliography. The very longest bibliography comprised 167 items. The average article is fourteen pages long with an interquartile range of ten to eighteen pages. The longest comprised no less than 46 pages.

Possibly the most interesting column of this table was the counting of how many references used in *Laterality* have been "recent" ones. This is a statistic that greatly interested one "founding father" of bibliometrics :- Derek de Solla Price. In a 1970 article based on a study of 162 journals, Price (see also 1965) argued this "immediacy" index differentiates *types* of journals. Some, with an index of 75-80% recent references (defined as in Table 1), were a manifestation of a new scientific research front. "Hard" sciences like physics and biochemistry checked in at 60-70%; social sciences at 40% or so; the humanities 10-30%. Moed (1989) built on this earlier work of Price.

Table 1 shows that the immediacy index for *Laterality* is 25% with only two years of 35% exceeding that at all substantially. The interquartile range is 14% to 33%. This is an intriguing result that does not make sense in terms of Price's framework. For there can be little doubt that the journal owes more to a scientific than humanistic ethos (for example there is rarely any deviation in *Laterality* articles from the standard scientific format of Introduction – Method – Results – Discussion). However the result is to my mind a reassuring one. Not all research is dropping away

completely and being replaced rather than built upon, in the way it is, so it seems to me, in many areas of psychology and even of behavioural science.

In order to appraise the (citation-defined) *impact* of a set of documents a statistic due to Hirsch (2005) called the *h*-index is currently much used (but see Antonakis & Lalive, 2008). Usually it refers to the work of an individual but the idea applies just as well to the articles in a journal. If each of *n* articles drawn from a larger set has attracted *n* or more citations, then that set of articles has an *h*-index of *n*. The index is not fixed but will tend to increase with time and further citations. It will be greater if author self-citations are included.

For *Laterality* on 15 April 2008 and excluding author self-citations the *h*-index was seventeen. Those seventeen high-impact articles can be called the "core set". To differentiate a core set that are all of roughly equal impact from one that is sharply skewed by "superstar" articles, the number can also be counted of citations to all the articles of the core set. These seventeen articles had been cited 512 times (again excluding author self-citations).

No fewer than 56 (17%) out of the total of 326 articles surveyed reported work with animals. These 56 articles are indistinguishable from the bulk of articles either in length or in number of references cited. However they attract more citations (8.4 rather than 5.1 for the rest). This might be because prior to the founding of *Laterality* there was no appropriate vehicle in which to publish this sort of research. Four of these articles are in the "core set" of relatively highly-cited articles.

There are various conjectures about citations that can be checked on the present data-set. Price (1965) conjectured that how many references an article carries itself bears *no* relation to the number of times an article is cited Even if this conjecture is true, it is possible that things may be changing as evaluative judgements based on citations proliferate. Could some of the referencing in articles be attempts to initiate an *exchange of gifts*? Another conjecture is one of Moed (1989) that a high immediacy index for an article predicts a high number of citations to it.

Obviously, Year-of-Publication ought to be inversely related to citations attracted before a particular date. It could be argued that other variables, too, obtainable from Scopus/Web-of-Knowledge, might be related to the citation count. Articles with more authors ought to benefit from the range of expertise. The distribution of the number of authors of each article is given as Table 2:-

Table 2. Number of articles with each number of authors

#authors	1	2	3	4	5	6	7	8	9	10
#articles	55	131	67	43	16	8	4	1	0	1

It can be seen that 271 (83%) of the articles are co-authored, most often by two people– one to do the work and one to gain the credit perhaps? Also, should *long* articles have more substance and therefore be relevant to more future work?

A technical problem in checking all such conjectures is that an article can go on being cited forever, so this dependent variable is never known definitively. However there is evidence of a typical secular pattern for citations - they build up to a peak reasonably soon after publication but then decline to a steady-state (Stringer *et al.*, 2008).

An analysis that is appropriate for checking these conjectures is multiple regression. However this makes assumptions about the distributions of the variables and for Times-Cited the assumption of normality is very far from being upheld. As can be seen from Table 3 this distribution is highly skewed.

Table 3. Number of articles with each number of citations

#citations	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15-30	>30
# articles	77	50	30	35	26	12	8	11	16	4	7	6	1	7	7	19	10

That means that pairwise correlations of Times-Cited with the various candidate predictor variables will also be invalid where the correlation statistic chosen is Pearson *r*. Though, for interest, these correlations were calculated, as were the nonparametric correlation coefficients Spearman rho and Kendall tau, the results from the parametric and the nonparametric tests were indeed at sharp variance from each other and are not reported here. Although Number-of-References and Immediacy-Index did not differ hugely from (left-truncated) normal distributions, the decision was made to use for the regression, which was done using the open source statistical language "R", *not* the standard linear model regression lm(). Instead rlm() (named for "robust linear model") was used; it is available from VR (MASS) which is a special R download (not part of the base package).

The first run of rlm() gave the regression equation:-

Times-Cited = 9.9 – 0.75 Year-of-Publication + 4.6 Immediacy Index + 0.18 Number-of-Authors
+ 0.01 Number-of-References +0.09 Number-of-Pages

The predictors removed were first Number-of-Authors, then Number-of-References, giving:-
Times-Cited = 10.3 - 7.3 Year-of-Publication + 4.5 Immediacy-Index + 0.12 Number-of-Pages
The *t*-values for the three predictors were:- -11.79, 3.0 and 3.34.

Scopus/Web-of-Knowledge tabulate the most productive authors in *Laterality* over this period. This evidence is reproduced in Table 4:-

Table 4. Most productive authors

9 articles	L.J. Rogers
7 articles	G. Vallortigara
6 articles	I.C. McManus, M.K. Mandal, D. Voyer, W.D. Hopkins, C. Porac & M.P. Bryden
5 articles	C. Cantalupo, E.A. Roy, W.F. McKeever & P.J. Bryden
4 "	Six authors
3 "	14 authors
2 "	61 authors
1 article	> 160 authors.

G. Vallortigara, W.D. Hopkins and L.J. Rogers, with the addition of J.T. Manning, have also been the biggest citers of *Laterality*. That these first three are animal workers must have a bearing on the observations made previously about animal work published in *Laterality*.

In terms of the journals that cite *Laterality* the findings are healthy. Well over thirty give it four citations or more; *Laterality* is not even its own biggest citer. Prolific citers of *Laterality* include well-established journals such as *Neuropsychologia, Cortex, Brain & Cognition, Brain & Language, The Behavioral and Brain Sciences* and *Neuropsychology*. The nationality of the citers approximately reflects the nationality of the authors.

These nationalities, from most to least frequent were:-

first, the four big anglophone areas – USA, UK, Australasia and Canada (in that order, with England accounting for about 60% of the UK and Australia about 60% of Australasia)

then France, Germany and Italy (in that order, together accounting for as many as Australasia).

All the up-and-coming "BRICs" (Brazil, Russia, India and China), except China, contributed, together accounting for more than France.

Then comes Japan.

Then some more European countries – Norway, Finland, Spain, Holland and Switzerland – even together, accounting for less than France,

then Turkey, Israel, the Lebanon and Bulgaria – together about as many as Germany.

Lastly, Taiwan, and six other European and three African countries.

      Text-analysis software freely available on the Internet (I used Hamlet II) permits further bibliometric investigation, this time on the titles of the articles surveyed. On average they are eleven words long and the words have an average length of six letters. Over the complete set, each word type is used nearly three times (has three tokens). The most frequent words follow in descending order of frequency as Table 5, pooling closely related words as shown:-

Table 5. Words most frequently used in *Laterality* titles.

# occurrences	Word(s)
155	Hand(ers)/Handed(ness)/Bi(manual)
93	Left/Right/Side
79	Laterality/Lateralised/Lateralisation/Bi(lateral)
76	Preference(s)/Preferred/Bias
60	Asymmetr(ies)y
52	Hemisphere(s)/(Inter)hemispheric
42	Children/Development(al)/Age
29	Visual/Eye
28	Cerebral/Brain
28	Performance/Skill
26	Differences/Advantage
19	Task(s)
15	Language
15	Processing
15	Study

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