**Appendix A. Criticisms of the Journal Impact Factor**

While the purpose here is not to evaluate all the criticisms of the JIF, I outline many of the common concerns below:

* **Citable Materials:** As calculated by the Thompson Reuters and reported in the JCR, citations outside the ISI database are not included and many citations in books are not included (refs - Harzing). This is expected to be a large problem in the humanities because much of the scholarly work is in the form of books ([Pendlebury 2009](#_ENREF_6))
* **Free Citations:** Letters and editorials do not count towards the number of papers published but the citations to these materials (i.e. increase numerator citations but not denominator publication number). Therefore, journals with lively discussion through letters and editorials have inflated JIFs ([Cameron 2005](#_ENREF_1))
* **Insufficient Time Period:** For the standard 2-year JIF, the spread of information and rate of journal publication is often not sufficient to allow for citations from outside scholars; therefore, the 2-year JIF is overly influenced by self citations ([McGarty 2000](#_ENREF_4))
* **Distributional Representation:** The JIF is also calculated as using the mean citations per article but the distribution of citations among articles in generally highly skewed ([Seglen 1997](#_ENREF_7)), making the mean and inappropriate measure of the impact of a journal as a whole. The use of the arithmetic mean is also potentially sensitive to outliers.
* **Review Articles:** The JIF is also influenced by the publication of review articles, which tend to be highly read and cited, but potentially in disproportion to their influence compared with original research papers.
* **Inflation:** The average JIF across all journals tends to increase over time as more articles are published with more citations (although many journals are now limiting the number of citations to save print space). Therefore, journals that have increasing JIFs might appear to be increasing in influence, but if their JIF could be increasing slower than the rate of inflation. These journals may be decreasing in influence compared with others in the field ([Neff & Olden 2010](#_ENREF_5)).
* **Over simplification:** Many consider the JIF to be overly simplistic; therefore, it does not sufficiently represent the full, multi-dimensional scope of a journal’s influence ([Pendlebury 2009](#_ENREF_6))
* **Multidisciplinary journals:** It can be difficult to interpret which fields of study contribute to the journal influence if many fields of study are published in one journal ([Pendlebury 2009](#_ENREF_6))
* **Journal Exclusion:** Not all journals are indexed by Thompson Reuters and there is bias in relation to nation and languages ([Pendlebury 2009](#_ENREF_6))
* **Manipulation:** The JIF can be manipulated through publishing practices. Increasing the rate of publication, soliciting review articles, and encouraging self-citation can enhance a journal’s impact factor.

**Appendix B. – Definitions of Journal Influence Metrics**

JIF – The journal impact factor is defined as the number of citations to all articles in a journal published in the previous 2 years divided by the number of articles published by that journal in that time frame.

JIF5 – The 5-year journal impact factor is calculated the same way as the JIF but over 5 years rather than the previous 2 years

Eigenfactor – Scholarly interactions exist in a network connected by citations among articles. The influence of an article does not necessarily stop with the publications that cite the original article but extends through the network of scholarly work citing those secondary publications. The Eigenfactor uses network theory in an algorithm, similar to Google PageRank, to iteratively resample the network to determine the influence of journals in the network. It uses a modified version of eigenvector centrality methods to overcome problems of dangling nodes at the edges of the network. The details of the algorithm are beyond the scope of this paper, but more information including the code used can be found at (<http://www.eigenfactor.org>) and the Eigenfactor is originally described in Bergstrom (REF 2007) (provide in appendix? - http://www.eigenfactor.org/methods.pdf). Of note, the Eigenfactor reported in the JCR does not include self citations and the sum the Eigenfactors for all journals in the database sums to 100. Therefore, the Eigenfactor score of a journal can be interpreted as the total influence of the journal on scholarly thought as identified through citations.

Article Influence (AI) – the citation influence of a journal on a per citation basis. It is calculated as

where EF is the Eigenfactor value and *a* is the number of articles over a 5 year time period. As with the Eigenfactor, the AI does not include self citations. The article influence score is intended to be comparable to the JIF because the EF measures the entire influence of a journal whereas the JIF and AI calculate the influence on a per-article basis.

H-index – the number of papers that have at least H citations (Hirsch ref). While originally intended as a metric of author influence, Harzing and van der Wal (REF: 2007) showed that it can be used as a metric for journal influence. Although the H-index can be calculated over any timeframe, it is often calculated over the previous 5 years when comparing current influence.

Hc-index – the contemporary H-index is an age-adjusted version of the H-index. It is calculated using gamma=4 and delta=1 by Publish or Perish software (Antonis Sidiropoulos, Dimitrios Katsaros, and Yannis Manolopoulos in their paper **Generalized h-index for disclosing latent facts in citation networks**, *[arXiv:cs.DL/0607066](http://arxiv.org/abs/cs.DL/0607066" \t "_blank) v1 13 Jul 2006*.) – now in Scientometrics 2007

e-index – the square root of the number of citations above the H-index. It is intended to complement the H-index by differentiating between authors or journals with different citation patters but similar H-indices (Chun-Ting Zhang in his paper **The e-index, complementing the h-index for excess citations**, *PLoS ONE*, Vol 5, Issue 5 (May 2009), e5429.)

g-index – similar to the H-index but represents the number of papers such that g papers have at least g2 citations (by Leo Egghe in his paper **Theory and practice of the g-index**, *Scientometrics, Vol. 69, No 1 (2006), pp. 131-152)*

AR-index - The AR-index stands for the age-dependent index calculated using square-root. It is calculated as

where *Hcore* are the publications constituting the H-index, *Citp* is the number of citations for publication *p* in the H-index, and *ap* is the age of publication *p*. The AR-index is intended to adjust the H-index for age and allow the index to decrease over time, unlike the H-index which can only increase over time ([Jin 2007](#_ENREF_3)). However, for the purpose of understanding journal influence, I calculated the AR-index including all publications found for each journal during 2007-2011. As it is age-adjusted, this should more accurately reflect the total scientific influence of each journal, at least with respect to citations (see Altmetrics for limitations).

SNIP – The Source Normalized Impact per Paper is intended to correct for differences in publication characteristics across fields of study. Some fields of study publish more quickly, allow more citations per paper, and have a greater total volume of publications than other fields. These characteristics lead to differences in most citation metrics unrelated to the influence of papers within a discipline. This may be a concern even within journals publishing ecologically-oriented papers because ecology spans a variety of disciplines including evolution, genetics, physiology, conservation, and behavior. To calculate the SNIP, the raw impact per paper is divided by the database citation potential, which adjusts for differing publication characteristics across fields of study. The SNIP is calculated over 3-year periods using Elsevier’s Scopus database and is freely available at [www.journalmetrics.com](http://www.journalmetrics.com). Greater detail on SNIP methodology can be found in Colledge *et al.* ([2010](#_ENREF_2)) and Waltman *et al.* ([2013](#_ENREF_8)).

SJR – The SCImago Journal Rank is similar to the Article Influence, in that it measures the influence of journals based on their network of citations on a per article basis. However, it differs from the AI by weighting citations based on the influence of the citing journal. Journals that act as larger hubs in the citation network receiving higher weights. Weighting is calculated iteratively. Again, the details of the SJR are beyond the scope of this paper but details can be found in Guerrero-Bote and Moya-Anegon (Ref: 2012). Of note for the purposes of this paper, the SJR is calculating using the Scopus database over a 3-year window and only citations from and to scholarly papers are used, excluding books and technical reports.

**Appendix C.** – All journals, all metrics (won’t fit in word document but would work as a supplement or link to online database)

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