The heterogeneity of social media metrics and its effects on statistics

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Under the umbrella term of "altmetrics", a number of methodologies and metrics have been introduced as potentially timelier and broader analyses of research impact which could complement citations (Priem, Taraborelli, Groth, & Neylon, 2010). Document-centered altmetrics, i.e. referring to use and mentions of scientific articles on social media platforms, include links on microblogging platforms Twitter and Weibo, posts on social network sites such as Facebook and Google+, saves on social reference managers Mendeley and CiteULike, reviews on F1000Prime, Publons and PubPeer, as well as mentions in scholarly blogs and news and mainstream media. As such, altmetrics group very heterogeneous indicators that are based on different types of usage, levels of engagement, user groups and audiences as well as user uptake and the possibilities to collect relevant data. This heterogeneity affects quantitative analyses, complicating the search for the meaning of various indicators (Costas, Zahedi, & Wouters, 2014; Haustein, Peters, Sugimoto, Thelwall, & Larivière, 2014; Thelwall, Haustein, Larivière, & Sugimoto, 2013; Zahedi, Costas, & Wouters, 2014). Based on 1.3 million documents published in journals indexed by the Web of Science in 2012 and corresponding data from Altmetric.com, we analyze and discuss differences between citations, tweets, Facebook and Google+ posts, as well as mentions in scholarly blogs and news outlets. We highlight the effects of the heterogeneity of altmetrics on resulting statistics with a particular focus on zero and null values.

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