

# The Agony and the Ecstasy— The History and Meaning of the Journal Impact Factor

Presented by

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I had considered as an alternative title for my talk “Citation Sanity and Insanity -- the Obsession and Paranoia of Citations and Impact Factors.” Others might have preferred “Uses and Abuses of Impact Factors.”

### **Origins of the Impact Factor**

I first mentioned the idea of an impact factor in *Science* magazine in 1955.<sup>1</sup> That paper is considered the primordial reference for the concept of the *Science Citation Index*. Five years later, we began the experimental *Genetics Citation Index* project which led to the publication of the 1961 *Science Citation Index*. In 1955, it did not occur to me that “impact” would one day become so controversial. Like nuclear energy, the impact factor is a mixed blessing. I expected it to be used constructively while recognizing that in the wrong hands it might be abused. Since *Current Contents*, no less *SCI*, did not exist, it would have been precocious indeed to contemplate the influence of the nascent impact factor.

In the early 1960s, Irving H. Sher and I created the journal impact factor to help select journals for the new *Science Citation Index (SCI)*. To do this we simply re-sorted the author citation index into the journal citation index. From this simple exercise, we learned that initially a core group of large and highly cited journals needed to be covered in the new *SCI*.

## SLIDE 1: TOP JOURNALS SORTED BY ARTICLES PUBLISHED IN 2004

### TOP JOURNALS SORTED BY NUMBER OF ARTICLES, 2004

| Abbreviated Journal Title            | Total Cites | Impact Factor | Articles |
|--------------------------------------|-------------|---------------|----------|
| <a href="#">J BIOL CHEM</a>          | 405017      | 6.355         | 6585     |
| <a href="#">P NATL ACAD SCI USA</a>  | 345309      | 10.452        | 3084     |
| <a href="#">BIOCHEM BIOPH RES CO</a> | 64346       | 2.904         | 2312     |
| <a href="#">J IMMUNOL</a>            | 108602      | 6.486         | 1793     |
| <a href="#">BIOCHEMISTRY-US</a>      | 96809       | 4.008         | 1687     |
| <a href="#">J VIROL</a>              | 74388       | 5.398         | 1464     |
| <a href="#">J AGR FOOD CHEM</a>      | 27992       | 2.327         | 1261     |
| <a href="#">CANCER RES</a>           | 105196      | 7.690         | 1253     |
| <a href="#">J NEUROSCI</a>           | 93263       | 7.907         | 1233     |
| <a href="#">BLOOD</a>                | 97885       | 9.782         | 1206     |
| <a href="#">NUCLEIC ACIDS RES</a>    | 66057       | 7.260         | 1160     |
| <a href="#">CIRCULATION</a>          | 115133      | 12.563        | 1129     |
| <a href="#">FEBS LETT</a>            | 54417       | 3.843         | 1112     |
| <a href="#">NEUROSCI LETT</a>        | 25138       | 2.019         | 1101     |
| <a href="#">J CLIN MICROBIOL</a>     | 35117       | 3.439         | 1090     |
| <a href="#">TRANSPLANT P</a>         | 9048        | 0.511         | 1070     |
| <a href="#">CLIN CANCER RES</a>      | 23585       | 5.623         | 1052     |
| <a href="#">BRAIN RES</a>            | 58204       | 2.389         | 1037     |
| <a href="#">J UROLOGY</a>            | 39589       | 3.713         | 1029     |
| <a href="#">ONCOGENE</a>             | 45546       | 6.318         | 1003     |

#### Slide 1

In Slide 1, we see the top 20 life science journals sorted by the number of articles published in 2004. *Journal of Biological Chemistry* published 6,500 articles last year.

## SLIDE 2: MOST-CITED LIFE SCIENCE JOURNALS 2004

In contrast, slide 2 shows the list of journals most-cited in 2004. The *JBC* was cited over 400,000 times last year – this includes citations to any articles in its entire history.

However, we also recognized that smaller but important review and specialty journals might not be selected if we depended solely on total publication or citation counts.<sup>2</sup>

We needed a simple method for comparing journals regardless of size or citation frequency. So we created the journal “impact factor.”

**MOST-CITED JOURNALS, 2004**

| Abbreviated Journal Title           | Total Cites | Impact Factor | Articles |
|-------------------------------------|-------------|---------------|----------|
| <a href="#">J BIOL CHEM</a>         | 405017      | 6.355         | 6585     |
| <a href="#">NATURE</a>              | 363374      | 32.182        | 878      |
| <a href="#">P NATL ACAD SCI USA</a> | 345309      | 10.452        | 3084     |
| <a href="#">SCIENCE</a>             | 332803      | 31.853        | 845      |
| <a href="#">J AM CHEM SOC</a>       | 231890      | 6.903         | 3167     |
| <a href="#">PHYS REV LETT</a>       | 229765      | 7.218         | 3575     |
| <a href="#">PHYS REV B</a>          | 185905      | 3.075         | 4964     |
| <a href="#">NEW ENGL J MED</a>      | 159498      | 38.570        | 316      |
| <a href="#">ASTROPHYS J</a>         | 144264      | 6.237         | 2478     |
| <a href="#">J CHEM PHYS</a>         | 138693      | 3.105         | 2772     |
| <a href="#">CELL</a>                | 136472      | 28.389        | 288      |
| <a href="#">LANCET</a>              | 126002      | 21.713        | 415      |
| <a href="#">CIRCULATION</a>         | 115133      | 12.563        | 1129     |
| <a href="#">APPL PHYS LETT</a>      | 112516      | 4.308         | 3731     |
| <a href="#">J IMMUNOL</a>           | 108602      | 6.486         | 1793     |
| <a href="#">J GEOPHYS RES</a>       | 105601      | 2.839         | 2085     |
| <a href="#">CANCER RES</a>          | 105196      | 7.690         | 1253     |
| <a href="#">BLOOD</a>               | 97885       | 9.782         | 1206     |
| <a href="#">BIOCHEMISTRY-US</a>     | 96809       | 4.008         | 1687     |
| <a href="#">J NEUROSCI</a>          | 93263       | 7.907         | 1233     |

Slide 2.

### SLIDE 3: LIFE SCIENCE JOURNALS SORTED BY IMPACT FACTOR

TOP JOURNALS SORTED BY IMPACT FACTOR, 2004

| Abbreviated Journal Title            | Total Cites | Impact Factor | Articles |
|--------------------------------------|-------------|---------------|----------|
| <a href="#">ANNU REV IMMUNOL</a>     | 14357       | 52.431        | 30       |
| <a href="#">CA-CANCER J CLIN</a>     | 3725        | 44.515        |          |
| <a href="#">NEW ENGL J MED</a>       | 159498      | 38.570        | 316      |
| <a href="#">NAT REV CANCER</a>       | 6618        | 36.557        | 79       |
| <a href="#">PHYSIOL REV</a>          | 14671       | 33.918        | 35       |
| <a href="#">NAT REV MOL CELL BIO</a> | 9446        | 33.170        | 84       |
| <a href="#">NAT REV IMMUNOL</a>      | 5957        | 32.695        | 80       |
| <a href="#">NATURE</a>               | 363374      | 32.182        | 878      |
| <a href="#">SCIENCE</a>              | 332803      | 31.853        | 845      |
| <a href="#">ANNU REV BIOCHEM</a>     | 16487       | 31.538        | 33       |
| <a href="#">NAT MED</a>              | 38657       | 31.223        | 168      |
| <a href="#">CELL</a>                 | 136472      | 28.389        | 288      |
| <a href="#">NAT IMMUNOL</a>          | 14063       | 27.586        | 130      |
| <a href="#">JAMA-J AM MED ASSOC</a>  | 88864       | 24.831        | 351      |
| <a href="#">NAT GENET</a>            | 49529       | 24.695        | 191      |
| <a href="#">ANNU REV NEUROSCI</a>    | 8093        | 23.143        | 26       |
| <a href="#">PHARMACOL REV</a>        | 7800        | 22.837        | 19       |
| <a href="#">NAT BIOTECHNOL</a>       | 18169       | 22.355        | 138      |
| <a href="#">LANCET</a>               | 126002      | 21.713        | 415      |

#### Slide 3

Slide 3 shows the life science journals ranked by impact factor. Note the appearance of small review journals.

The term “impact factor” has gradually evolved, especially in Europe, to describe both journal and author impact. This ambiguity often causes problems. It is one thing to use impact factors to compare journals and quite another to use them to compare authors. Journal impact factors generally involve relatively large populations of articles and citations. Individual authors, on average, produce much smaller numbers of articles although some are phenomenal. The transplant surgeon Tom Starzl has co-authored over 2,000 articles.<sup>3</sup> Over ten years ago, I attended a celebration of Carl Djerassi’s 1000<sup>th</sup> paper.<sup>4</sup>

While my 1955 paper is considered primordial for citation indexing history, it is my 1972 paper in *Science* on “Citation Analysis as a tool in journal evaluation,” that has received most attention from journal editors.<sup>5</sup> That paper was published before the *Journal Citation Reports* existed. We used a quarterly issue of the 1969 SCI to identify the most significant journals of science. I bring

this up for an important reason. While our analysis was based on a large sample of literature, the annual *JCR* is not based on a sample. The *JCR* today includes every citation that appears in the 5,000 plus journals that it covers. Therefore, discussions of sampling errors in relation to *JCR* are not particularly meaningful. Furthermore, I myself deplore the quotation of impact factors to three decimal places. ISI uses three decimal places to reduce the number of journals with the identical impact rank. It matters very little whether the impact of *JAMA* is quoted as 21.5 rather than 21.455.

A journal's impact factor is based on two elements: the numerator, which is the number of cites in the current year to any items published in the journal in the previous 2 years; and the denominator, the number of substantive articles (source items) published in the same 2 years. The impact factor could just as easily be based on the previous year's articles alone, which would give even greater weight to rapidly changing fields. A less current impact factor could take into account longer periods of citations and/or sources, but then the measure would be less current. The *JCR* help page provides instruction for computing five-year impact factors.

### Scientometrics and Journalology

Citation analysis has blossomed over the past three decades into the field of scientometrics which now has its own International Society of Scientometrics and Informetrics (ISSI).<sup>6</sup> The journal *Scientometrics* was started in 1978. Over 15 years ago, Steve Lock aptly named the application of scientometrics to journals evaluation "journalology."<sup>7</sup>

All citation studies should be normalized to take into account variables such as the discipline, citation density, and half-life.<sup>8</sup> The citation density is the average number of references cited per source article. Citation density (R/S) is significantly lower for mathematics journals than for molecular biology journals. The half-life (number of retrospective years required to find 50% of the cited references) is longer for a physiology journal than that for a physics journal. For some fields, *JCR*'s two-year based impact factors may or may not give as complete a picture as would a five- or ten-year period.

Nevertheless, when journals are studied within disciplinary categories, the rankings based on 1-, 7- or 15-year impact factors do not differ significantly. I reported on this in *The Scientist*.<sup>9,10</sup> seven years ago. When journals were studied across fields, the ranking for physiology journals improved significantly as the number of years increased, but the rankings within the physiology category did not change significantly. Similarly, Hansen and Henrikson<sup>11</sup> reported "good agreement between the journal impact factor and the overall [cumulative] citation frequency of papers on clinical physiology and nuclear medicine."

There are always exceptions to these generalities. Impact critics will usually find them. They also cite all sorts of anecdotal citation behavior which do not represent average behavior. The same can be said about alleged citation errors, most of which are really variants of one kind or another or do not affect impact since only variants in cited journal abbreviations matter in calculating impact. These are all unified prior to issuing the *JCR* each

year. And a huge number of author errors or variants are corrected by the ISI system but unseen to the user.

The impact factors reported by *JCR* tacitly imply that all editorial items in *Science*, *Nature*, *JAMA*, *NEJM*, etc. can be neatly categorized. Such journals publish large numbers of items that are not substantive research or review articles. Correspondence, letters, news stories, obituaries, editorials, interviews, and tributes are not included in *JCR*'s calculation of source items (the denominator). But we all know that they may be cited, especially in the current year, but that is also why they don't have a significant effect on the impact calculations. Nevertheless, since the *JCR* numerator includes citations to these more ephemeral items, some distortion will result. But only a small group of journals are affected, if at all. Those that are affected change by 5 or 10%.<sup>8</sup>

The assignment of article publication codes is based on human judgment. A news story might be perceived as a substantive article, and a significant letter might not be. Furthermore, no effort is made to differentiate clinical versus laboratory studies or, for that matter, practice-based versus research-based articles. All these potential variables provide grist for the critical mill of citation aficionados.

### **Size vs. Citation Density**

There is a widespread but mistaken belief that the size of the scientific community that a journal serves significantly affects the journal's impact factor. This assumption overlooks the fact that while more authors produce more citations, these must be shared by a larger number of cited articles. Most articles in most fields are not well cited, whereas some articles in small fields may have unusual impact, especially where they have cross-disciplinary impact. It is well known that there is a skewed distribution of citations in most fields. The well-known 80/20 rule applies in that 20% of articles may account for 80% of the citations.

To reiterate -- the key determinants in impact are not the number of authors or articles in the field but, rather, the citation density and the age of the literature cited. The average number of citations per article and the immediacy of citations are the significant elements.<sup>12</sup> The size of a field, however, will generally increase the number of "super-cited" papers. And while a few classic methodology papers exceed a high threshold of citation, thousands of other methodology and review papers do not. Nevertheless, review papers on average are cited about twice the average. Publishing mediocre review papers will not necessarily boost your journal's impact.

### **SLIDE 4: SUPER CITED PAPERS IN THE LIFE SCIENCES**

For your amusement, consider this short list of super-cited papers in the life sciences. Incidentally, since they are all a decade or more old, they don't affect the calculation of their journal's impact factor. The Lowry paper was recently discussed in *Journal of Biological*

*Chemistry*<sup>13</sup> but the authors failed to mention Lowry's own commentary on this most-cited paper in the history of science.<sup>14</sup> Lowry himself noted that it was not his most important paper.

**MOST-CITED ARTICLES IN THE ISI WEB OF SCIENCE 1945-July, 2005**

| Authors  | Title  | Source   | Yr   | V   | Pg   | Hits    |
|--|--|--|------|-----|------|---------|
| LOWRY, OH;<br>ROSEBROUGH, NJ; FARR,<br>AL; RANDALL, RJ | PROTEIN MEASUREMENT<br>WITH THE FOLIN PHENOL<br>REAGENT  | JOURNAL OF<br>BIOLOGICAL<br>CHEMISTRY  | 1951 | 193 | 265  | 293,328 |
| LAEMMLI, UK  | CLEAVAGE OF STRUCTURAL<br>PROTEINS DURING ASSEMBLY<br>OF HEAD OF<br>BACTERIOPHAGE-T4   | NATURE   | 1970 | 227 | 680  | 192,022 |
| BRADFORD, MM   | RAPID AND SENSITIVE<br>METHOD FOR QUANTITATION<br>OF MICROGRAM QUANTITIES<br>OF PROTEIN UTILIZING<br>PRINCIPLE OF PROTEIN-DYE<br>BINDING | ANALYTICAL<br>BIOCHEMISTRY   | 1976 | 72  | 248  | 120,179 |
| SANGER, F; NICKLEN, S;<br>COULSON, AR                  | DNA SEQUENCING WITH<br>CHAIN-TERMINATING<br>INHIBITORS   | PROCEEDINGS OF<br>THE NATIONAL<br>ACADEMY OF<br>SCIENCES OF THE<br>UNITED STATES OF<br>AMERICA | 1977 | 74  | 5463 | 63,909  |
| CHOMCZYNSKI, P;<br>SACCHI, N                           | SINGLE-STEP METHOD OF<br>RNA ISOLATION BY ACID<br>GUANIDINIUM THIOCYANATE<br>PHENOL CHLOROFORM<br>EXTRACTION                             | ANALYTICAL<br>BIOCHEMISTRY   | 1987 | 162 | 156  | 55,987  |
| TOWBIN, H; STAEHELIN, T;<br>GORDON, J                  | ELECTROPHORETIC<br>TRANSFER OF PROTEINS<br>FROM POLYACRYLAMIDE<br>GELS TO NITROCELLULOSE<br>SHEETS - PROCEDURE AND<br>SOME APPLICATIONS  | PROCEEDINGS OF<br>THE NATIONAL<br>ACADEMY OF<br>SCIENCES OF THE<br>UNITED STATES OF<br>AMERICA | 1979 | 76  | 4350 | 48,671  |
| FOLCH, J; LEES, M;<br>STANLEY, GHS                     | A SIMPLE METHOD FOR THE<br>ISOLATION AND PURIFICATION<br>OF TOTAL LIPIDES FROM<br>ANIMAL TISSUES   | JOURNAL OF<br>BIOLOGICAL<br>CHEMISTRY  | 1957 | 226 | 497  | 35,646  |
| SOUTHERN, EM   | DETECTION OF SPECIFIC<br>SEQUENCES AMONG DNA<br>FRAGMENTS SEPARATED BY<br>GEL-ELECTROPHORESIS  | JOURNAL OF<br>MOLECULAR BIOLOGY  | 1975 | 98  | 503  | 31,273  |

**Slide 4**

I have not included here super cited books such as *Molecular Cloning: a Laboratory Manual* by Maniatis and Sambrook which appeared<sup>15</sup> in numerous editions beginning with 1982. They have been cited in at least 150,000 papers. This is my way of reminding those who are book authors, that *SCI*, *SSCI* and *A&HCI* do include citations to books as well as individual chapters of books.

## SLIDE 5: CITATION FREQUENCY DISTRIBUTIONS

### Citation Frequency Distribution 1900-August, 2005 (articles cited at least once)

| Number of Citations        | Approx # of Items Receive Citations | % of WOS      |
|----------------------------|-------------------------------------|---------------|
| >10,000                    | 61                                  | 0.00%         |
| 5,000-9,000                | 120                                 | 0.00%         |
| 4,000-4,999                | 116                                 | 0.00%         |
| 3,000-3,999                | 215                                 | 0.00%         |
| 2,000-2,999                | 664                                 | 0.00%         |
| 1,000-1,999                | 3,887                               | 0.02%         |
| 900-999                    | 1,232                               | 0.00%         |
| 800-899                    | 1,762                               | 0.01%         |
| 700-799                    | 2,614                               | 0.01%         |
| 600-699                    | 4,077                               | 0.02%         |
| 500-599                    | 6,637                               | 0.03%         |
| 400-499                    | 12,557                              | 0.06%         |
| 300-399                    | 27,059                              | 0.14%         |
| 200-299                    | 74,025                              | 0.37%         |
| 100-199                    | 343,269                             | 1.73%         |
| 50-99                      | 953,064                             | 4.83%         |
| 25-49                      | 2,006,529                           | 10.1%         |
| 15-24                      | 2,226,603                           | 11.2%         |
| 10-14                      | 2,106,995                           | 10.6%         |
| 5-9                        | 3,891,542                           | 19.5%         |
| 2-4                        | 4,931,952                           | 24.7%         |
| 1                          | 3,343,789                           | 16.7%         |
| <b>Items Cited</b>         | <b>19,938,769</b>                   | <b>100.1%</b> |
| <b>Total Items in File</b> | <b>38,163,319</b>                   |               |

### Slide 5

For a more realistic view of citation frequencies, slide 5 shows that from 1900-2005, about one half of one percent of cited papers were cited over 200 times. Out of about 38 million source items about half were not cited at all. Keep in mind that “items” includes not only substantive articles but also ephemera mentioned earlier. Therefore, these data provide a distorted picture for high impact journals where the number of uncited publications is much smaller.



The skewness of citations is well known and repeated as a mantra by critics of the impact factor. On the one hand, some editors would like to see impacts calculated solely on the basis of their most-cited papers so that their otherwise low impact factors can be ignored. However, since most journals experience this skewness, that should not significantly affect journal rankings. Others would like to see rankings by geographic area because of *SCJ*'s alleged English language bias. Europhiles would like to be able to compare their journals by language or geographic groups especially in the social sciences and humanities.

The time required to referee manuscripts may also affect impact. If manuscript processing is delayed, references to articles that are no longer within the *JCR* two-year window will not be counted.<sup>16</sup>

Alternatively, the appearance of articles on the same subject in the same issue of a journal may have an upward effect. Opthof<sup>17</sup> showed how journal impact performance can vary from issue to issue.

For greater precision, it is preferable to conduct item-by-item journal audits so that any differences in impact for different types of editorial items can be taken into account.<sup>18</sup>

Other objections to impact factors are related to the system used in *JCR* to categorize journals. In a perfect system it ought to be possible to compare journals with an identical profile. But in fact there rarely are two journals with identical semantic or bibliographic profiles. ISI's heuristic, somewhat subjective methods for categorizing journals are by no means perfect, even though their specialists do use citation analysis to support their decisions. Some might argue that *JCR* categories are larger than necessary. Recent work by Alexander Pudovkin and myself<sup>19</sup> is an attempt to group journals more objectively. We rely on the two-way citational relationships between journals to reduce the subjective influence of journal titles. Three decades ago, I demonstrated that journal titles can be deceiving. Citation analysis proved the *Journal of Experimental Medicine* was a leading immunology journal.<sup>20</sup> It still is one of the five top immunology journals based on its impact factor.

**SLIDE 6: GENERAL INTERNAL MEDICINE CATEGORY SORTED BY IMPACT 2004.**

In Slide 6, you see the list of journals in the JCR category “Medicine, General and Internal.” There are no surprises here. Few would quarrel with the assignment of these journals to this category, but this tells us little about their actual subject content.

**MEDICINE, GENERAL & INTERNAL  
Journals sorted by Impact factor**

| Abbreviated Journal Title            | Total Cites | Impact Factor | Articles |
|--------------------------------------|-------------|---------------|----------|
| <a href="#">NEW ENGL J MED</a>       | 159498      | 38.570        | 316      |
| <a href="#">JAMA-J AM MED ASSOC</a>  | 88864       | 24.831        | 351      |
| <a href="#">LANCET</a>               | 126002      | 21.713        | 415      |
| <a href="#">ANN INTERN MED</a>       | 36932       | 13.114        | 189      |
| <a href="#">ANNU REV MED</a>         | 3188        | 11.200        | 29       |
| <a href="#">ARCH INTERN MED</a>      | 26525       | 7.508         | 282      |
| <a href="#">BRIT MED J</a>           | 56807       | 7.038         | 623      |
| <a href="#">CAN MED ASSOC J</a>      | 6736        | 5.941         | 100      |
| <a href="#">AM J MED</a>             | 21000       | 4.179         | 285      |
| <a href="#">MAYO CLIN PROC</a>       | 6816        | 3.746         | 161      |
| <a href="#">MEDICINE</a>             | 4255        | 3.727         | 30       |
| <a href="#">ANN MED</a>              | 2626        | 3.617         | 79       |
| <a href="#">J INTERN MED</a>         | 4793        | 3.590         | 135      |
| <a href="#">AM J PREV MED</a>        | 3972        | 3.188         | 143      |
| <a href="#">CURR MED RES OPIN</a>    | 1148        | 2.928         | 212      |
| <a href="#">J GEN INTERN MED</a>     | 4686        | 2.821         | 163      |
| <a href="#">QJM-INT J MED</a>        | 4073        | 2.580         | 73       |
| <a href="#">EUR J CLIN INVEST</a>    | 4332        | 2.530         | 110      |
| <a href="#">PREV MED</a>             | 5372        | 2.327         | 287      |
| <a href="#">J PAIN SYMPTOM MANAG</a> | 2941        | 2.187         | 117      |

Slide 6

## SLIDE 7: CALCULATING RELATEDNESS COEFFICIENTS

*JCR* recently added a new feature which provides you the ability to more precisely establish journal categories based on citation relatedness. Slide 7 provides the general formula for calculating citation relatedness between two journals and the relatedness coefficient expressing the average of the maximum and minimum.

### CALCULATING RELATEDNESS COEFFICIENT OF JOURNAL<sub>1</sub> AND JOURNAL<sub>2</sub>

$$R_{1>2} = \frac{C_{1>2} \times 10^6}{\text{Ref}_1 \times \text{Pap}_2}$$

$$R_{1<2} = \frac{C_{1<2} \times 10^6}{\text{Ref}_2 \times \text{Pap}_1}$$

$$R_{\text{coeff}} = \sqrt{R_{1>2} \times R_{1<2}}$$

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**C = Citations**

**Ref<sub>1</sub> is the number of references cited in Journal 1.**

**Pap<sub>2</sub> is the number of papers published by Journal 2.**

**Ref<sub>2</sub> is the number of references cited in Journal 2.**

## SLIDE 8: JOURNALS: *JAMA* - RELATED JOURNALS SORTED BY CITATION RELATEDNESS COEFFICIENT

### Slide 8

#### JOURNALS MOST RELATED BY CITATION RELATEDNESS TO *JAMA* √ = Not in Medicine, General & Internal Category

|   | Journal                              | Rcoefficient |
|---|--------------------------------------|--------------|
|   | <a href="#">JAMA-J AM MED ASSOC</a>  | 274.97       |
|   | <a href="#">ANN INTERN MED</a>       | 127.26       |
|   | <a href="#">NEW ENGL J MED</a>       | 123.09       |
|   | <a href="#">ARCH INTERN MED</a>      | 89.85        |
|   | <a href="#">J GEN INTERN MED</a>     | 70.26        |
| √ | <a href="#">CONTROL CLIN TRIALS</a>  | 69.23        |
| √ | <a href="#">ADV RENAL REPLACE TH</a> | 66.41        |
| √ | <a href="#">MED CARE</a>             | 66.02        |
|   | <a href="#">J FAM PRACTICE</a>       | 64.81        |
| √ | <a href="#">HEALTH AFFAIR</a>        | 64.64        |
| √ | <a href="#">J AM GERIATR SOC</a>     | 53.06        |
| √ | <a href="#">CURR CONTR TRIALS C</a>  | 52.84        |
| √ | <a href="#">ACAD MED</a>             | 52.75        |
| √ | <a href="#">INQUIRY-J HEALTH CAR</a> | 52.00        |
|   | <a href="#">CAN MED ASSOC J</a>      | 46.98        |
|   | <a href="#">AM J MED</a>             | 46.70        |
|   | <a href="#">AM J PREV MED</a>        | 45.37        |
| √ | <a href="#">ARCH PEDIAT ADOL MED</a> | 40.25        |
| √ | <a href="#">CLIMACTERIC</a>          | 39.73        |
| √ | <a href="#">J AM MED INFORM ASSN</a> | 38.28        |
| √ | <a href="#">MENOPAUSE</a>            | 34.55        |
| √ | <a href="#">PHARMACOEPIDEM DR S</a>  | 34.20        |
| √ | <a href="#">AM J MED QUAL</a>        | 33.89        |
| √ | <a href="#">ENDOCRIN METAB CLIN</a>  | 33.89        |
| √ | <a href="#">MATURITAS</a>            | 31.90        |
| √ | <a href="#">BLOOD PRESS MONIT</a>    | 30.20        |
|   | <a href="#">FAM MED</a>              | 30.16        |

Slide 8 is a list of the 20 journals most related to *JAMA* by the citation relatedness coefficient, which reflects how often *JAMA* cites and is cited by each of the journals listed. The relatedness coefficient takes into account the sizes of the journals involved (papers published) as well as the number of times each journal cites the other.

The top four journals related to *JAMA* remain the same as in the sort by impact, but many journals have moved up in rank such as *Journal of Family Planning* and *Journal of the American Geriatrics Society*. The checks on the left indicate the journal was not assigned to the General Medicine category.

## SLIDE 9: *NEJM* RELATED JOURNALS SORTED BY CITATION RELATEDNESS

Slide 9

### JOURNALS MOST RELATED BY CITATION RELATEDNESS TO NEW ENGLAND JOURNAL OF MEDICINE

√ = Not in Medicine, General & Internal Category

|   | Journal                              | Rcoefficient |
|---|--------------------------------------|--------------|
|   | <a href="#">NEW ENGL J MED</a>       | 345.24       |
|   | <a href="#">JAMA-J AM MED ASSOC</a>  | 123.09       |
|   | <a href="#">ANN INTERN MED</a>       | 124.85       |
|   | <a href="#">ARCH INTERN MED</a>      | 64.49        |
|   | <a href="#">AM J MED</a>             | 61.13        |
| √ | <a href="#">CIRCULATION</a>          | 57.36        |
| √ | <a href="#">J AM COLL CARDIOL</a>    | 58.15        |
|   | <a href="#">MAYO CLIN PROC</a>       | 47.96        |
| √ | <a href="#">CHEST</a>                | 37.64        |
| √ | <a href="#">PROG CARDIOVASC DIS</a>  | 45.66        |
|   | <a href="#">CAN MED ASSOC J</a>      | 40.31        |
| √ | <a href="#">CRIT CARE MED</a>        | 35.11        |
| √ | <a href="#">CURR PROB CARDIOLOGY</a> | 36.19        |
| √ | <a href="#">J CARD FAIL</a>          | 34.62        |
| √ | <a href="#">EUR HEART J</a>          | 36.77        |
| √ | <a href="#">AM HEART J</a>           | 37.99        |
| √ | <a href="#">AM J CARDIOL</a>         | 33.90        |
|   | <a href="#">AM J MED SCI</a>         | 27.40        |
| √ | <a href="#">MED LETT DRUGS THER</a>  | 32.97        |
| √ | <a href="#">RESUSCITATION</a>        | 24.79        |
| √ | <a href="#">BONE MARROW TRANSPL</a>  | 22.66        |
| √ | <a href="#">GASTROENTEROL CLIN N</a> | 24.72        |
| √ | <a href="#">CURR OPIN CARDIOL</a>    | 21.46        |
|   | <a href="#">MED CLIN N AM</a>        | 22.25        |
| √ | <a href="#">HEART</a>                | 22.54        |

Performing the identical exercise for the *NEJM*, we see differences that are quite striking. The top four journals are there: *NEJM*, *Annals of Internal Medicine*, *JAMA*, and *Archives of Internal Medicine*, but the next two are cardiology journals, as are 9 of the next 12 journals shown.

While this observation does not affect the categorization of *NEJM* as a general medicine journal, the next slide will demonstrate further that it is relevant to list it in the cardiology category, as well.

## SLIDE 10: JCR CARDIAC & CARDIOVASCULAR SYSTEMS BY IMPACT FACTOR

Here is the listing of the cardiac journals category in the 2004 *JCR*. The ranking by impact factor probably conforms to the general idea of the most prestigious journals in the field.

### Slide 10

#### **JCR Category: Cardiac & Cardiovascular Systems**

Source: 2004 *Journal Citation Reports*

↓

| Rmax Rank | JCR Rank | Abbreviated Journal Title                                 | Total Cites | Impact Factor | Articles |
|-----------|----------|---|-------------|---------------|----------|
| 3         | 1        | Circulation   | 115133      | 12.563        | 1129     |
| 12        | 2        | Circulation Research                                      | 35038       | 9.972         | 340      |
| 2         | 3        | Journal of the American College of Cardiology             | 40841       | 9.133         | 591      |
| 4         | 4        | European Heart Journal                                    | 10890       | 6.247         | 250      |
| 16        | 5        | Trends In Cardiovascular Medicine                         | 1497        | 4.716         | 53       |
| 13        | 6        | Cardiovascular Research                                   | 12390       | 4.575         | 269      |
| 14        | 7        | Journal of Molecular and Cellular Cardiology              | 7618        | 4.198         | 163      |
| 7         | 8        | American Heart Journal                                    | 14243       | 3.681         | 356      |
| 17        | 9        | American J of Physiology-Heart and Circulatory Physiology | 23887       | 3.539         | 652      |
| 6         | 10       | Heart   | 6023        | 3.271         | 314      |
| 15        | 11       | Journal of Thoracic and Cardiovascular Surgery            | 15028       | 3.263         | 327      |
| 5         | 12       | American Journal of Cardiology                            | 29703       | 3.140         | 824      |
| 19        | 13       | Chest   | 27826       | 3.118         | 654      |
| 11        | 14       | Basic Research in Cardiology                              | 1702        | 3.009         | 45       |
|           | 15       | European J of Cardiovascular Prevention & Rehabilitation  | 46          | 3.000         | 73       |
| 1         | 16       | Journal of Cardiovascular Electrophysiology               | 4258        | 2.967         | 205      |
| 8         | 17       | Journal of Cardiac Failure                                | 1213        | 2.879         | 79       |
| 18        | 18       | Journal of Heart and Lung Transplantation                 | 4023        | 2.813         | 220      |
| 10        | 19       | European Journal of Heart Failure                         | 1164        | 2.796         | 118      |
| 9         | 20       | Progress in Cardiovascular Diseases                       | 1327        | 2.676         | 31       |

SLIDE 11: JOURNALS MOST RELATED TO *CIRCULATION* BY CITATION RELATEDNESSJOURNALS MOST RELATED BY CITATION RELATEDNESS TO  
CIRCULATION

| Journal                              | Rmax   | Rcirc>j | Rj>circ | Rcoefficient | Rank by Rcoefficient |
|--------------------------------------|--------|---------|---------|--------------|----------------------|
| <a href="#">CIRCULATION</a>          | 160.16 | 160.16  | 160.16  | 160.16       | 1                    |
| <a href="#">J AM COLL CARDIOL</a>    | 165.01 | 85.54   | 165.01  | 118.81       | 2                    |
| <a href="#">J CARDIOVASC ELECTR</a>  | 220.69 | 27.68   | 220.69  | 78.16        | 3                    |
| <a href="#">AM J CARDIOL</a>         | 156.28 | 32.9    | 156.28  | 71.71        | 4                    |
| <a href="#">EUR HEART J</a>          | 159.56 | 31.57   | 159.56  | 70.97        | 5                    |
| <a href="#">AM HEART J</a>           | 139.48 | 30.65   | 139.48  | 65.38        | 6                    |
| → <a href="#">NEW ENGL J MED</a>     | 170.03 | 170.03  | 19.35   | 57.36        | 7                    |
| <a href="#">PROG CARDIOVASC DIS</a>  | 124.73 | 24.96   | 124.73  | 55.80        | 8                    |
| → <a href="#">J CARD FAIL</a>        | 128.67 | 20.57   | 128.67  | 51.45        | 9                    |
| <a href="#">CORONARY ARTERY DIS</a>  | 170.9  | 14.68   | 170.9   | 50.09        | 10                   |
| <a href="#">CURR PROB CARDIOLOGY</a> | 180.95 | 12.9    | 180.95  | 48.31        | 11                   |
| <a href="#">BASIC RES CARDIOL</a>    | 105.09 | 21.21   | 105.09  | 47.21        | 12                   |
| <a href="#">HEART</a>                | 145.6  | 14.54   | 145.6   | 46.01        | 13                   |
| <a href="#">PACE</a>                 | 159.27 | 10.76   | 159.27  | 41.40        | 14                   |
| <a href="#">J AM SOC ECHOCARDIOG</a> | 144.16 | 11.7    | 144.16  | 41.07        | 15                   |
| <a href="#">CARDIOLOGY</a>           | 113.14 | 14.54   | 113.14  | 40.56        | 16                   |
| <a href="#">CURR OPIN CARDIOL</a>    | 142.56 | 11.14   | 142.56  | 39.85        | 17                   |
| <a href="#">CARDIOVASC DRUG THER</a> | 112.77 | 10.89   | 112.77  | 35.04        | 18                   |
| <a href="#">CATHETER CARDIO INTE</a> | 164.94 | 6.94    | 164.94  | 33.83        | 19                   |
| <a href="#">J CARDIOV MAGN RESON</a> | 153.61 | 7.44    | 153.61  | 33.81        | 20                   |
| <a href="#">J INTERV CARD ELECTR</a> | 173.06 | 6.45    | 173.06  | 33.41        | 21                   |
| <a href="#">J NUCL CARDIOL</a>       | 169.8  | 6.45    | 169.8   | 33.09        | 22                   |
| <a href="#">EUR J HEART FAIL</a>     | 123.25 | 8.31    | 123.25  | 32.00        | 23                   |
| <a href="#">CLIN CARDIOL</a>         | 115.94 | 7.09    | 115.94  | 28.67        | 24                   |
| <a href="#">INT J CARDIOL</a>        | 125.83 | 5.56    | 125.83  | 26.45        | 25                   |
| <a href="#">J ELECTROCARDIOL</a>     | 119.84 | 5.45    | 119.84  | 25.56        | 26                   |
| <a href="#">INT J CARDIOVAS IMAG</a> | 129.29 | 4.74    | 129.29  | 24.76        | 27                   |

## Slide 11

However, using the *JCR* relatedness ranking method, some journals would be assigned to different *JCR* categories. Using *Circulation*, the highest impact journal in this area, to represent cardiology, we find that *NEJM* ranked 7<sup>th</sup> among the most related journals in this field. Heretofore one could only guess at the proximity of *NEJM* to this or other topics. However, this analysis also tells us something about the *JCR* placement of the journal *Coronary Artery Disease*. *JCR* assigns it to the category “Peripheral Vascular Disease” but it is in fact the 10<sup>th</sup> journal in this list.

Journal Performance Indicators

**SLIDE 12: JPI DATA ON JAMA – CITATION IMPACT (ALL ITEMS) IN ONE YEAR PERIODS, 1981 TO 2004**

**JAMA**

**CITATION IMPACT (ALL ITEMS)**

**IN ONE YEAR PERIODS 1981 TO 2004**

Source: *ISI Journal Performance Indicators file, 2004*

| Rank | Year | Impact | Citations | Papers |               |  |
|------|------|--------|-----------|--------|---------------|--|
| 1    | 1981 | 29.57  | 16,291    | 551    |               |  |
| 2    | 1982 | 35.53  | 20,358    | 573    |               |  |
| 3    | 1983 | 40.11  | 22,219    | 554    |               |  |
| 4    | 1984 | 35.26  | 21,791    | 618    |               |  |
| 5    | 1985 | 35.05  | 18,436    | 526    |               |  |
| 6    | 1986 | 48.76  | 24,576    | 504    |               |  |
| 7    | 1987 | 44.70  | 26,688    | 597    |               |  |
| 8    | 1988 | 48.40  | 30,009    | 620    |               |  |
| 9    | 1989 | 55.79  | 34,979    | 627    |               |  |
| 10   | 1990 | 54.83  | 35,968    | 656    | <u>31,257</u> | <u>Citations received 1999-2004 = 84.5</u> |
| 11   | 1991 | 47.19  | 30,389    | 644    | 370           | Articles published in JAMA in 1999         |
| 12   | 1992 | 58.48  | 34,389    | 588    |               |  |
| 13   | 1993 | 65.55  | 38,349    | 585    |               |  |
| 14   | 1994 | 70.54  | 39,148    | 555    |               |  |
| 15   | 1995 | 81.99  | 45,094    | 550    |               |  |
| 16   | 1996 | 60.16  | 32,908    | 547    |               |  |
| 17   | 1997 | 58.19  | 32,821    | 564    |               |  |
| 18   | 1998 | 75.20  | 37,372    | 497    |               |  |
| →    | 19   | 1999   | 84.48     | 31,257 | 370           | ←  |
|      | 20   | 2000   | 56.71     | 21,040 | 371           |  |
|      | 21   | 2001   | 49.98     | 18,842 | 377           |  |
|      | 22   | 2002   | 42.84     | 16,921 | 395           |  |
|      | 23   | 2003   | 19.09     | 7,311  | 383           |  |
|      | 24   | 2004   | 3.34      | 1,174  | 351           |  |

**Slide 12**

Many of the discrepancies with journal impact factors are eliminated altogether in another ISI database called the *Journal Performance Indicators (JPI)*.<sup>21</sup> This annual compilation now covers the period 1981 to 2004. Unlike *JCR*, the database links each source item to its own unique citations. Therefore, the impact calculations are more precise. Only citations to the substantive items are counted in the denominator. And it is possible to obtain cumulative impact measures covering longer time spans.

For example, the cumulated impact for *JAMA* articles published in 1999 was 84.5. This was derived by dividing the 31,257 citations received (from 1999 to 2004) by the 370 articles published in 1999.



$$\frac{31,257}{370} = \frac{\text{Citations received 1999-2004}}{\text{Articles published in JAMA}} = 84.5$$

In 1999, *JAMA* published 1905 items of which 680 were letters, and 253 editorials. Citations to these items were not included in the *JPI* calculation of impact.

**SLIDE 13: MYCOLOGY JOURNALS EFFECT OF TIME ON IMPACT RANKINGS FOR ONE, FIVE, AND 24 YEAR PERIOD.**

**EFFECT OF TIME ON IMPACT RANKINGS OF MYCOLOGY JOURNALS**  
Ranks for one, five, and 24 year period

| Rank | 2004<br>Impact Factor                      | Impact<br>2000-2004                        | Impact<br>1981-2004                        |
|------|--|--|--|
| 1    | Fungal Genetics/Biol.<br>(3.05)            | Fungal Genetics/Biol.<br>(5.81)            | Yeast<br>(17.53)                           |
| 2    | Yeast<br>(1.94)                            | Yeast<br>(5.13)                            | Experimental Mycology<br>(14.36)           |
| 3    | Mycorrhiza<br>(1.74)                       | <a href="#">Medical Mycology</a><br>(4.53) | J. Med. Veter. Mycol.<br>(12.76)           |
| 4    | <a href="#">Medical Mycology</a><br>(1.45) | Mycorrhiza<br>(3.37)                       | Fungal Genetics/Biol.<br>(9.70)            |
| 5    | Mycologia<br>(1.43)                        | Mycologia<br>(3.20)                        | Mycologia<br>(8.46)                        |
| 6    | Fungal Diversity<br>(1.89)                 | Mycological Research<br>(3.17)             | Mycological Research<br>(7.72)             |
| 7    | Mycological Research<br>(1.13)             | Lichenologist<br>(1.95)                    | Mycorrhiza<br>(7.16)                       |
| 8    | Lichenologist<br>(0.73)                    | Fungal Diversity<br>(1.87)                 | Mycopathologia<br>(6.19)                   |
| 9    | Mycopathologia<br>(0.87)                   | Mycoses<br>(1.63)                          | <a href="#">Medical Mycology</a><br>(6.16) |
| 10   | Mycoses<br>(0.69)                          | Mycopathologia<br>(1.53)                   | Lichenologist<br>(5.90)                    |

From: [http://in-cites.com/research/2005/april\\_25\\_2005-1.html](http://in-cites.com/research/2005/april_25_2005-1.html)

Slide 13

To illustrate the chronological changes in rankings for a group of related journals, consider the topic of mycology which was reported recently in *inCites* for April 25, 2005.<sup>22</sup> ([http://in-cites.com/research/2005/april\\_25\\_2005-1.html](http://in-cites.com/research/2005/april_25_2005-1.html))

*inCites* is a free ISI news bulletin.

While the journal *Medical Mycology* ranked 4th in 2004, it moved to 3<sup>rd</sup> place when five years of data were used but 9th when 23 years of data were used. This example seems to contradict the generalization I made when discussing physiology journals.

In addition to helping libraries decide which journals to purchase, journal impact factors are also used by authors to decide where to submit their articles. As a general rule, the journals with high impact factors include the most prestigious. The perception of prestige is a murky subject. Some

would equate prestige with high impact. However, some librarians argue that the numerator in the impact-factor calculation is itself even more relevant. Bensman<sup>23</sup> argued that this 2-year total citation count is a better guide to journal significance and cost-effectiveness than is the impact factor. This brings us full circle to the first slide I showed you on the most-cited journals.

Journal impact can also be useful in comparing expected and actual citation frequency. Thus, when *ISI* prepares a personal citation report it provides data on the expected citation impact not only for a particular journal but also for a particular year, because impact factors can change from year to year.

The use of journal impact factors instead of actual article citation counts to evaluate individuals is a highly controversial issue. Granting and other policy agencies often wish to bypass the work involved in obtaining actual citation counts for individual articles and authors. And allegedly recently published articles may not have had enough time to be cited, so it is tempting to use the journal impact factor as a surrogate evaluation tool. Presumably the mere acceptance of the paper for publication by a high impact journal is an implied indicator of prestige. Typically, when the author's recent bibliography is examined, the impact factors of the journals involved are substituted in lieu of the actual citation count. Thus, the impact factor is used to estimate the expected influence of individual papers which is rather dubious considering the known skewness observed for most journals.

Today so-called "webometrics" are increasingly brought into play, though there is little evidence that this is any better than traditional citation analysis. Web "sitations" may occur a little earlier, but they are not the same as Citations. Thus, one must distinguish between readership or downloading and actual citation in new research papers. But some studies would indicate that web sitation is a harbinger of future citation

The assumption that the impact of recent articles cannot be evaluated in *SCI* is not universally correct. While there may be several years delay on some topics, papers that achieve high impact are usually cited within months of publication and certainly within a year or so. This pattern of immediacy has enabled *ISI* to identify "hot papers" in its bimonthly publication *Science Watch*. However, full confirmation of high impact is generally obtained 2 years later. *The Scientist magazine* waits up to 2 years to select "hot papers" for commentary by authors. Most of these papers will eventually go on to become "citation classics."<sup>24</sup>

**SLIDE 14: EXAMPLES OF HOT PAPERS****Slide 14.****HOT PAPER: Citations: 515****Title: A NOVEL CORONAVIRUS ASSOCIATED WITH SEVERE ACUTE RESPIRATORY SYNDROME****Authors: Ksiazek TG; Erdman D; Goldsmith CS; Zaki SR; Peret T; Emery S; Tong SX; Urbani C; Comer JA; Lim W; Rollin PE; Dowell SF; Ling AE; Humphrey CD; Shieh WJ; Guarner J; Paddock CD; Rota P; Fields B; Derisi J; Yang JY; Cox N; Hughes JM; Leduc JW; Bellini WJ; Anderson LJ**

Source: N ENGL J MED 348: (20) 1953-1966 MAY 15 2003

## Addresses:

Ctr Dis Control &amp; Prevent, Special Pathogens Branch, Natl Ctr Infect Dis, Atlanta, GA 30333 USA.

Ctr Dis Control &amp; Prevent, Resp &amp; Enter Virus Brach, Natl Ctr Infect Dis, Atlanta, GA USA.

Ctr Dis Control &amp; Prevent, Infect Dis Pathol Act, Natl Ctr Infect Dis, Atlanta, GA USA.

Ctr Dis Control &amp; Prevent, Influenza Branch, Natl Ctr Infect Dis, Atlanta, GA USA.

Ctr Dis Control &amp; Prevent, Div Bacterial &amp; Mycot Dis, Natl Ctr Infect Dis, Atlanta, GA USA.

Ctr Dis Control &amp; Prevent, Off Director, Div Viral &amp; Rickettsial Dis, Natl Ctr Infect Dis, Atlanta, GA USA.

WHO, Hanoi, Vietnam.

Queen Mary Hosp, Govt Virus Unit, Hong Kong, Hong Kong, Peoples R China.

Int Emerging Infect Dis Program, Bangkok, Thailand.

Univ Calif San Francisco, San Francisco, CA 94143 USA.

Singapore Gen Hosp, Dept Pathol, Singapore, Singapore.

Ctr Dis Control, Dept Hlth, Taipei, Taiwan.

**HOT PAPER: Citations: 475****Title: IDENTIFICATION OF A NOVEL CORONAVIRUS IN PATIENTS WITH SEVERE ACUTE RESPIRATORY SYNDROME****Authors: Drosten C; Gunther S; Preiser W; Van Der Werf S; Brodt HR; Becker S; Rabenau H; Panning M; Kolesnikova L; Fouchier Ram; Berger A; Burguiere Am; Cinatl J; Eickmann M; Escriou N; Grywna K; Kramme S; Manuguerra Jc; Muller S; Rickerts V; Sturmer M; Vieth S; Klenk HD; Osterhaus ADME; Schmitz H; Doerr HW**

Source: N ENGL J MED 348: (20) 1967-1976 MAY 15 2003

## Addresses:

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Univ Frankfurt, Med Clin 3, D-6000 Frankfurt, Germany.

Univ Marburg, Inst Virol, D-3550 Marburg, Germany.

Inst Pasteur, Natl Influenza Ctr No France, Paris, France.

Erasmus Univ, Inst Virol, Rotterdam, Netherlands.

From: <http://in-cites.com/hotpapers/2005/may05-cli.html>

Two recent examples of Hot Papers published in *JAMA* and *NEJM* include papers on coronavirus at <http://in-cites.com/hotpapers/2005/may05-cli.html>

“A NOVEL CORONAVIRUS ASSOCIATED WITH SEVERE ACUTE RESPIRATORY SYNDROME”

“IDENTIFICATION OF A NOVEL CORONAVIRUS IN PATIENTS WITH SEVERE ACUTE RESPIRATORY SYNDROME”

## **Conclusion**

Of the many conflicting opinions about impact factors, Hoeffel<sup>25</sup> expressed the situation succinctly.

“Impact Factor is not a perfect tool to measure the quality of articles but there is nothing better and it has the advantage of already being in existence and is, therefore, a good technique for scientific evaluation. Experience has shown that in each specialty the best journals are those in which it is most difficult to have an article accepted, and these are the journals that have a high impact factor. Most of these journals existed long before the impact factor was devised. The use of impact factor as a measure of quality is widespread because it fits well with the opinion we have in each field of the best journals in our specialty.”

Yes, a better evaluation system would involve actually reading each article for quality but then this entire congress is dedicated to the difficulties of reconciling peer review judgments. When it comes time to evaluating faculty, most people do not have or care to take the time to read the articles any more! Even if they did, their judgment surely would be tempered by observing the comments of those who have cited the work. We call this citation context analysis. Fortunately, new full-text capabilities in the web make this more practical to perform.

I have had to rush through a lot material to save time but hope that I have given you a balanced view of a complex and controversial topic.

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