

## Books or articles: which are more important in the scientific evaluation of different disciplines?

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The question of whether books or articles are more important in the scientific evaluation of different disciplines is quite an old problem. At present, we all recognize the view that the relative importance of these two kinds of publications should be separately identified according to the different characteristics of various disciplines. For example, in the natural sciences and engineering<sup>1</sup>, research articles are far more important and popular than academic monographs, whereas in the social sciences and humanities<sup>2</sup>, academic monographs are treated as having the same, or even more, importance, than research articles. However, in my opinion, this general view should be refined through quantitative and comparative analysis at the disciplinary level.

Thomson Reuters' *Web of Science* (*WoS*) is one of the main databases for research literature. In this database, documents are divided into various types, such as article, proceedings paper, meeting abstract, editorial material, book review, etc. Here, we consider that the ratio of the number of book reviews to that of the articles in a specific discipline is proportional to the relative importance of academic monographs relative to research articles in the discipline. This is because, only if academic monographs are important, people are willing to review them and journals are willing to publish the book reviews.

In this note, we analyse the number of book reviews (NB), number of articles (NA), and ratio of NB to NA (BA) in specific disciplines in the *WoS*. Table 1

shows the values of NB, NA and BA in various disciplines according to the research areas in the *WoS* database. The time span is 2000–2015, and the retrieval date is 10 July 2015.

Table 1 lists 153 disciplines. According to the principle of what is both reasonable and convenient, we can set two thresholds of the BA value: 0.1 and 0.001. We can then divide the disciplines into three categories.

The first category is the social sciences (in its broad sense, including the humanities), which includes 38 disciplines whose BA values are all greater than 0.1. For these disciplines, academic monographs are quite important relative to research articles, if not more important. However, it should be noted that at least one of these subjects, i.e. information

**Table 1.** Number of books (NB), number of articles (NA) and ratio of NB to NA values of 153 research areas in *WoS*

Research areas	NB	NA	BA
History	223,954	78,643	2.8477
Arts humanities other topics	139,788	55,831	2.5038
Classics	25,652	10,490	2.4454
Religion	77,245	36,463	2.1184
Information Science Library Science	88,385	44,188	2.0002
Asian studies	21,243	13,021	1.6314
Area studies	35,435	22,951	1.5439
Literature	159,061	125,974	1.2626
History Philosophy of Science	23,529	23,158	1.0160
Theater	7,510	9,484	0.7919
Ethnic studies	4,872	6,531	0.7460
Linguistics	42,743	61,379	0.6964
Music	17,911	25,824	0.6936
Philosophy	39,650	59,879	0.6622
Anthropology	24,456	38,216	0.6399
Sociology	35,147	57,692	0.6092
International relations	21,368	36,830	0.5802
Film radio television	6,936	13,172	0.5266
Archaeology	12,382	23,519	0.5265
Art	17,252	36,498	0.4727
Women's studies	8,348	18,001	0.4638
Government law	57,089	125,670	0.4543
Geography	13,793	36,139	0.3817
Communication	10,454	28,974	0.3608
Social issues	7,192	20,140	0.3571
Social sciences other topics	31,439	98,371	0.3196
Public administration	14,266	46,104	0.3094
Demography	3,085	10,337	0.2984

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Research areas	NB	NA	BA
Cultural studies	2,806	9,620	0.2917
Urban studies	5,993	21,063	0.2845
Social work	6,405	22,677	0.2824
Architecture	6,857	27,280	0.2513
Dance	1,181	5,544	0.2130
Criminology penology	3,443	20,754	0.1659
Education educational research	19,589	143,740	0.1633
Biomedical social sciences	3,956	30,663	0.1290
Business economics	43,978	350,355	0.1255
Family studies	2,941	23,722	0.1240
Medical ethics	707	8,498	0.0832
Psychiatry	15,684	192,115	0.0816
Psychology	31,203	397,939	0.0784
Health care sciences services	7,153	105,251	0.0680
Mathematical methods in social sciences	1,426	26,036	0.0548
Nursing	3,523	65,816	0.0535
Geriatrics gerontology	2,554	57,933	0.0441
Rehabilitation	2,807	74,591	0.0376
Substance abuse	1,155	36,311	0.0318
Public environmental occupational health	7,921	266,939	0.0297
Environmental sciences ecology	12,205	594,630	0.0205
Physical geography	998	49,920	0.0200
Legal medicine	255	18,995	0.0134
Audiology speech language pathology	302	26,140	0.0116
Operations research management science	924	91,070	0.0101
Life sciences biomedicine other topics	1,147	114,347	0.0100
Behavioral sciences	689	68,917	0.0100
Science technology other topics	5,440	560,406	0.0097
Transportation	400	47,133	0.0085
Pediatrics	1,436	175,621	0.0083
Evolutionary biology	544	67,306	0.0081
Agriculture	2,177	360,603	0.0060
Sport sciences	561	93,506	0.0060
Computer science	3,099	569,338	0.0054
Obstetrics gynecology	347	133,509	0.0026
Paleontology	76	31,163	0.0024
Mathematics	1,523	657,899	0.0023
Neurosciences neurology	1,375	637,773	0.0022
Geology	537	251,639	0.0021
Mycology	34	24,128	0.0014
Veterinary sciences	250	189,117	0.0013
Spectroscopy	143	113,595	0.0013
Energy fuels	234	196,211	0.0012
Engineering	1,609	1,630,661	0.0010
Oncology	310	362,874	0.0009
General internal medicine	251	290,354	0.0009
Nuclear science technology	117	128,757	0.0009
Respiratory system	96	102,048	0.0009
Telecommunications	114	140,868	0.0008
Otorhinolaryngology	44	67,175	0.0007
Genetics heredity	151	238,254	0.0006
Radiology nuclear medicine medical imaging	120	222,679	0.0005
Zoology	76	157,497	0.0005
Emergency medicine	17	34,334	0.0005
Physiology	54	143,309	0.0004
Fisheries	23	63,038	0.0004
Medical informatics	10	27,121	0.0004
Plant sciences	63	246,586	0.0003
Marine freshwater biology	49	148,358	0.0003
Meteorology atmospheric sciences	36	133,249	0.0003
Orthopedics	30	119,907	0.0003
Pathology	30	97,890	0.0003

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Research areas	NB	NA	BA
Mathematical computational biology	21	61,624	0.0003
Entomology	22	76,328	0.0003
Acoustics	20	57,771	0.0003
Biodiversity conservation	16	46,826	0.0003
Biotechnology applied microbiology	45	297,236	0.0002
Water resources	32	130,015	0.0002
Infectious diseases	31	145,735	0.0002
Mineralogy	5	29,902	0.0002
Anatomy morphology	4	23,756	0.0002
Chemistry	223	1,819,953	0.0001
Physics	149	1,738,393	0.0001
Surgery	31	405,662	0.0001
Food science technology	30	224,825	0.0001
Pharmacology pharmacy	29	475,924	0.0001
Astronomy astrophysics	26	232,735	0.0001
Urology nephrology	18	129,854	0.0001
Crystallography	17	123,338	0.0001
Gastroenterology hepatology	14	140,645	0.0001
Nutrition dietetics	12	109,233	0.0001
Geochemistry geophysics	10	113,331	0.0001
Oceanography	9	76,548	0.0001
Anesthesiology	7	52,135	0.0001
Dermatology	7	80,742	0.0001
Forestry	6	54,959	0.0001
Remote sensing	5	33,886	0.0001
Developmental biology	3	55,455	0.0001
Imaging science photographic technology	2	37,140	0.0001
Medical laboratory technology	2	37,867	0.0001
Microscopy	1	14,263	0.0001
Materials science	16	1,059,556	0.0000
Biochemistry molecular biology	13	843,847	0.0000
Cardiovascular system cardiology	9	311,168	0.0000
Research experimental medicine	9	188,567	0.0000
Mechanics	8	205,553	0.0000
Hematology	7	133,906	0.0000
Biophysics	4	169,048	0.0000
Endocrinology metabolism	4	197,899	0.0000
Polymer science	3	222,629	0.0000
Toxicology	3	123,949	0.0000
Cell biology	2	308,755	0.0000
Construction building technology	2	57,555	0.0000
Dentistry oral surgery medicine	2	98,811	0.0000
Ophthalmology	2	106,905	0.0000
Thermodynamics	2	89,788	0.0000
Transplantation	2	67,508	0.0000
Instruments instrumentation	1	162,937	0.0000
Integrative complementary medicine	1	25,128	0.0000
Microbiology	1	234,612	0.0000
Mining mineral processing	1	31,241	0.0000
Parasitology	1	55,002	0.0000
Tropical medicine	1	33,319	0.0000
Optics	0	287,228	0.0000
Immunology	0	272,722	0.0000
Metallurgy metallurgical engineering	0	207,557	0.0000
Electrochemistry	0	132,740	0.0000
Ophthalmology	0	106,905	0.0000
Automation control systems	0	86,928	0.0000
Virology	0	81,572	0.0000
Rheumatology	0	51,242	0.0000
Allergy	0	26,964	0.0000
Integrative complementary medicine	0	25,128	0.0000
Anatomy morphology	0	23,756	0.0000
Robotics	0	17,533	0.0000

and library science, is misplaced, since many book reviews published in the journals of this discipline actually review books from other research areas. This reflects the necessity of a combination of quantitative and qualitative analysis.

In my view, we can even take 1 as the boundary and then subdivide the 38 subjects into two sub-categories. Humanities are the fields whose BA values are greater than 1, while social sciences (in the narrow sense) are those whose BA values are less than 1. It should be pointed out that although the position of philosophy here is not necessarily appropriate, modern philosophy, which is strongly based on logic, is actually quite different from traditional metaphysics as an area within the humanities.

The second category is the soft sciences (or more appropriately, softer sciences), which includes 34 disciplines whose BA values are all less than 0.1 but greater than 0.001. For these disciplines, research articles play a more important role, but academic monographs still have a certain position in academic evaluations. At the end of the larger BA values of these 34 disciplines, there are some social sciences, but with strong characteristics of intermediate disciplines, such as medical ethics and psychology. While

at the other end, with smaller values, there are some comprehensive research areas, such as engineering, and energy and fuels research. Some methodological disciplines, such as mathematics, are also among them.

The third category is the hard sciences (or more appropriately, harder sciences), which includes 81 disciplines whose BA values are all less than 0.001. The function of academic monographs in these 81 subjects, compared to that of research articles, seems negligible. Because the research paradigm of hard science disciplines is unified and clear, and these disciplines include medical and technical expertise, especially in the part of the table that lists disciplines with the smallest BA values are some of the most typical natural sciences, such as physics and chemistry. The main carrier of the results of scientific research and innovation in these disciplines is the research article, and the academic monograph that interprets and summarizes the ideas of many articles usually does not provide new knowledge.

Finally, it should be emphasized that the aim of this study is not to perform a classification of human knowledge, but only to explore a specific bibliometric issue, namely whether books or articles

are more important in the scientific evaluation of different disciplines. The division of disciplines (humanities, social sciences, soft sciences and hard sciences) based on BA values is intended just for the specific issue discussed in this note, and it is based on the principle of what is both reasonable and convenient, not necessarily with universal significance.

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1. Narin, F., *Evaluative Bibliometrics: The Use of Publication and Citation Analysis in the Evaluation of Scientific Activity*, Computer Horizons, Washington, D.C., 1976.
  2. Williams, P., Stevenson I., Nicholas, D., Watkinson, A. and Rowlands, I., *Aslib Proc.*, 2009, **61**(1), 67–82.

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