

ASSESSING THE USEFULNESS OF BIBLIOMETRIC INDICATORS FOR THE HUMANITIES AND THE SOCIAL AND BEHAVIOURAL SCIENCES: A COMPARATIVE STUDY

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An evaluation was made of the use of bibliometric indicators for five disciplines in the humanities (social history, general linguistics, general literature, Dutch literature, and Dutch language) and three disciplines in the social and behavioural sciences (experimental psychology, anthropology, and public administration) in the Netherlands. Articles in journals were the predominant outlet in all disciplines. Monographs and popularizing articles were more important outlets in 'softer' fields than in 'harder' ones. The enlightenment function of scholarship was especially evident in Dutch literature and language, and public administration. Only some of the humanities disciplines are locally oriented. Although many publications were written in English, only experimental psychology, general linguistics, anthropology, and general literature were internationally oriented regarding output media. The impact of departments differed greatly both within and between disciplines. For all disciplines, bibliometric indicators are potentially useful for monitoring international impact, as expert interviews confirmed. Especially in Dutch language, Dutch literature and public administration, ISI-citation data are not very useful for monitoring national impact.

Introduction

Bibliometric indicators have mostly been studied in the natural and the life sciences (e. g., *Garfield*, 1979; *Moed, Burger, Frankfort, van Raan*, 1985; *Irvine and Martin*, 1985; *Cole and Cole*, 1973; *Nederhof and van Raan*, 1987). A relatively small number of studies has used bibliometric indicators to chart developments in the social sciences (e. g., *Nederhof*, 1985), while few studies have focused on the humanities (e. g., *Frost*, 1979; *Garfield*, 1980; *Heinzkill*, 1980).

Various modes of development have been proposed for the natural sciences, the social sciences, and the humanities. *Price* (1970) distinguished between the growth of knowledge from the 'skin' of science and from the 'body' of science: "the thinner the skin of science, the more crystalline the growth and the more rapid the process" (*Price*, 1970: 177). *Price* measured the growth of knowledge for a number of fields in a sample of 154 journals by computing the percentage of references which were

to literature published in the last five years (the Price Index). For physics and biochemistry, this percentage amounted to 60–70 percent, while social science journals ranged between 40 and 50%, and the humanities scored well below this (frequently around 10%).

However, *Price* failed to distinguish 'data source' citations, which occur when a work is used as a source of data (e. g., when a rhetorical analysis is made of a work of Cicero). Thus, *Cole* (1983) found that the mean age of data source citations in a sample of 50 articles in the humanities was 83 years, and that of other citations only 18 years. After taking this into account, however, the Price Index for Studies in English Literature still amounted to only 13%, and for the Publications of the Modern Language Association to 21%. The Price Index for psychological articles, however, was not statistically different from natural science articles. In general, *Cole* (1983) found little difference among the natural and social sciences at the research frontier, but large differences in the extent to which core knowledge accumulates.

A study by *Cozzens* suggests a reason for this latter difference. Case studies drawn from opiate receptor research and the field of sociology of science suggest that, while pharmacologists pay close attention to specific points of a work, the empirical evidence and quality of the data were not considered by sociologists of science (*Cozzens*, 1985). In the latter case, no contribution to the formation of core knowledge was made.

By means of co-citation analysis, *Small* and *Crane* (1979) compared processes of growth in the specialty of high energy physics with three disciplines in the social sciences: sociology, economy, and psychology. Within each of the social sciences, they observed closely interlinked clusters of publications, comparable to the highly interlinked clusters found in the specialty of high energy physics. These interlinked clusters represented, according to *Small* and *Crane*, "areas. . . organized around clearly defined research goals (which) exploit the implications of new ideas rapidly" (1979: 454). In economics, but not in sociology, books figured less prominently in the more highly interlinked and younger clusters (with regard to date of publication of cited documents) clusters than in the more peripheral and older clusters. *Broadus* (1971) found that books received about 60–70% of all citations in disciplines in the humanities like music, philology, and fine arts, 30–60% in various social sciences, and below 10% in some natural sciences. Thus, although processes of knowledge growth in the natural sciences and some of the social sciences may be comparable in some respects, the underlying processes of communication in the natural sciences, the social sciences, and the humanities are clearly not identical. In this paper, we shall study some of these processes in more detail.

One often neglected issue of scientific communication concerns the 'enlightenment' function of research: researchers in the humanities, but also social scientists, stress the importance of enlightening the non-scientific public, such as policymakers, as

well as the general public. One reason for the slower rate of knowledge growth in the humanities may be the larger amount of time devoted to enlightenment. We shall examine whether scholars in the humanities direct a larger part of their publications towards non-scientific audiences than social scientists. More specific hypotheses are discussed below.

Whereas bibliometric tools have proved their usefulness as monitors of developments in the natural and life sciences (e.g., *Moed et al.*, 1985), evidence on this point is almost completely lacking for the humanities and many social science disciplines. The present paper is a first attempt to both compare and evaluate the potential usefulness of bibliometric measures in these fields.

Assessment of 'scientific' output

While the written output of researchers in the natural and life sciences consists mainly of articles in journals, scholars in the social sciences and humanities are believed to communicate to a large extent by means of books (e.g., *Garfield*, 1983, 1985). Also, it is believed that these scholars direct their scholarly publications mainly to a local public, which in turn leads to a slower growth of knowledge. In order to investigate these two hypotheses, publications of Dutch scholars in the humanities and social sciences were classified with regard to three indicators: the language of the publication, the nationality of the medium of publication, and coverage of articles by ISI databases.

Each method yielded a different result. When, for instance, the language of publication is observed, the categorization is relatively simple: all publications in languages other than Dutch are international, as well as papers written in Dutch, but published in Belgium and former Dutch colonies. This method is useful for an assessed by the (inter)nationality of the output media: a paper published in an internationally current scholarly journal is probably more effective in reaching a nonlocal public than an unpublished paper. Also, papers published in national and international journals covered by ISI (and abstracted in *Current Contents*) may be more likely to reach international audiences. The latter two methods are more restrictive, as they rule out institute papers, written in a language other than Dutch, as international.

Method

For eight disciplines in the fields of the Humanities and the Social Sciences, the output of all departments of Dutch universities was categorized. In order to optimize the generalizability of the conclusions, disciplines were selected with relatively large contrasts in terms of both their object of study and their scholarly traditions. Three disciplines were chosen among the social sciences: the relatively 'soft' discipline of

Anthropology, the new discipline of Public Administration, and the 'hard' field of Experimental Psychology. The five disciplines selected in the humanities include Social History, a discipline on the borderline between the humanities and the social sciences, two specific language disciplines: Dutch Literature and Dutch Language, and two metalanguage disciplines: General Literature, and the relatively 'hard' General Linguistics.

In the selection of the departments, we applied explicit definitions of the disciplines (see *Appendix*), which did not always agree with the actual organization of departments. The comparability constraint sometimes resulted in combinations of departments, or in elimination of parts of departments from our research (e.g., when a department combined experimental psychology and educational psychology, the latter part was excluded from study).

Output was assessed mainly by using the annual reports of the Dutch universities in a six-year period, from 1980–1985. Although these reports contain numerous inaccuracies, nevertheless, at present there is no better database available for output assessment. Bibliographies and Citation Indexes were used as a check on the Annual Reports. The output was categorized and quantified according to the following scheme. First, on the most global level, the distinction made in the annual reports between scientific and popularizing publications has been observed. This implies that we used the qualifications made by departments.

The main categories for the scientific publications were: articles in scientific journals, books, contributions to edited books, dissertations, internal publications. For the popularizing publications, the main categories were: (book) reviews in scientific journals, articles in popularizing journals, articles in newspapers, and contributions to (popularizing) books.

To validate the results, individual interviews with twelve experts from the eight disciplines were conducted, and two workshops (one for the social sciences and one for the humanities) were held, in each of which 8–10 full professors participated.

Results

The first part of the study consists of a longitudinal assessment of the output of all Dutch departments in these fields in the years 1980–1985 (see Table 1).

Contrary to general beliefs, for all disciplines, articles in scholarly journals are the most important single outlet. This category covered from 35% of the output of General Linguistics departments to 57% of the output of Dutch Language departments. The share of monographs as a means of publication differs widely: between 9% for General Literature and 0.8% for Experimental Psychology. Both relatively 'hard' disciplines, General Linguistics (1.6%) and Experimental Psychology (0.8%), seldom use monographs as outlets, while 'soft' disciplines like anthropology, social history,,

Table 1
 Distribution of six modes of scientific publication in eight fields in
 percentages of total production of titles

Field	Journal articles	Books	Edited books	Book chapters	Reports	Proceedings
Anthropology	48	5	2	31	—	2
Exp. Psychology	40	1	2	27	12	13
Social History	45	8	4	28	0.7	6
Dutch Literature	43	5	2	24	—	3
Dutch Language	57	3	1	21	—	6
Gen. Literature	43	9	4	26	—	5
Gen. Linguistics	35	2	4	34	—	10
Public Administr.	37	7	1	28	—	7

general literature, and Dutch Literature show higher percentages of monographs. One explanation for the low share of books in the output of Dutch Language departments might be the availability of a number of 'local' (university) journals, which may stimulate the production of journal articles; as Table 1 shows, journals have a comparatively large share in the output of Dutch Language departments (57%).

Edited books are less common than monographs in the 'softer' disciplines, while they are more common than monographs in the harder disciplines. The disciplines show less variation, however, with regard to edited books, which represent 1–4% of the total output. Not surprisingly, then (although different volumes may be involved), differences among the eight disciplines are relatively small with regard to the number of chapters published in edited books (21–34%). It is interesting to note the relatively high percentage of so-called 'grey' publications (reports and proceedings) in Experimental Psychology: more than 25%, whereas the average for all other disciplines is only 7%. Again, General Linguistics departments resemble the Experimental Psychology departments most closely.

Although journal articles are the most important single outlet, publications in books are also important for all of the eight disciplines studied. For citation studies, this implies that not only citations to journal articles should be included, but also those to books and chapters in edited volumes. In this respect, the social and behavioural sciences and the humanities seem to differ from the natural and life sciences.

'Scholarly' vs. 'enlightenment' publications

We focused on three departments per field for the detailed study: one small, one medium-sized, and one relatively large department. A distinction between 'scientific' and 'enlightenment' publications was observed. The category of enlightenment publications includes:

- (1) Popularizing articles
 - (a) in popular magazines and newspapers
 - (b) in encyclopaedias
- (2) Reviews in popular magazines
- (3) Popularizing books
 - (a) books
 - (b) edited books
 - (c) contributions to edited books
- (4) Other modes of popularizing publications.

In addition, although a wide audience is not always reached, external reports of mission-oriented research can also be subsumed under enlightenment, as these are not primarily directed at a scientific audience.

In General Linguistics and Experimental Psychology, only between 3% and 12% of the produced titles were dedicated to enlightenment, whereas Dutch Literature departments dedicated 30%–43% of their production to this end, and public administration departments 25–33% (see Table 2). In the four other disciplines, large

Table 2
Percentage of total production of enlightenment-oriented titles

Discipline	Popularizing publications	Popularizing publications and external reports
Exp. Psychology	3.2%–10.4%	9.0%–12.0%
Anthropology	11.1%–23.2%	11.6%–26.9%
Public Administr.	5.7%–32.6%	24.9%–32.6%
General Linguistics	4.5%–8.5%	4.5%–8.5%
General Literature	10.0%–20.7%	10.0%–20.7%
Social History	3.1%–35.0%	3.1%–35.0%
Dutch Language	9.1%–29.6%	9.1%–29.6%
Dutch Literature	29.5%–43.0%	29.5%–43.0%

variations were apparent: more than 30% of the production of some departments is written for a nonscholarly audience, while this figure amounts to only 3% in other departments. Although there are clearly important differences among disciplines, the differences within 4 out of 8 disciplines are also large. It is apparent that, contrary to general belief, variations in the production of titles for a nonscientific audience among disciplines and departments in the humanities are significant. While some departments in the humanities were more dedicated to enlightenment than any of the departments in the social sciences, other departments in the humanities were less dedicated to enlightenment than any of the departments in the social sciences.

Language and medium of publication

A distinction was made between national and international publications, with focuses on language and medium of publication as indicators of the national/international orientation of the disciplines (see Table 3).

When the nationality of the medium of publication is examined, only experimental psychology is predominantly internationally oriented, while general literature and

Table 3
Percentages of national and international scholarly publications in journals and books

Discipline	Medium		Language
	Int.	Nat.	Dutch
Exp. Psychology	53%	47%	40%
Anthropology	48%	52%	50%
Public Administr.	8%	92%	88%
General Literature	48%	52%	52%
General Linguistics	26%	74%	44%
Social History	19%	81%	75%
Dutch Language	5%	95%	77%
Dutch Literature	5%	95%	95%

anthropology are almost as much internationally as nationally oriented. On this criterion, Public Administration, Dutch Language, Dutch Literature, and to a lesser extent social history, are almost exclusively nationally oriented.

For some disciplines, considerable changes can be noted when, instead of the nationality of the medium of publication, the language of the publication (i.e., Dutch and non-Dutch) is taken as a criterion of local orientation. While General Linguistics appears locally oriented when the former criterion is used (74% of publications occur in Dutch media), its nonlocal orientation becomes evident when the latter criterion rules: only 44% of the publications are in Dutch, and nearly 56% is in English. While Dutch Language is 95% locally oriented according to the medium of publication, this percentage decreases to 77% when language is taken into account. For social history, the change is somewhat smaller, from 81% local orientation (medium) to 75% (language), while in experimental psychology the change is from 47% to 40%. This shows the difference a definition can make. Although General Linguistics and, to a much smaller extent, parts of Dutch Language are internationally oriented, this orientation does not seem to translate into medium of publication. The effects on the impact of this work will be studied more closely in the citation counts.

A third and the weakest criterion for (non)locality of orientation is provided by the degree of coverage in ISI databases (*A&HCI*, *SSCI* and *SCI*) of articles published by Dutch scholars in the various disciplines (see Table 4). The ISI claims to cover the most important scientific and scholarly journals in all disciplines. However, it

Table 4
Percentages of articles covered by
ISI-journals

Field	Percentage
Experimental Psychology	62%
General Literature	39%
General Linguistics	21%
Anthropology	15%
Dutch Literature	13%
Dutch Language	10%
Social History	10%
Public Administration	2%

is well known that the ISI databases are characterized by a heavy Anglosaxon bias in coverage.

Even though ISI coverage of Dutch journals is limited (even though it includes *Maatstaf*, a nonscholarly literary journal), with a strong preference for English-language Dutch journals, the conclusions drawn from both other indicators of local orientation are largely supported. The coverage of especially experimental psychology, and, to a lesser extent, general literature is quite thorough. Articles by Dutch researchers in public administration, however, are very poorly covered, with only 2%.

The four disciplines with the respectively the highest and lowest percentages of publications in languages other than Dutch are also among the four disciplines with respectively the highest and lowest ISI coverage. The ISI coverage of the three social sciences is much more variable (2%–62% than that of the humanities (10%–39%). The high coverage of experimental psychology (62%) may be due at least partly to its relatively ‘hard’, natural science flavored character, and to its strong nonlocal orientation. The low coverage of public administration can be traced back largely to its strong local orientation, its recent establishment as a discipline in the Netherlands, and, as we learned from scholars in the field, its emphasis on education rather than scholarship.

It can be concluded that experimental psychology has a clear non-local orientation, while Public Administration and Dutch Literature are predominantly locally oriented.

General Linguistics, General Literature, and Anthropology are about fifty-fifty locally oriented, while Dutch Language and Social History are more locally than nonlocally oriented.

Impact scores, departments, modes of publication, and fields compared

To assess the feasibility of monitoring the impact of Dutch departments citations in the Arts and Humanities Citation Index (*A&HCI*), and the *Social Science Citation Index (SSCI)* were counted for the years 1980–1984. The short-term impact was computed by counting for each department the citations in the *A&HCI*, the *SSCI* or the *SCI* (excluding doubles) to one year's output in that same year and the two subsequent years. To increase reliability, we merged two subsequent publication years into one two-year publication block. For example, we counted citations to 1980 output in the years 1980, 1981 and 1982, and the citations to 1981 output in the years 1981, 1982, 1983; then we added the results and divided them by the number of (scientific) publications in 1980 and 1981.

The low coverage by ISI of the output of some disciplines may pose a serious limitation to our approach (see Table 4). This means that only a small percentage of all citations to an article is recorded in the citation indexes. For example, all citations in the Dutch journal *Spektator* (an important outlet for all literature and language departments) are not present in the *A&HCI*, simply because *Spektator* is not covered by ISI. As articles are often cited most frequently by other articles in the same journal, it can be expected that few citations to articles in Public Administration will be found, whereas articles in Experimental Psychology will show a considerably higher ISI impact. These effects will be dampened, however, by the fact that highly cited journals (which are more likely to be covered by ISI) have generally higher journal self-citation scores than less cited journals (which are less likely to be covered by ISI). Table 5 offers the empirical results.

As was expected, most of the General Linguistics, Experimental Psychology, General Literature, and Anthropology departments score relatively high (≥ 0.3) and one of the Social History departments intermediately, whereas Dutch Language, Dutch Literature and Public Administration departments have almost no international impact (the few citations we counted were almost all in Dutch journals). One partial explanation might be the following: because almost every publication in for instance Dutch Literature is written in Dutch, it does not stand much chance of becoming cited; not by non-Dutch scholars, because they are unable to read Dutch, and perhaps for this same reason not by Dutch scholars in international (ISI) journals:

Table 5
Average short-term impact of 1980–1984 publications in journals and
books for 17 departments

Discipline	Department	Articles	Publications in books
Dutch Literature	1	0.0	0.42
	2	0.21	0.07
Dutch Language	3	0.03	0.03
	4	0.06	0.06
General Linguistics	5	0.56	0.45
	6	0.13	0.44
General Literature	7	0.43	0.46
	8	0.35	0.76
Social History	9	0.27	0.35
	10	0.12	0.45
Public Administr.	11	0.0	0.0
	12	0.02	0.11
Anthropology	13	0.89	0.32
	14	0.16	0.15
Experimental Psychology	15a	0.48	1.57
	15b	0.40	0.63
	16	0.20	0.0
	17a	0.15	0.06
	17b	0.77	0.06

a: Psychology section.

b: Psychophysiology section.

it is not very useful and informative for an international audience to be referred to a publication written in Dutch.

However, this does not necessarily mean that these publications are not useful; their use is perhaps more of a local nature, and should therefore be assessed by citations counts in important Dutch journals. These findings suggest that the international orientation of part of the Dutch Language discipline observed in section 1.2 does not translate into international impact.

In contrast to general expectations, these tables show that not all research in the humanities has only a local impact; several departments have a relatively high impact. The impact of journal articles in these departments is even higher than those of some of the experimental psychology departments, although some of the few books and book contributions in the latter field have a much higher short-term impact than in the former fields. The data clearly support the gathering of citation data of both journal and book publications: whereas 7 of the 19 departments or sections average better than 0.3 in terms of the impact of journal articles, the impact of book publi-

cations exceeds 0.3 in 10 cases. Interviews, both with individual scientists and with groups of 8–10 full professors, confirm that disciplines characterized by low impact scores produce publications which are not often used by foreign researchers.

Conclusions

These results have shown some of the processes of scholarly communication and knowledge growth in eight disciplines in the social sciences and the humanities. Contrary to general beliefs, scholarly articles in journals were the predominant outlet for published scholarly communication in all these disciplines. Nevertheless, books are an important medium of publication in all of the eight disciplines, and seem more important quantitatively than in the natural sciences (cf. *Nederhof*, in press). The importance of books as a publication medium was less evident in this study than in previous (generally considerably older) studies. One explanation for this finding is that publication habits in the social sciences and the humanities are becoming more similar to those of the natural sciences over time. It is also possible, however, that differences among the disciplines or the countries studied have given rise to these results. At present, a study is being undertaken which takes into account the differences among countries. With regard to disciplines, we found that monographs and popularizing articles were more important outlets in 'softer' fields than in 'harder' ones. The enlightenment function of scholarship was especially evident in Dutch Literature, Dutch Language, and Public Administration.

Contrary to popular beliefs about the humanities, only some of the humanities disciplines are locally oriented. Many publications in all disciplines were written in English, although only Experimental Psychology, General Linguistics, Anthropology, and General Literature were internationally oriented regarding output media. Apparently, what influences the impact of a publication is not the language of the publication, but the national or international signature of the medium of publication. Articles published in English in Dutch journals were usually cited infrequently.

The results suggest that a differentiated approach is called for concerning the use of bibliometric indicators. With regard to scholarly performance, it was found that some humanities fields more closely resemble some fields in the social sciences than other fields within the humanities. The impact of departments differed greatly both within and between disciplines. For all fields, bibliometric indicators were potentially useful for monitoring international impact, as expert interviews confirmed. Especially in Public Administration, Dutch Language, and Dutch Literature, however, ISI citation data are not of much use in monitoring the national impact of Dutch scholars,

because of the low coverage of national journals. More extensive research, both of a qualitative and a quantitative nature, especially at lower levels of aggregation, should be conducted in order to examine these matters more closely.

Appendix

Definition of the fields

Anthropology. A distinction has been made between Comparative Sociology and Cultural Anthropology; only departments in the latter field were taken into account.

Experimental Psychology. At several universities, Experimental Psychology forms a department together with (psycho)physiology, a discipline that differs from experimental psychology on important points, and that, depending on the emphasis, is closer to the natural or the life sciences.

Social History. It was not possible to separate social history from economic history, so the field was defined as social economic history. Departments in this field were found not only in the Faculties of Literary studies, but also in those of Economic and Social Sciences.

Public Administration. This discipline has only recently been established in the Netherlands, and blends parts of law, political sciences, sociology, and economics.

Dutch Language and Literature, General Linguistics and General Literature. These four disciplines can be divided along two axes: (1) linguistic/literary and (2) language specific/language independent. For Dutch literature, several separate units have been combined (Medieval Dutch, Renaissance Dutch, and Modern Dutch Literature), which yielded relatively big departments. General Linguistics had in some cases to be separated from Applied Linguistics and Phonetics (probably the most 'scientific' of the humanities), because these fields have separate journal packets and different publication habits.

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