Letter to the Editor

Response to "Big Macs and Eigenfactor Scores: The Correlation Conundrum"

Sir,

As we pointed out in our original article (West, Bergstrom, & Bergstrom, in press), currency denominations generate a spurious correlation in the Big Mac data. The high correlation between wage rates and Big Mac prices denominated in local currency might lead a careless reader to believe that in all countries it takes a laborer about the same amount of time to earn a Big Mac. By rescaling currencies in a few of the countries, Prathap (in press) shows that this is not the case. Of course. Any competent statistician would do something like this. For example, when *The Economist* publishes their Big Mac index,[1] they convert all prices into US dollars at prevailing currency exchange rates. That was the point of our analogy—to pick a case where the source of spurious correlation was so obvious that anyone could recognize the problem.

When Davis (2008) compares eigenfactor scores to citation counts, his spurious correlation is not a matter of units. Rather, as we showed in our original paper, it due to the presence of a common factor with a large coefficient of variation—namely, log total articles—on both sides of his comparison. A spurious correlation not based on different units is still a spurious correlation, as Pearson correctly noted in 1897.

In his letter, Prathap comments only on the Big Mac analogy and not on the eigenfactor analysis that was central to our paper. We should be careful to ensure that this point is not lost in the quibble about analogy: one cannot conclude from a high correlation coefficient that two measures provide the same information, and one requires a statistical hypothesis testing framework to make claims about hypotheses such as "prestige and popularity yield the same results." As we showed, correlation coefficients can be misleading, and the hypothesis described above is easily rejected at the 10^{-167} level. Citation counts and impact factors provide very different information than eigenfactor scores and article influence scores.

[1] The Economist's Big Mac Index: http://www.economist.com/markets/Bigmac/Index.cfm

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