Journal Impact factors: what they mean, what they don't mean, and why you should care

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Stokes Library
Wallace Hall
Lunch and Learn
November 30, 2011
Publish or Perish

- One’s publication record is a key component of hiring, tenure and promotion decisions.
- Grant agencies want their money to support research that is widely distributed/relevant.
“I did all that research...

• Are people reading my work?
  – To me, this is a much more interesting question than which journals are most highly read.

• However, I am frequently asked by researchers for suggestions of the best journal for them to submit their work to.
  – The underlying assumption is that the more visible the journal is, the more your paper will get seen and (hopefully) read and (hopefully) cited.
Overview of session

- What is a citation?
- What is impact?
- What is a bibliographic database?
- Web of Science (a.k.a. Science Citation Index/Social Science Citation Index)
- Journal Citation Reports
- Journal’s Impact Factor
- Google Scholar as an alternative to Web of Science
- Alternative measures of Impact Factor (briefly, if time)
- How do you decide the “best journal” to publish in?
- What is the best way to keep track of who’s citing me?
Basic Definitions

• Impact = effect.
• Citation = entries in a list of references at the end of an article, chapter, book, etc.
• Database = collection of records about, for example, articles published in a particular field.
Impact of one article

• Looking for a way to quantify an article’s impact.
• The simplest measure of impact is “Times Cited.”
• Whether being cited is an indication of impact requires a leap of faith.
But even the simplest measure of impact (Times Cited) quickly gets complicated

- What counts as a citation?
  - Self-citation?
  - Citation by one’s co-authors?
  - Only citations in peer-reviewed journal articles?
Continued... But even the simplest measure of impact (Times Cited) quickly gets complicated

• The older the article the more potential for citations. The total number of citations doesn’t control for this.

• Some fields are much larger and would therefore have more citations.
The person who has given more thought to these questions than anyone else is Eugene Garfield.
Like every field...

• Garfield developed what were referred to as “Citation Indexes” to compile information about citation counts.

• These citations indexes evolved into the present day Web of Science

• nb: earlier versions of WoS were referred to as the discipline specific Science Citation Index and Social Science Citation Index
Web of Science

• We can talk about the impact of one article, one author, or one journal. All of this comes from the database Web of Science and the related product, Journal Citation Reports.
  – Bibliographic database.
  – http://isiknowledge.com/wos

• Alternatives to using Web of Science exist, most notably Google Scholar.
The workings of Web of Science

- Journals aren’t included in Web of Science until they have a “proven publication record.”
- Once Web of Science accepts a journal into its list of covered journals...
- The bibliographic information of each article of each issue of the journal is added to their database PLUS the References at the end of the article (REGARDLESS of whether or not the journal it appeared in is one of the journals Web of Science covers.)
References


References as they appear in Web of Science
Times Cited: 228 (from Web of Science)
Cited References: 28 [ view related records ]
Citation Map

These first two are books. Since books aren’t covered in WoS there is no title.

There are 228 articles that cite this one

There are a total of 28 references (a.k.a. Cited References)
Coverage is highly selective back to 1900. Still...it is a very large database.

WEB OF SCIENCE COVERAGE:

- Over 1,600 regional journals recently added
- Over 46 million records across the Sciences, Social Sciences, Arts and Humanities
- Conference Proceedings Citation Index™
  - 1990 to present
  Fully indexes over 148,000 conference titles in the Sciences and Social Sciences with 12,000 conferences added annually
- Science Citation Index Expanded™
  - 1900 to present
  Fully indexes over 8,300 major journals across 150 disciplines
- Social Sciences Citation Index™
  - 1900 to present
  Fully indexes over 4,500 social sciences journals, covering the most significant social sciences discoveries from all of the 20th century.
- Arts & Humanities Citation Index®
  - to 1975 to present
  Fully indexes over 2,300 arts and humanities journals, as well as selected items from over 250 scientific and social sciences journals
Web of Science entries evolved in a time when computer storage was expensive and data entry unsophisticated.

I always think of monkeys entering the references because obvious errors appear that could have been corrected. To correct them would have been too labor intensive.
TITLE: Journal impact factors and self-citations: Implications for psychology journals

AUTHOR(S): Ansee F (REPRINT); Duyck W; De Baene W; Brysbaert M

JOURNAL: AMERICAN PSYCHOLOGIST, 2004, V59, N1 (JAN), P49-51

CITED REFERENCES:

NATURE, 2002, V415, P101

*AM PSYCH ASS, 2001, PUBL MAN AM PSYCH AS
ADAI RG, 2003, V58, P15, AM PSYCHOL
AKSLES DW, 2003, V56, P235, SCIENTOMETRICS
BOOR M, 1982, V37, P975, AM PSYCHOL
GOTTFREDSON SD, 1978, V33, P920, AM PSYCHOL
LAWRENCE PA, 2003, V422, P259, NATURE
MCGarTHY C, 2000, V5, P1, CURRENT RES SOCIAL P
MOED HF, 1999, V46, P575, SCIENTOMETRICS
This is not meant to be a session on Web of Science, but

• Spelling variations are problematic. They use a standardized list of abbreviations but the citation is only as good as the article they are analyzing.

• Errors in citing articles’ citations are perpetuated.

• The increasing role of unpublished working papers articles that may not be indexed by WoS.
The reference list is used to compute the impact factor for the journals cited in the reference list, not the journal that the article came from (unless they’re the same).
From Times Cited to the Impact Factor

• The counts of Times Cited becomes the basis for the Impact Factor. Web of Science citations are compiled in a related database called Journal Citation Reports (JCR). The impact factors are available in JCR.

• The Impact Factor seems to have taken on a life of its own, from a very simple number to a oft-cited (pun intended) badge of honor.
Impact factor bragging rights
Impact Factor

• The Impact Factor is an attempt to measure the impact a journal has had.
• It is designed to “scale” the number of times a journal has been cited.
• The older an article is, the more opportunities it has to have been cited.
• Some disciplines have more people working in them (child psychology vs. demography; surgery vs. mycology)
Human Fertility now indexed by ISI

Dear Colleagues,

Informa Healthcare is pleased to announce that Human Fertility is now indexed by ISI and will receive its first Impact Factor in 2012!

Human Fertility is a leading international, multidisciplinary journal dedicated to furthering research and promoting good practice in the areas of human fertility and infertility. Topics included span the range from molecular medicine to healthcare delivery, and contributions are welcomed from professionals and academics from the spectrum of disciplines concerned with human fertility.

Editor-in-Chief:
Professor Henry Leese
University of Hull, UK

Wiley-Blackwell, the scientific, technical, medical, and scholarly business of John Wiley & Sons, Inc., today announced that two thirds of its journals (57% and 1,013 titles) have an Impact Factor according to the Thomson ISI® 2010 Journal Citation Reports (JCR). This is a higher proportion of the list than any other major journals publisher. Of these ranked titles, nearly a quarter are in the top ten of their subject category (332 titles) whilst two thirds are in the top half of their category.
## Journal: FUTURE OF CHILDREN

<table>
<thead>
<tr>
<th>Mark</th>
<th>Journal Title</th>
<th>ISSN</th>
<th>Total Cites</th>
<th>Impact Factor</th>
<th>5-Year Impact Factor</th>
<th>Immediacy Index</th>
<th>Citable Items</th>
<th>Cited Half-life</th>
<th>Citing Half-life</th>
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<tr>
<td></td>
<td>FUTURE CHILD</td>
<td>1054-8289</td>
<td>968</td>
<td>1.535</td>
<td>4.213</td>
<td>0.500</td>
<td>18</td>
<td>7.5</td>
<td>5.7</td>
</tr>
</tbody>
</table>

**Journal Information**

- **Full Journal Title:** FUTURE OF CHILDREN
- **ISO Abbrev. Title:** Future Child.
- **JCR Abbrev. Title:** FUTURE CHILD
- **ISSN:** 1054-8289
- **Issues/Year:**
- **Language:** ENGLISH
- **Journal Country/Territory:** UNITED STATES
  - Publisher Address: 277 WALLACE HALL, PRINCETON, NJ 08544
- **Subject Categories:** FAMILY STUDIES, HEALTH POLICY & SERVICES, SOCIAL SCIENCES, INTERDISCIPLINARY

**Journal Impact Factor**

- **Cites in 2010 to items published in:**
  - 2009 = 9
  - 2008 = 57
  - Sum: 66
- **Number of items published in:**
  - 2009 = 26
  - 2008 = 17
  - Sum: 43
- **Calculation:** Citations to recent items = 66, Number of recent items = 43
- **Impact Factor = 1.535**
Computing Journal Impact Factor

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
<th>Sum:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cites in 2010 to items published in:</td>
<td>9</td>
<td>57</td>
<td>66</td>
</tr>
<tr>
<td>Number of items published in:</td>
<td>26</td>
<td>17</td>
<td>43</td>
</tr>
</tbody>
</table>

Calculation: Cites to recent items = \( \frac{66}{43} = 1.535 \)

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
<th>2007</th>
<th>2006</th>
<th>2005</th>
<th>Sum:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cites in {2010} to items published in:</td>
<td>9</td>
<td>57</td>
<td>39</td>
<td>181</td>
<td>110</td>
<td>396</td>
</tr>
<tr>
<td>Number of items published in:</td>
<td>26</td>
<td>17</td>
<td>17</td>
<td>18</td>
<td>16</td>
<td>94</td>
</tr>
</tbody>
</table>

Calculation: Cites to recent items = \( \frac{396}{94} = 4.213 \)

<table>
<thead>
<tr>
<th>Total Cites</th>
<th>968</th>
<th>Self Cites</th>
<th>13 (1% of 968)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cites to Years Used in Impact Factor Calculation</td>
<td>66</td>
<td>Self Cites to Years Used in Impact Factor Calculation</td>
<td>0 (0% of 66)</td>
</tr>
<tr>
<td>Impact Factor</td>
<td>1.535</td>
<td>Impact Factor without Self Cites</td>
<td>1.535</td>
</tr>
</tbody>
</table>

The tables show the contribution of the journal’s self cites to its impact factor. This information is also reflected in the calculation.
Social Science Subject Categories for Journal Citation Reports (JCR)

- Anthropology
- Area Studies
- Business
- Business, Finance
- Communication
- Criminology & Penology
- Demography
- Economics
- Education & Educational Research
- Education, Special
- Environmental Studies
- Ergonomics
- Ethics
- Ethnic Studies
- Family Studies
- Geography
- Gerontology
- Health Policy & Services
- History
- History & Philosophy Of Science
- History of Social Sciences
- Industrial Relations & Labor
- Information Science & Library Science
- International Relations
- Law
- Linguistics
- Management
- Nursing
- Planning & Development
- Political Science
- Psychiatry
- Psychology, Applied
- Psychology, Biological
- Psychology, Clinical
- Psychology, Developmental
- Psychology, Educational
- Psychology, Experimental
- Psychology, Mathematical
- Psychology, Multidisciplinary
- Psychology, Psychoanalysis
- Psychology, Social
- Public Administration
- Public, Environmental & Occupational Health
- Rehabilitation
- Social Issues
- Social Sciences, Biomedical
- Social Sciences, Interdisciplinary
- Social Sciences, Mathematical Methods
- Social Work
- Sociology
- Substance Abuse
- Transportation
- Urban Studies
- Women's Studies

Journals are assigned to one or more categories. That is how the impact factor takes on bragging rights.
Impact factor vs. total cites for Demography Journals

### Table 1: Impact Factor vs. Total Cites for Demography Journals

<table>
<thead>
<tr>
<th>Rank</th>
<th>Journal Title</th>
<th>Total Cites</th>
<th>Impact Factor</th>
<th>5-Year Impact Factor</th>
<th>Influence Index</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DEMOGRAPHY</td>
<td>3320</td>
<td>2.466</td>
<td>3.817</td>
<td>0.316</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>POPUL DEV REV</td>
<td>1091</td>
<td>3.781</td>
<td>3.760</td>
<td>0.306</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>INT MIGR REV</td>
<td>1032</td>
<td>3.168</td>
<td>3.144</td>
<td>0.180</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>POP STUD-I DEMOG</td>
<td>998</td>
<td>2.787</td>
<td>3.703</td>
<td>0.222</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>POPUL SCI</td>
<td>874</td>
<td>1.786</td>
<td>1.818</td>
<td>0.259</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>J BRIDSEC SCI</td>
<td>684</td>
<td>1.217</td>
<td>1.330</td>
<td>0.196</td>
<td>51</td>
</tr>
<tr>
<td>7</td>
<td>J ETHNIC STUD</td>
<td>616</td>
<td>1.398</td>
<td>1.447</td>
<td>0.300</td>
<td>97</td>
</tr>
<tr>
<td>8</td>
<td>PERSPECT SEX RENQ</td>
<td>572</td>
<td>2.975</td>
<td>3.842</td>
<td>0.280</td>
<td>28</td>
</tr>
<tr>
<td>9</td>
<td>J POPUL ECON</td>
<td>503</td>
<td>0.948</td>
<td>1.357</td>
<td>0.281</td>
<td>57</td>
</tr>
<tr>
<td>10</td>
<td>DEMOG RES</td>
<td>458</td>
<td>1.531</td>
<td>1.582</td>
<td>0.159</td>
<td>89</td>
</tr>
</tbody>
</table>

### Diagram 1: Ranking of Journals by Impact Factor

- **Ranking is based on your journal and sort selections.**

- **Top 10 Journals:**
  - PERSPECT SEX RENQ
  - DEMOGRAPHY
  - POPUL DEV REV
  - INT FAM PLAN PERSPEC
  - POPUL SCI
  - J BRIDSEC SCI
  - J ETHNIC STUD
  - PERSPECT SEX RENQ
  - J POPUL ECON
  - DEMOG RES
You do the math!

- Impact factor = \frac{\text{Cites to recent items}}{\text{Number of recent items}}
- For journals with a few articles, the impact factor is easily influenced by the number of citations.
- The latency (time to get published) makes using the previous two years of citations problematic.
- All citations count in the numerator, but certain types of articles are excluded from the denominator.
- A citation counted in the numerator may be a critique of the article in question.
Alternatives to impact factor

- 5 year impact factor
- Eigenfactor Score™ (see West et al., 2008)
- H-index (see Hirsch, 2005 in References)

- Calculations that may make sense in science, don’t seem relevant in social science.
  - Cited half life
  - Immedicacy
  - H-factor
Sins of Omission

• One of my proudest moments at Princeton was when I realized that a certain journal’s low ranking was due to a failure to send issues of the journal to the people who produce Web of Science.

• Fortunately this was before every impact factor became a household word.
Google Scholar vs. Web of Science

• Web of Science is the rich man’s Google Scholar.
• We pay more than $100,000 for Web of Science. We have the full-blown version.
• Remember how Web of Science is created (data entry of each reference in a complete issue of a journal). Google is created much differently.
Google Scholar vs. WoS

Being indexed in WoS requires admission to the “in crowd.”

Google Scholar includes everything that its robots can crawl on the internet.
Complete citation analysis requires both GS and WoS.
New! Google Scholar Citations open to all

Office of Population Research
Princeton University
Unknown interests
Verified email at princeton.edu
My profile is private

Citation indices

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Since 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citations</td>
<td>12465</td>
<td>4865</td>
</tr>
<tr>
<td>h-index</td>
<td>61</td>
<td>35</td>
</tr>
<tr>
<td>i10-index</td>
<td>161</td>
<td>117</td>
</tr>
</tbody>
</table>

Citations to my articles

Select: All, None

<table>
<thead>
<tr>
<th>Title / Author</th>
<th>Citations</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraceptive technology</td>
<td>1132</td>
<td>2008</td>
</tr>
<tr>
<td>RA Hatcher, J Trussell, AL Nelson PDR Network</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contraceptive failure in the United States: a critical review of the literature</td>
<td>423</td>
<td>1987</td>
</tr>
<tr>
<td>J Trussell, K Kost Studies in Family Planning 18 (5), 237-283</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age and infertility</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The best way to keep track of who is citing you.

- Have a very complete copy of your publications
- Use Web of Science and Google Scholar. They will produce overlapping and unique results
“Kids, don’t try this at home”--Using Web of Science

• Have a librarian help you do a Cited Reference Search in Web of Science to get citations from journals not covered by Web of Science.
• Important to search variants of name, etc.
• Create an alert to be notified when new articles that cite your work have been added.
“Kids don’t try this at home”--
Using Google Scholar

• Conduct a search in Google Scholar for all your publications
  – There may be multiple entries for the same article
• Create an alert in Google Scholar for all your publications
• Use Google’s new Google Scholar Citations
• Depending on your discipline, use Scopus and Biosis, too.
Conclusions

• Journal Impact Factor is a very crude measure of a journal’s impact in a discipline

• Do not make important decisions about submitting to a journal based on it
Bibliography


