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Editorial

More citations, but a fall in impact factor

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On 29 June 2011, the Institute for Scientific Information (ISI) released its annual statistics on citations of articles published in previous years in scientific journals. A number of different summary statistics are produced by the ISI, the most widely discussed being the impact factor. I have used previous editorials to keep readers informed of the most recent statistics for the *BJN* and to analyse them in relation to those of comparator journals and to temporal changes[1–6]. The *BJN* is listed in the Nutrition and Dietetics category of ISI Journal Citation Reports®. In 2010, there were seventy journals listed in this category, including review journals and journals in the areas of obesity (e.g. *International Journal of Obesity, Obesity*) and lipidology (e.g. *Progress in Lipid Research*, *Lipids*). The impact factor of a journal is calculated as the number of citations of papers published in the previous 2 years divided by the number of papers published in those 2 years. Thus, the impact factor for 2010 (issued in 2011) is based upon the number of citations during 2010 of papers published in a particular journal in 2008 and 2009 divided by the number of papers published in that journal in 2008 and 2009. Clearly, this favours very rapidly moving areas of research. Hence, journals such as *Nature*, *Cell* and *Science* have high impact factors (36·1, 32·4 and 31·4, respectively, for 2010). For the past 9 years, the two highest ranked journals in the Nutrition and Dietetics category have been *Progress in Lipid Research* and *Annual Reviews in Nutrition*, with impact factors of 9·51 and 7·88, respectively, for 2010. Table 1 lists the impact factors for the *BJN* and nine comparator journals over the period 2001–10 inclusive. The comparator journals all publish a similar range of material as does the *BJN*, including molecular, cellular, whole body, human, clinical, public health and experimental animal nutrition and, in most cases, also farm animal nutrition. It is evident that the *American Journal of Clinical Nutrition* is firmly established as the highest ranked journal in this category that is not solely limited to publishing review articles. In 2010, the impact factor of the *BJN* slipped from 3·45 to 3·07 (2559 citations in 2010 to the 833 articles published in 2008 and 2009). This slip is disappointing and is due, I think, to the increased number of articles now being published in the *BJN*[7]. Nevertheless, an impact factor above 3 is a sign of good health of the journal and it is firmly established in the top 30 % of journals in the category. Readers may be interested in the impact factors of our sister journals. For 2010, these were 3·93, 3·77 and 2·08 for *Proceedings of the Nutrition Society* (ranked 10/70), *Nutrition Research Reviews* (11/70) and *Public Health Nutrition* (39/70), respectively.

Table 2 lists the articles published in the *BJN* during 2008 and 2009 that were most highly cited in 2010[8–23]. This table indicates the importance of review articles and the *Horizons in Nutritional Science* series to the impact factor of the journal. Although the articles published in 2008 continue to be cited (Table 2), they will not contribute to the impact factor for 2011 which will be based upon articles published in 2009 and 2010.

One argument against the importance of impact factor in indicating the 'value' of a journal is that the time frame over which it is calculated is too short to really reflect the impact that the articles that a journal publishes will have. Thus, alternative measures of article citations are available. These include the total number of citations made to articles published in a journal, the 5-year impact factor and the cited half-life of articles. Table 3 lists the total number of citations made to articles published in the *BJN*, irrespective of their year of publication, during the years 2000–10. In 2010, articles published in the *BJN* were cited 14 057 times, placing the *BJN* fifth in the Nutrition and Dietetics category for total citations in 2010. It is apparent that the total number of citations of articles in the journal has increased year-on-year and increased by 9 % from 2009 and by over 150 % since 2000. The cited half-life of a journal (Table 3) is the median age of the articles published in that journal that are cited in the reporting year. Thus, publication of articles that remain important (or controversial) long after they are published will result in a long cited half-life. The cited half-life of the *BJN* for 2010 was 6·9 years, indicating that half of the citations to articles in the *BJN* in 2010 were to articles published in 2003 or before. Thus, it seems to me that the *BJN* is publishing articles that are seen as important in the short term, as judged by the reasonably high impact factor (within the journal category), but which remain important for many years, as judged by the cited half-life. For comparison, the cited half-lives for the *American Journal of Clinical Nutrition* and the *Journal of Nutrition* for 2010 were 8·0 and 8·1 years, respectively. The immediacy index is calculated as citations of articles published in the reporting year (e.g. 2010) by papers published in the same year. It is a measure of how immediately important (or controversial) published papers are. For 2010, the immediacy

Table 1. Impact factor of the British Journal of Nutrition and comparator journals over the period 2001–10 (data are from ISI Journal Citation Reports®)

	2001		2002		2003		2004		2005	
	Impact factor	Ranking	Impact factor	Ranking	Impact factor	Ranking	Impact factor	Ranking	Impact factor	Ranking
American Journal of Clinical Nutrition	5·02	2/50*	5·60	3/50	5·69	3/53	5·43	3/53	5·85	3/53
Journal of Nutrition	3·25	5/50	3·62	4/50	3·32	5/53	3·25	7/53	3·69	7/53
Clinical Nutrition	2·46	9/50	1·55	22/50	1·19	32/53	2·02	18/53	2·29	15/53
European Journal of Nutrition	2·13	13/50	1·64	21/50	1·68	22/53	2·09	17/53	2·26	16/53
British Journal of Nutrition	1·99	16/50	2·49	7/50	2·62	9/53	2·71	10/53	2·97	9/53
Nutrition	1·43	23/50	2·27	10/50	2·32	11/53	1·96	19/53	2·06	20/53
European Journal of Clinical Nutrition	1·77	20/50	1·94	18/50	1·86	19/53	2·13	16/53	2·16	18/53
Annals of Nutrition and Metabolism	1·01	31/51	1·08	28/50	1·81	20/53	1·07	35/53	1·56	29/53
Nutrition Research	0·60	37/50	0·79	35/50	0·72	39/53	0·57	41/53	0·77	40/53
Journal of the American College of Nutrition	1·53	22/50	2·17	11/50	2·98	7/53	2·80	9/53	2·21	17/53

	2006		2007		2008		2009		2010	
	Impact factor	Ranking	Impact factor	Ranking	Impact factor	Ranking	Impact factor	Ranking	Impact factor	Ranking
American Journal of Clinical Nutrition	6·56	3/55	6·60	3/56	6·74	3/59	6·31	3/66	6·61	3/70
Journal of Nutrition	4·01	5/55	3·77	7/56	3·65	8/59	4·09	8/66	4·29	8/70
Clinical Nutrition	2·47	15/55	2·88	14/56	3·20	12/59	3·27	14/66	3·41	15/70
European Journal of Nutrition	2·36	18/55	2·09	23/56	1·89	29/59	2·87	18/66	3·34	16/70
British Journal of Nutrition	2·71	12/55	2·34	17/56	2·76	15/59	3·45	11/66	3·07	19/70
Nutrition	2·23	20/55	2·10	21/56	2·28	23/59	2·60	23/66	2·73	21/70
European Journal of Clinical Nutrition	2·12	22/55	2·33	18/56	2·69	18/59	3·07	17/66	2·56	24/70
Annals of Nutrition and Metabolism	1·62	30/55	1·83	28/56	1·24	40/59	1·97	32/66	2·17	35/70
Nutrition Research	0·73	44/55	0·68	51/56	0·87	48/59	1·19	49/66	2·09	37/70
Journal of the American College of Nutrition	2·45	16/55	2·28	19/56	2·16	25/59	2·36	26/66	1·95	40/70

* Ranking amongst journals in the Nutrition and Dietetics subject category.

Table 2. Articles published in the *British Journal of Nutrition* in 2008 and 2009 that were most highly cited in 2010 (data were obtained from ISI Web of Science® on July 2011)

	Type of article	Citations in 2010	Total citations to date
Rayman[8]	Review	29	68
Trayhurn *et al.*[9]	Horizons	28	73
Lillycrop *et al.*[10]	Research paper	26	58
Rayman *et al.*[11]	Review	25	48
Rzehak *et al.*[12]	Research paper	21	33
Cooper *et al.*[13]	Review	19	56
Galgani *et al.*[14]	Review	18	33
Spencer *et al.*[15]	Review	17	35
Zimmermann[16]	Supplement article	15	26
Romier *et al.*[17]	Research paper	15	20
Ramirez-Farias *et al.*[18]	Research paper	13	29
Chapkin *et al.*[19]	Review	13	28
Tzounis *et al.*[20]	Research paper	13	27
Swarbrick *et al.*[21]	Research paper	13	24
Egert *et al.*[22]	Research paper	13	21
McNulty *et al.*[23]	Supplement article	13	17

index of the *BJN* was 0·507 (231 citations in 2010 of 456 articles published in 2010). In 2008, the 5-year impact factor was calculated for the first time; this is the number of citations in the year to articles published in the previous 5 years. For 2010, the 5-year impact factor of the *BJN* was 3·30 (5880 citations in 2010 to 1781 articles published from 2005 to 2009 inclusive), placing it 17th in the Nutrition and Dietetics category. For comparison, 5-year impact factors for the *American Journal of Clinical Nutrition* and the *Journal of Nutrition* for 2010 were 7·50 and 4·41, respectively. The final statistic shown in Table 3 is the Eigenfactor™ score. This is a complex calculation which, like impact factor, is a ratio of the number of citations to the total number of articles published. However, unlike the impact factor, the Eigenfactor™ score counts citations to journals in both the sciences and social sciences, eliminates self-citations (i.e. every reference from one article in a journal to another article from the same journal is discounted) and weights each reference according to a stochastic measure of the amount of time researchers spend reading the journal (http://www.eigenfactor.org/methods.htm). For 2010, the Eigenfactor™ score of the *BJN* was 0·0302, placing it sixth in the Nutrition and Dietetics category for 2010.

Another relatively new statistic is the Article Influence™ score, which calculates the relative importance of the journal on a per-article basis. It is the journal's Eigenfactor™ score divided by the fraction of articles within the category published by that journal. That fraction is normalised so that the mean Article Influence™ score within the category is 1·00. A score greater than 1·00 indicates that each article in the journal has above-average influence, while a score less than 1·00 indicates that each article in the journal has below-average influence. For 2010, the Article Influence™ score of the *BJN* was 0·872, placing it 17th in the Nutrition and Dietetics category. For comparison, the Article Influence™ scores for the *American Journal of Clinical Nutrition* and the *Journal of Nutrition* for 2010 were 2·271 and 1·227, respectively.

Table 3. Citation statistics for the *British Journal of Nutrition* 2000–10

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Impact factor	2·415	1·989	2·491	2·616	2·710	2·967	2·708	2·339	2·764	3·45	3·07
Total citations	5515	5360	6205	7144	7204	7893	8665	9843	11 287	12 904	14 057
Cited half-life (years)	> 10·0	8·9	8·0	7·7	7·0	6·3	6·8	7·1	7·1	7·0	6·9
5-Year impact factor								3·13	3·23	3·57	3·30
Immediacy index	0·307	0·283	0·402	0·500	0·515	0·289	0·300	0·337	0·602	0·530	0·507
Eigenfactor™ score								0·02486	0·02741	0·03080	0·03024

My overall view based upon these statistics is that the *BJN* is doing well, but could do better. As I indicated in my previous editorials[2–7], the *BJN* is receiving more submissions and is publishing more articles than ever before[7]. This suggests that the journal is in very good health and is viewed favourably by researchers within the discipline. My aim is to act to further improve the impact factor, the 5-year impact factor and the Article Influence™ score in order that the prestige and attractiveness of the *BJN* are maintained in the face of mounting competition from other journals, and that its perceived quality is enhanced. An improvement in (perceived) quality of the *BJN* will assure its place amongst the top journals in the field.

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