

# Citation pattern of newsworthy research articles

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## ABSTRACT

Popular science magazines cover research articles published in scholarly journals that the magazines perceive as having news value. Despite thousands of research articles being published in research journals, a very few get identified for coverage in popular science magazines, general magazines, and newspapers. Do research articles published in journals that are covered in popular science magazines receive higher citations? We hypothesize that newsworthy articles should receive higher citations as the newsworthiness can be a reflection of higher research value of the articles and also because of the visibility received by the articles owing to its coverage in popular science magazine. To empirically study the citedness, we identified 193 research articles and that were reported in New Scientist magazine in 2001. The characteristics of these articles including the citations received following coverage in New Scientist in 2001 were looked at. It was found that average citations per paper of articles covered in New Scientist was higher than the journal average for the year 2001 for 19 out of the 24 journals identified here.

**Keywords:** Blog, citation, citedness, magazine, media, newsworthy

## INTRODUCTION

Although the coverage of science in the lay press is dismal, major scientific breakthroughs do attract the attention of popular media including print and electronic media. In addition to the general newspapers, science magazines such as New Scientist, Discover, etc., cover recent scientific research published in leading research journals such as Science, Nature, Cell, and many others. The reporting of research articles in the popular science media helps not only the general readers, but also scientists in other areas of research to be aware of the latest research activities in a given area. However, the basis on which the newspapers and general science magazines identify research papers

published in scholarly journals to be reported upon is not known. However, one can be certain that the popular science magazines select research papers that on its perceived news value. As for coverage of science news in mainstream science media, Petersen<sup>[1]</sup> states that “articles appearing in mass-circulation science journals such as Nature, Science, New Scientist, Scientific American, and Science News, which provide the source for many stories in the mainstream news media, have been found to draw extensively on popular imagery and metaphors, and to contain gender and heterosexist biases.”

In the realm of scientific research, citations have been an indicator to assess the value of a research paper.<sup>[2]</sup> The time taken for a research paper to gather citations also depend on several factors including the field of research, novelty of the research,<sup>[3]</sup> type of research,<sup>[4]</sup> collaborations,<sup>[5]</sup> etc., It is seen that many papers that are published even in high impact journals never get a citation or may get citations after a several years of actual publication or may get some quick citations that may taper off in a few years.<sup>[6,7]</sup>

It is will be useful to look at the citedness of the research papers that have been covered by news magazines. This study looks at the citations received by those articles that

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have been covered by New Scientist magazine during the year 2001.

## REVIEW OF LITERATURE

In 2010, Moriarty, Jensen and Stryker analyzed the content of 3,656 cancer stories that appeared in media and found that the most frequently cited sources in cancer news articles—research institutions and medical journals receive disproportionately more attention compared to other sources.<sup>[8]</sup> The study shows that journal articles are an important source of information for the popular media that report science news.

“Does popular coverage of medical research in turn amplify the effects of that research on the scientific community?” Phillips *et al.* in attempting to answer the question compared the number of references in Science Citation Index to articles in the New England Journal of Medicine (NEJM) that were covered by The New York Times with the number of references to similar articles that were not covered by the Times.<sup>[9]</sup> The authors found that articles in NEJM that were covered by the Times received a disproportionate number of scientific citations in each of the 10 years after the NEJM articles appeared. The study concluded that coverage of medical research in the popular press amplifies the transmission of medical information from the scientific literature to the research community. Kiernan’s study also found similar results.<sup>[10]</sup>

The impact on research articles following its discussion on Technology, Entertainment, and Design (TED) was discussed by Sugimoto and Thelwall. The results of the study suggested that discussions on TED does not impact the academic realm as it does the public sphere.<sup>[11]</sup> Likewise, Haustein *et al.* study on the impact on tweeting of scholarly articles show low correlations between tweets and citations.<sup>[12]</sup>

Shema and Bar-Illan found that articles that have been blogged about receive higher journal citations later than the articles that have been published in the same journal in the same year and haven’t received blog citations. Based on the results of their study, the authors suggested that blog citations can be used as an alternative metric source.<sup>[13]</sup> Fanelli highlighted that citation advantage of research covered by mass media as being poorly studied and reported that compared to research not appearing in newspapers, those featured in British newspapers had around 63% more citations.<sup>[14]</sup>

As can be noted from the foregoing, the studies on popular coverage of research articles and its impact on citedness are negligible. Even among the studies that have been carried out, the basis of identifying research articles for coverage are varied and approaches that have been adopted to study the relationship are different. This study introduces a new approach by selecting a set of articles that were covered by New Scientist in 2001.

## Objectives of the Study

- To identify the kinds of research papers selected as news-worthy article
- To study the citation pattern of news-worthy articles.

## METHODOLOGY

To assess how newsworthy articles are cited in subsequent years, we looked through all the issues of New Scientist belonging to the year 2001. Articles in New Scientist that were based on research articles published in journals were studied. Being news items, the brief write-ups do not have references and give limited information about the research paper under discussion. It was found that typically, a news item includes the name of the researcher, the institution, and the journal name. The exact title of the research paper, names of co-authors, volume number, issue number, page number, etc., of the original article are not given in the write-up. For the year 2001, we found that New Scientist published 244 news items about research papers published in different journals. Based on the information contained in these news items, we searched the Web of Science to locate the source items and could locate 193 papers in Web of Science. For the remaining 51 news items, as complete information was not available we could not retrieve the exact records from Web of Science. The complete details of each of the 193 papers along with the citations data 2001–2013 were gathered for analysis using MS-Excel.

## Analysis

It was found that out of the 193 news items appearing in New Scientist in the year 2001, all but five news items were based on research papers published in the same year. Five news items were based on research papers published in journals in 2000. The 193 research papers were published in 85 journals. It was found that 59 papers (31%) were from the two iconic multi-disciplinary journals Nature and Science. About 27% (53 papers) belonged to 12 other

journals from where three or more articles were covered and remaining 42% (81 papers) were from 71 journals.

Table 1 gives the number of papers, the citation records, and average citations per paper (ACPP) of newsworthy papers. Furthermore, given in the table are the total number of papers published by these journals during the reference year 2001, citations, and ACPP. We have limited the table to 24 journals that had two or more news items in New Scientist.

To assess the ACPP received by papers covered by New Scientist, we also looked at the ACCP of all the articles published in the source journal during the year. We found the ACPP of the articles that were reported in New Scientist is higher than the journal average for 19 out of the 24 journals.

### Papers by Subject

Subject-wise analysis in Table 2 shows that 114 papers out of the 193 papers are from biology (59%) followed by seven other disciplines including physics, medicine, geology, engineering,

chemistry, environmental science, and psychology constituting the remaining 41%. However, if we were to look at the average citations, two papers in engineering have yielded more citations on an average, followed by chemistry, medicine, and then biology. The papers in geology, psychology, and environmental science have <100 citations per paper. It is interesting to see that New Scientist has covered more papers in biological science (59%) and remaining 41% papers belong to seven disciplines.

### Citations Received

The break-up of citations received is shown in Table 3. It is seen that one paper has received more than 5000 citations whereas 3 papers have received more than 1000 citations, but <5000 citations. In all, 73 papers (38%) have received more than 100 citations. Nineteen papers have received <10 citations.

### CONCLUSION

Popular and news media such as science magazines play a very important role in the diffusing news about research that has been reported in scholarly journals. Selection of a

**Table 1: Citation pattern of newsworthy papers**

Journals	New scientist			Source journal		
	Papers	Citations	ACPP	Papers	Citations	ACPP
Nature	38	7602	200.05	2828	358,472	126.75
Science	21	10,085	480.24	2730	322,771	118.23
British Medical Journal	7	1198	171.14	3087	44,576	14.44
Geophysical Research Letters	7	304	43.43	1185	35,623	30.06
Behavioral Ecology and Sociobiology	6	390	65.00	139	5304	38.16
Proceedings of the Royal Society B-Biological Sciences	5	342	68.40	372	21,123	56.78
Biological Psychiatry	4	223	55.75	865	20,345	23.52
Cell	4	2973	743.25	368	88,827	241.38
Physical Review Letters	4	1008	252.00	3164	211,444	66.83
Proceedings of the National Academy of Sciences of the United States of America	4	331	82.75	2811	317,549	112.97
Applied Animal Behavior Science	3	68	22.67	123	2860	23.25
Geology	3	203	67.67	313	16,035	51.23
Hormones and Behavior	3	217	72.33	92	3821	41.53
Journal of Experimental Biology	3	71	23.67	410	13,025	31.77
Behavioral Ecology	2	106	53.00	113	4184	37.02
Environmental Science and Technology	2	257	128.50	929	40,265	43.34
Genome Research	2	124	62.00	243	20,127	82.83
Journal of Agricultural and Food Chemistry	2	108	54.00	983	40,631	41.33
Journal of the American Academy of Dermatology	2	39	19.50	503	11,825	23.51
Nature Biotechnology	2	312	156.00	374	29,990	80.19
Nature Genetics	2	716	358.00	331	59,811	180.69
Nature Medicine	2	421	210.50	522	50,840	97.39
Nature Neuroscience	2	445	222.50	282	34,561	122.56
Neurology	2	229	114.50	2517	56,671	22.51

ACPP=Average citations per paper

**Table 2: Subject areas of newsworthy papers**

Subject	Total paper	Total citation	Average citation
Biology	114	14,350	125.87
Physics	26	9828	378
General and Internal Medicine	20	2785	139.25
Geology	17	1496	88
Environmental sciences	7	600	85.71
Psychology	5	483	96.6
Engineering	2	1120	560
Chemistry	2	857	428.5
Total	193	31,519	

**Table 3: Citations break-up of newsworthy papers**

Number of citation	Number of papers
>5000	1
1001-5000	3
501-1000	7
101-500	62
51-100	40
11-50	61
0-10	19
Total	193

very few articles from hundreds of articles published every week is based on the perceived news value of the identified articles. It is seen from this study that the majority of the select articles that get covered in popular science magazines do get higher citations. Further, the number of journals from where articles are taken for coverage is very limited with Nature and Science being the most preferred journals.

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