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Editorial

Papers from international collaborations have higher impact

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Adair and Huynh (2012) noted that, within psychological research, the number of single-authored papers has progressively declined since the 1990s. It has become increasingly common for papers to have multiple authors, and, more recently, multiple authors from multiple institutions and countries. The rise of such international collaboration is perhaps a reflection of our digital age, where data can be shared electronically and analysed by different researchers at different locations across the globe.

International collaborations tend to be dominated by better-funded countries, with status, proximity and cultural/linguistic factors likely influencing chances of collaboration (Adair & Huynh, 2012). Some studies also report a negative correlation between country size and number of external collaborations (Frame & Carpenter, 1979; Melin & Persson, 1998; Schubert & Braun, 1990), suggesting that larger countries with larger scientific communities have little need to collaborate with researchers from other countries.

International collaboration is associated with greater scientific impact. It has been observed that studies originating from international collaborations are more cited and are published in journals with higher impact factors (Basu & Aggarwal, 2001; Bordons, Gómez, Fernández, Zulueta, & Méndez, 1996) than those run within national communities. For example, Bordons et al. (1996) found that research papers from Spanish institutions, including those published in the field of neuroscience, had a significantly greater average impact factor when featuring an international collaboration, and that the most productive authors had the greatest number of collaborations, both domestic and international.

The association between international collaboration and greater productivity and visibility may be due to practical factors; collaboration reduces each researcher's individual workload, enabling them to work on multiple projects. The fact that collaborations allow for expertise to be shared, enabling better research to be performed, may also be important. In addition, productive academics are more likely to be successful in bids for highly-competitive international grant funding (from agencies such as the European Commission), which increasingly require evidence of international networking and collaboration, and be able to choose from a wider pool of internationally-mobile doctoral and post-doctoral students, thereby facilitating more international collaborations. Accordingly, such international collaboration is encouraged by university departments, and is often considered when making decisions about staff hiring, tenure and promotion.

We were interested in the frequency and nature of international collaboration featured in the papers published in *Cortex*, and their impact, as measured by number of citations (2-year impact factor).

In 2011 and 2012, a total of 263 peer-reviewed articles were published in *Cortex*; 33 of these were written by a single author. The remaining 230 articles had up to 14 authors (mean = 4.12, SD = 2.53). Of these, 64 (24.30%) were written by authors from two countries and 21 (8.00%) from three countries.

Just under half of all international collaborations were between G8 member states ($n = 42$, 49.41% (including Canada, France, Germany, Italy, Japan, UK and USA); e.g., Yeterian, Pandya, Tomaiuolo, & Petrides, 2012; Zappalà et al., 2012) and many of these were from within Europe only ($n = 18$, 21.18%, e.g., Klemen, Hoffman, & Chambers, 2012). The commonest collaborations were between Italy and UK ($n = 9$,

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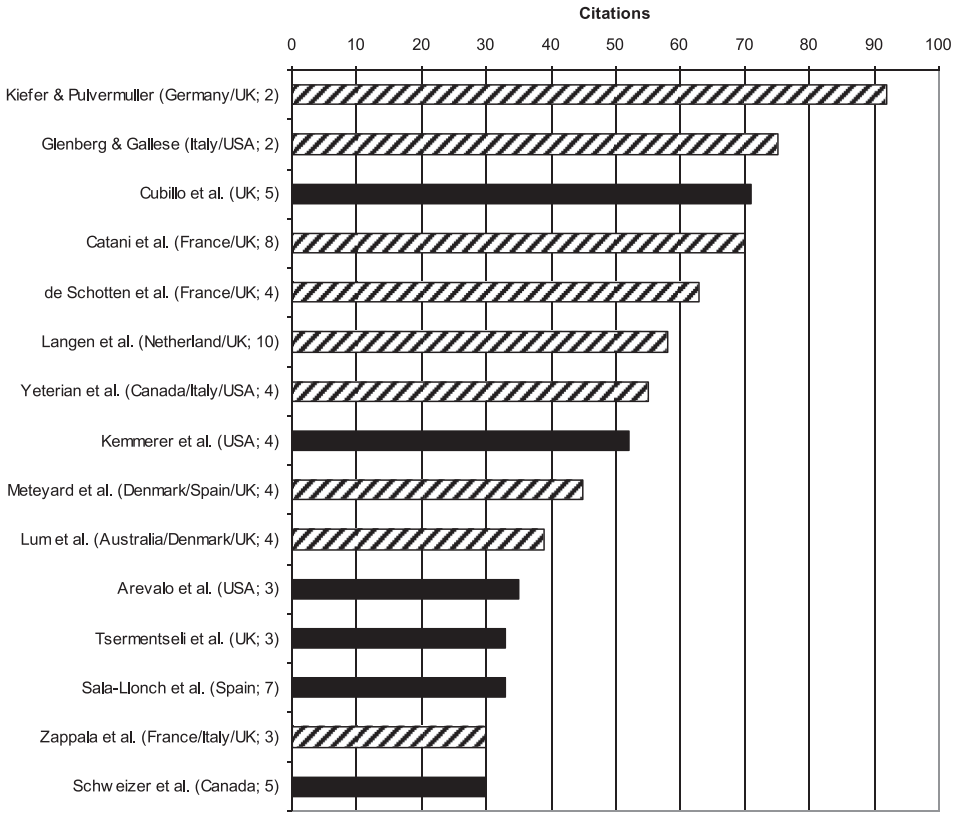

Fig. 1 – Number of citations for 15 most highly cited papers published in 2012 (as retrieved on 20.01.14), listing country affiliations and number of authors. Solid bars indicate papers from one country and striped bars indicate papers from multiple countries.

10.59%, e.g., Rusconi, Bueti, Walsh, & Butterworth, 2011) and Italy and USA ($n = 9$, 10.59%, e.g., Mahon, Garcea, & Navarrete, 2012), but many collaborations were between distant countries, such as France and Japan (Nakamura et al., 2012), and Italy and China (Zou, Ding, Abutalebi, Shu, & Peng, 2012).

Number of citations was retrieved by Google Scholar between November 2013 and January 2014. Google Scholar was chosen for its speed of citation-updating (Minasny, Hartemink, McBratney, & Jang, 2013). Number of citations was positively correlated with number of countries ($r = .20$, $p < .01$). Specifically, the mean number of citations received was 10.07 ($SD = 11.10$) for articles from one country, rising to 13.28 ($SD = 17.67$) for articles from two countries, and to 19.67 ($SD = 16.93$) for articles from three countries.

Fig. 1 lists the 15 most highly cited papers published in 2012, with their country affiliations and number of authors, divided according to whether the authors were from one or multiple countries.

Number of countries was also positively correlated with number of self-citations ($r = .18$, $p < .01$). Even when only non-self-citations were considered, number of countries remained significant ($r = .18$, $p < .01$).

There was an association between number of authors and number of citations received (see also Foley & Della Sala, 2010), although this fell short of statistical significance ($r = .12$, $p = .06$). A partial correlation revealed that, when number of authors was factored out, there remained a significant correlation between number of countries and number of citations ($r = .17$, $p < .01$).

Similarly, an analysis of covariance revealed that, when number of authors was factored out, number of citations received was significantly different according to type of authorship collaboration [F (2, 259) = 3.24, $p < .05$]. Number of citations received by papers written by authors from the same country and same institution (e.g., Cazzoli et al., 2012) was 8.66 ($SD = 12.25$), rising to 11.83 ($SD = 11.07$) when the authors were from the same country but different institutions (e.g., Gandola et al., 2012), and 15.20 ($SD = 18.28$) when the authors were from different countries (e.g., Bizzi et al., 2012). However, planned contrasts revealed that citation rate was only significantly increased when collaboration was international [t (259) = −2.52, $p < .05$] and not when within the same country [t (259) = −1.57].

Thus, it appears that when authors do collaborate across country boundaries, their publications are rewarded with more citations. This benefit is not limited to self-citations only, perhaps reflecting the greater productivity and quality of research undertaken. In addition, international collaboration may also imply dissemination of scientific findings to more scientific communities, reaching a greater

number of interested parties, and resulting in greater scientific impact.

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