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Lost or found in translation? To what extent are the translations of scientific, medical and technical texts the key to their dissemination and impact?

Duplicate Publications and the Status of Cover-to-Cover Translations

An issue that has recently caused concern among Information Science specialists is the ethical question arising from so-called duplicate publications. Research into potentially unethical behavior on the part of authors has sought to identify by electronic means the incidence of three phenomena: duplication, co-submission, and plagiarism.[1] The exponential growth of the Internet and explosion of online journals mean opportunities to publish have multiplied, but this boom has been accompanied by the increasing ease with which unethical authors can 'break rules' in their search for enhanced 'impact'. Defined by Yue and Wilson[2] as „a forceful consequence or strong influence", 'impact' is generally understood to be an indirect indicator of the quality, importance, influence or performance of publications.

Our principle aim is to determine how much language of publication influences any given journal's impact. Errami and Garner[1] argue that duplicate publication makes „significant works available to a wider audience, especially in other languages" and report that 20% of duplicate publications are translations into another language, which suggests the market for professional translators is growing apace with the publishing boom. Comparisons of publication volume suggest the countries that publish the most, produce the most duplicate publications too. The only variation is found in works of authors from China and Japan, where translations account for rather more of the total.

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[1] Mounir Errami and Harold Garner: „A tale of two citations", in *Nature*, 2008,451,S. 397-399

[2] W. Yue and C. S. Wilson: „Measuring the citation impact of research journals in clinical neurology: A structural equation modelling analysis", in *Scientometrics*, 2004,60,S. 317–332

'Impact' and the *Journal of Citation Reports'* (JCR) 'Impact factor' (IF) have become bywords in scientific publication and our case studies illustrate how specific editorial strategies–here, the decision to publish in English rather than in a national language–are adopted to enhance a journal's status and achieve greater impact.

The Matthew Effect

The authors of scientific publications are subject to what is termed „the Matthew effect":

> For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath.[3]

Jackson[4] suggests that authors who have achieved a certain status find it comparatively easy to gain recognition for their publications–'status-enhancement'–whereas those who have yet to establish a reputation are less likely to be given recognition–'status-suppression'. For authors who publish in languages other than English, 'status-suppression' is a fact of life. Ardila,[5] Bakewell,[6] Bekavac[7] and Vandenbroucke[8] lament but reluctantly accept the need to publish in English. They describe a scientific social status gap between 'upper' and 'lower class' authors on the basis of the language they choose as their medium of communication. Gibbs[9] surveys status-suppression in the developing world and warns of its consequences in terms of status, recognition and, most importantly, finance.

Eugene Garfield–who invented the IF–considered these circumstances normal and pointed to two significant consequences of the 'language barrier':

> First, those [authors] whose native language is not English risk being unaware of–and overlooked by–mainstream international research unless they learn to read, write, and publish in English. Second, native English-speaking researchers risk

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[3] Matthew 25: 29

[4] R. Jackson: „The Matthew Effect in science", in *International Journal of Dermatology*, 1968, 27, S. 16

[5] Rubén Ardila: „International psychology", in *American Psychologist*, 1982,37,S. 323–329

[6] David Bakewell: „Publish in English, or perish?", in *Nature,* 1992,356,S. 648

[7] Anamarija Bekavac, Jelka Petrak and Zoran Buneta: „Citation behavior and place of publication in the authors from the scientific periphery: A matter of quality?", *Information Processing & Management*, 1994,30,S. 33-42

[8] J. P. Vandenbroucke: „On not being born a native speaker of English", in *British Medical Journal*, 1989,298,S. 1461-1462

[9] W. Wayt Gibbs: „Lost Science in the Third World", in *Scientific American*, 1995,273,2,S. 92-99

> being ignorant of significant findings reported in foreign languages […] unless they become proficient in at least one other language.[10]

Garfield's research was Anglocentric, ignoring any possible value of publishing in languages other than English. The answers to his three research questions–Who writes in what languages? Who cites what languages? and Who cites what nations?–reinforced the dominance of English showing that 32.8% of Spanish authors published in English; only 1.5% of Spanish authors cited Spanish-language publications; and most authors cited English-language publications most, despite the attraction of language self-citation (i.e. Spanish-language authors citing Spanish-language publications).

Following a brief review of the literature, the present article analyzes the consequences of REC's editorial decision to adopt cover-to-cover translation into English and begins with a brief case study of REC. We then report a parallel study involving *Annales de l'Institut Pasteur* (AIP).

Review of the Literature

To gain a broader perspective of the language/IF relation we have conducted an online review of the literature in search of earlier studies that specifically deal with different aspects of the impact of scientific publications and the role of language of publication. To construct our initial bibliography, we began with an 'All fields' search of the Scopus database using the keywords: 'Scientific publications' AND 'Impact factor' AND 'Translation' AND 'Spanish language;' and we filtered out publications in languages other than English and Spanish. This search produced no results. Removing 'Spanish language' provided eight hits of which manual revision excluded two: one that we considered irrelevant and another that was published in Slovak and had 'slipped past' the language filter. A 'Topic' search of the Web of Science (WoS) using the same initial set of keywords and filters produced no results either. Removing 'Spanish language' from this search also proved fruitless and by trial and error we arrived at the following combination which did produce results susceptible to manual editing: 'Scientific publications' AND 'Translation' NOT 'Knowledge translation' resulted in 19 hits. Manual revision excluded 15 references: one was neither published in English nor Spanish and 14 others dealt with different topics. Our bibliography was therefore founded on these texts, which we audited manually to add further references on the basis of the authors' citations.

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[10] Eugene Garfield and Alfred Welljams-Dorof: „Language Use in International Research: A Citation Analysis", in *Annals of the American Academy of Social and Political Science*, 1990,511,S. 10-24

Variables

The initial results of our search reveal that impact and language of publication are but two of the variables included in the multidimensional field of assessment into research. Our study has identified access, author geographical location, authorship practices, citation practice, editorial board, editorial strategy, the Immediacy index (II), internationality, journal geographical location, language, marketing peer-review and quality as just some of the variables representing other dimensions of the field. Furthermore, our reading has revealed bias, the limitations of the IF, and manipulation of the IF as some of the confounding issues which have undergone empirical investigation, the results of which contribute to our present study.

In the field of basic research, the need for assessment has been justified in terms of the so-called 'sophistication factor', which defines the growth in the cost of ever-more sophisticated research methods; the constraints on public expenditure; the failings of the increasingly pressed peer-review process; and the demand for public accountability. In applied research, customer satisfaction represents a further input to assessment. Martin[11] considers that this multidimensionality demands the balanced use of a range of performance indicators in addition to exhaustive peer-review but balancing the costs and benefits of this dual approach are crucial in the decision-making process. Indicators that can provide hard data in comparatively shorter periods of time at lower costs–such as publication counts, citation counts, IF scores–are generally preferred to more time consuming procedures such as extensive peer-review. The benefits of using a multidimensional approach lie in the fact that it more accurately reflects the multidimensional nature of research. Whatever approach we take, the results can only ever be comparative.

In this context, Martin views language of publication as a component of 'impact' and suggests that the 'impact' of a publication describes

> Its *actual* influence on surrounding research activities at a given time. While this will depend partly on its importance, it may also be affected by such factors as the location of the author, and the prestige, language and availability of the publishing journal.

Yue and Wilson[2] are more precise in their configuration of indicators englobing language within journal accessibility–a conglomerate including circulation and the existence or not of an electronic version–although their definition of the concept is perhaps equally unhelpful in that it groups quality, influence, importance and performance all together.

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[11] B. R. Martin: „The use of multiple indicators in the assessment of basic research", in *Scientometrics*, 1996,36,S. 343-362

We would stress the importance of the fact that impact, and most especially the IF, is an indirect indicator and can also be highly imperfect. Impact is relatively immediate but may be positive or negative; impact does not necessarily equate with quality.[12,13]. Hence, valuing impact and an increase in a journal's IF as evidence of 'success' should be, at the very least, qualified by an awareness of the complexity of the concept.

The Impact Factor

A scientific publication's IF score for a given year is calculated on the basis of the number of citations of articles published in the two previous years, divided by the number of citable articles published in the same two years

The use and abuse of the IF has been reported widely.[14,15] Perhaps the most notable flaw highlighted by these authors is the fact that the IF is determined by factors other than the quality of the articles, many of which are of a technical nature. Other factors include differences in citation rates and research field dependence. The technical issues involved can be manipulated through the application of certain editorial strategies.

Editorial Strategies

The decision as to which articles are considered citable (the denominator in the IF equation) is solely that of WoS. However, definitions are public and journals are able to confer with WoS and, even, discuss changing which documents they have published are considered citable. Some editors show concern over the composition of the denominator and its influence on their journal's IF. Moreover, there are a number of ways in which editorial policy can intentionally or accidentally influence the citable articles included in a journal. Chew et al[16] report editorial awareness of four areas in which changes can lead to a reduction in the total number of citable articles: *(1)* a conscious decision to publish fewer citable articles, *(2)* changes in article

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[12] Jens Minnerup, Heike Wersching, Kai Diederich, Matthias Schilling, Erich Bernd Ringelstein, Jürgen Wellmann and Wolf-Rüdiger Schäbitz: „Methodological quality of preclinical stroke studies is not required for publication in high-impact journals", in *Journal of Cerebral Blood Flow and Metabolism*, 2010,30,S. 1619-24

[13] Humberto Reyes, Ronald Kauffmann and Max Andresen: „¿Es la metodología de nuestros trabajos de investigación esencialmente inferior a la de estudios similares en revistas que se publican en inglés?", in *Revista Médica de Chile*, 1998,126,S. 361-362.

[14] Per O. Seglen: „Why the impact factor of journals should not be used for evaluating research", in *British Medical Journal*, 1997,314,S. 498-502

[15] Andrew P. Kurmis: „Understanding the limitations of the journal impact factor" in *Journal of Bone and Joint Surgery*, 2003,85-A,S. 2449-54

[16] Mabel Chew, Elmer V Villanueva and Martin B. Van Der Weyden: „Life and times of the impact factor: retrospective analysis of trends for seven medical journals (1994-2005) and their Editors' views", *Journal of the Royal Society of Medicine*, 2007,100,S. 142-50

selection policy that favor specific content areas and/or article types, *(3)* article length changes–longer articles mean fewer articles unless the number of pages is increased–and *(4)* design changes that affect the paper format.

Study Design

Some studies included qualitative instruments–questionnaires and/or interviews; many drew on quantitative procedures–most notably regression analysis; and a few combined both approaches. Only two offered empirical data on the relation between IF and publication in English: Bracho-Riquelme et al[17,18] report <11% influence derived from language of publication and Yue and Wilson[2] report 0.3% influence.

Interrelationships among Variables

The most profitable approach to measuring variables that influence impact appears to be that which, in different forms, is proposed by Yue and Wilson[2] and Zych and Buela-Casal.[19,20] While differing in the details, these authors coincide in using theoretical constructs to group variables they consider to be associated. Their mesoanalyses focus on specific groups of research journals in given disciplines (clinical neurology and psychology, respectively) and use different statistical methods to quantify these constructs. Yue and Wilson propose five groups of variables: journal citation impact itself and four variables they term 'external,' consisting of journal characteristics, journal accessibility–within which they include language, journal visibility and journal internationality. They apply a partial least squares regression model and include language as a binary variable: English versus non-English. Their results suggest language accounts for as little as 0.030 of the variation in IF. Zych and Buela-Casal focus exclusively on the last of these–internationality–proposing and applying an internationality index by which to rank publications. In contrast to Yue and Wilson, they include language of publication within the extensive list of internationality

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[17] Rodolfo L. Bracho-Riquelme, Nazario Pescador-Salas and Miguel Arturo Reyes-Romero: „Repercusión bibliométrica de adoptar el inglés como idioma única de publicación", in *Revista de Investigación Clínica*, 1997,49,S. 369-372

[18] Rodolfo L. Bracho-Riquelme, Nazario Pescador-Salas and Miguel Arturo Reyes-Romero: „The change from French to English and its effect upon the impact factor and ranking of the Pasteur journals", in *Journal of Information Science*, 1999,25,S. 413-417

[19] Izabela Zych and Gualberto Buela-Casal: „The internationality index: Application to Revista Latinoamericana de Psicología", in *Revista Latinoamericana de Psicología*, 2009,41,S. 401-412

[20] Izabela Zych and Gualberto Buela-Casal: „Internacionalidad de las revistas de psicología multidisciplinar editadas en iberoamérica e incluidas en la Web of Science", in *Universitas Psychológica*, 2010 9,S. 27-34

variables and give it more consistency by considering the importance of the different languages in which a journal may be published. On the basis of their results, they divide the criterion into nine languages and weight each of them: English (4.89), French (2.23), Spanish (2.08), Chinese (1.77), Italian (1.72), German (0.32), Russian (0.1), Japanese (0.05) and Portuguese (0.02) (2009). They do not, however, go so far as to correlate these variables with IF.

Case Study 1. *Revista Española de Cardiología*

In 2001, *Revista Española de Cardiología* (REC) began to implement an editorial strategy aimed at increasing the journal's impact: cover-to-cover translation. Previously, monthly issues of REC had appeared in paper and electronic format, with the paper copies being available in the first days of each month. During the first stage of the changeover, the paper copies continued to appear following the same schedule and the unedited translation subsequently appeared in electronic format before the end of the corresponding month. This edition was available in online html and downloadable pdf formats from REC's free, open access website. Between 2001 and 2010 Elsevier España SL took over as publishers and the edited English Edition of each article usually appeared both at www.revespcardiol.org and via Elsevier's ScienceDirect database 3 to 5 months after the month of publication, i.e. the final edited English-language version of the January issue would appear online in May-June. Since January 2011, the significance of the English-language version has been further enhanced as it is now this which appears online at the beginning of the month and the Spanish edition that appears later.

The 87.9% increase in REC's IF between 2003 (IF=0.959) and 2004 (IF=1.802) reflected the growth in the number of citations in 2004 of articles published in 2002-03 with respect to the number of citations in 2003. [21] As translation began in January 2002, we could conclude that the online Spanish-into-English translations had made REC available to a wider readership and that this had contributed to the substantially enhanced IF. While we must remember that the IF is specific to a journal and not to any given article, the *prima facie* evidence strongly suggests the cover-to-cover translation was largely responsible.

[21] Fernando Alfonso, Javier Bermejo and Javier Segovia: „REVISTA ESPAÑOLA DE CARDIOLOGÍA 2005: actividad y reconocimiento científico", in *Revista Española de Cardiología*, 2005,58,S. 1482-1487

Case Study 2. ***Annales de l'Institut Pasteur***

A process resembling that undergone by REC had previously been experienced at the prestigious *Annales de l'Institut Pasteur* (AIP).[18,19] Here, the editorial decision was to make a gradual change in language of publication– from French to English. Prior to 1973, AIP published in French only. During a transition period from 1974 to 1989 the editors accepted English-language articles which were published alongside French-language articles. No translation was undertaken at all. Since 1990, AIP has published in English only.

The nature of this process facilitated the authors' study design in that they were able to apply simple regression analysis to identify the correlation coefficient (r^2) between the percentage of articles published in English and (a) the IF, and (b) journal ranking among publications listed by the JCR within the same field. Their conclusion was that the change to English represented less than 11% of the change in the journal's IF.

However, the AIP process differed from that at REC in aspects that invalidate any attempt to replicate this research design using REC data. *Annales de l'Institut Pasteur* has never issued cover-to-cover translations. The journal offered readers a mixed language edition in which some articles appeared in French and others in English. The authors were therefore able to calculate growth in the number of English-language articles published as a percentage of the total number of articles and obtain an annual percentage figure, which would not be possible at REC as the data would offer only two figures: 0% (2001), and 50% (2002). A further difference that also influenced this study was the fact that, over the study period, AIP divided into three separate journals, meaning the authors needed to compare IFs and ranking data for three different fields of study.

Nonetheless, both AIP and REC[22] adopted an editorial strategy based on the hypothesis that publishing in English was a valid means of enhancing journal status and that success could be measured in terms of an increased IF score. Bracho-Riquelme et al's conclusion was that the strategy had largely failed. Simple regression analysis of the relation between percentage of articles in English and IF, and that between percentage of articles in English and JCR ranking showed that less than 11% of variation in IF was due to the publication of articles in English (r^2=0.108). Furthermore, the relations between publication in English and the respective rankings of the three AIP journals were weak (r^2 = 0.178, 0.045 and 0.122).

We consider this study had significant limitations that invalidate parts of the design but not necessarily the overall conclusion. Their choice of two inter-dependent variables means they measured the same variable twice.

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[22] Xavier Bosch, Julián P. Villacastín and Fernando Alfonso: „Edición en inglés por Internet. Un nuevo gran paso adelante", in *Revista Española de Cardiología*, 2002,55,S. 1-3

The relation between percentage of English-language articles and IF is valid, as is that between English and the ISI rankings, but because the latter is also based on IF, they measured a single variable but expressed it in different terms.

Notwithstanding, we believe the study raised a number of issues, some of which the authors themselves comment on. Firstly, while the editorial decision was motivated by the desire to enhance status, we suggest that the IF may be only indirectly related to increased dissemination. Secondly, we wonder whether number of subscribers equates with number of readers, especially given the level of institutional subscribers many journals have and current levels of online access, whether by individual or institutional subscription or free of charge. Thirdly, the division of one journal into three must affect the study as would the changes in title by which the French-language *Annales de l'Institut Pasteur* became the English-language *Research in Microbiology, Research in Immunology* and *Research in Virology* in 1989. Fourthly, we coincide with the authors in asking what effect 'marketing' may have on dissemination. And finally, we would question the role that publication in electronic formats has on journal access. Clearly, from a methodological perspective, it is difficult to determine empirically the level of 'added value' a journal gains by publishing in English. Here alone, we have encountered editorial strategy, the IF, dissemination, readership, subscribers, access, title and marketing as variables that may to a greater or lesser extent influence the impact of a publication and interact with language of publication.

Further Research

Despite the apparently disheartening nature of currently available data, we consider it of importance to pursue the empirical study of the influence of language on the impact of scientific publications. Hence, we are currently conducting more detailed studies of *Revista Española de Cardiología*, alone and in comparison with other Spanish-language biomedical journals, as proposed by González Alcaide et al;[23] and of a number of the variables we have so far identified as of particular relevance–peer-review bias, citation patterns, and authorship practice in particular. Furthermore, we believe research into other language combinations would shed further light on the topic.

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[23] Gregorio González Alcaide, Miguel Castellano Gómez, Juan Carlos Valderrama Zurián and R. Aleixandre Benavent: „Literatura científica de autores españoles sobre análisis de citas y factor de impacto en Biomedicina (1981-2005)", in *Revista Española de Documentación Científica*, 2008,31,S. 344-365

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