

Brain network: social media and the cognitive scientist

Tom Stafford^{1*} and Vaughan Bell^{2*}

¹ Department of Psychology, University of Sheffield, Sheffield, UK

² Department of Clinical Neuroscience, Institute of Psychiatry, King's College London, London, UK

Cognitive scientists are increasingly using online social media, such as blogging and Twitter, to gather information and disseminate opinion, while linking to primary articles and data. Because of this, internet tools are driving a change in the scientific process, where communication is characterised by rapid scientific discussion, wider access to specialist debates, and increased cross-disciplinary interaction. This article serves as an introduction to and overview of this transformation.

Introduction

Although often thought of as recreational tools for lay discussion, blogs, Twitter and online discussion forums are becoming increasingly important as spaces in which to carry out scientific discussion, analysis, and networking. Scientists are increasingly using the internet as a platform to engage with their colleagues and others (e.g., [1,2]), and a recent study highlighted how science blogs have a clear preference for studies in the life and behavioural sciences [3]. Furthermore, as a potentially instant broadcaster of thoughts and comments that can often be tied to specific locations, online discussions themselves are being used as data to understand human cognition and behaviour [4]. However, despite the existence of a healthy and active online cognitive science community that includes researchers, clinicians, science writers, and allied professionals, it is often surprising how many people in the wider research community either do not know it exists, doubt its value, or are unsure about the technology.

What are blogs and Twitter?

A blog is a webpage that can be updated regularly with dated entries containing text, video, or other media. Twitter (www.twitter.com) is a form of 'micro-blogging', where updates ('tweets') are limited to 140 characters – long enough for a short opinion or report, and perhaps a link to another article on the internet. Although many people can readily see why a blog might be beneficial (after all, it allows anyone to publish their commentary online), at first glance Twitter can seem too limiting to be useful. However, consider an analogy with a news ticker: Twitter allows everyone to have one, where 'followers' subscribe to those they find interesting. For example, if you are interested in

developmental psychology, it is very useful to know when Dorothy Bishop, Professor of Developmental Neuropsychology at Oxford University (@deevybee on Twitter), has published a new paper, thinks highly of a new study, or has published an opinion piece online – each of which can be referenced by the inclusion of a link. As there are now hundreds of cognitive scientists online, you can create and participate in rich customised news feeds based on your own specific interests.

Embedded in the design of these tools for online discussion are facilities to enhance the speed and ease with which their content can be disseminated and responded to. Blogs usually allow comments at the bottom of each entry and automatically track mentions elsewhere on the internet. Twitter users are notified whenever someone mentions them (identified by the simple method of the use of their username preceded by an @ symbol). For both, there are tools which allow readers to collate entries from many sources in a single place, receiving instantaneous updates (for blogs, known as a 'reader'). Because of this, both blogs and Twitter are included under the umbrella term 'social media'.

How are social media affecting how science is communicated?

First among the ways science is affected by these new social media is that they facilitate scientists' communication – with the interested public, with colleagues in their discipline, and with specialists outside of their own area. They create forums for parties of all qualifications to discuss and debate a topic. As a scientist, this allows you to discuss research in your own words and it provides you with a larger potential audience than if your research was reported in a newspaper or magazine. In addition, social media also allow a rapid and automatic 'right of reply' to misquotation and misinformation if it does appear, but on the flip side, it means that errors or misunderstandings in your own work are unlikely to go unnoticed for long. The plurality of social media forms and styles means that, as a consumer of information, you can access all levels of explanation – from high theory and raw data to rolling news items and bullet-point summaries. Social media mean that those with niche interests can rapidly connect with each other, whether in long-standing forums or around of-the-moment topics.

Another difference from traditional scientific communication is that writers can link directly to primary sources in the scientific literature, even in material not written in a traditional academic style. This is often a misunderstood point by those not involved in online discussions, who

Corresponding authors: Stafford, T. (t.stafford@sheffield.ac.uk); Bell, V. (vaughan.bell@kcl.ac.uk)

* Author note: T.S. and V.B. can be followed on Twitter as @tomstafford and @vaughanbell. They both blog at www.mindhacks.com. T.S. writes a regular column about using cognitive science to understand everyday phenomena for BBC Future (www.bbc.com/future/columns/neurohacks). V.B. writes regularly for The Observer on psychology and neuroscience (<http://www.guardian.co.uk/profile/vaughan-bell>).

suggest that social media is a ‘free for all’ with no grounding in the academic literature and little ability to distinguish the wheat from the chaff. When the evidence is only a click away, it is often easier to evaluate arguments online than it is in the traditional journal format. This means that the medium can be used equally well to communicate with fellow scientists as with the public, and often at the same time. The corollary of this is that non-traditional participants, perhaps undergraduates, journalists, or even motivated lay people, can make important contributions to academic debates. A recent scientific commentary [5] cited as inspiration both academic papers and a debate in the ‘blogosphere’, in which a range of specialists and non-specialists contributed. Although online debate is not intended to replace the published literature, for researchers in cognitive science these discussions can provide some of the benefits of the journal club, scholarly meeting, coffee-room chit-chat, society notices, and more.

An example of this in action was the rapid online discussion of the pre-print that was later published as the influential paper ‘Puzzlingly high correlations in fMRI studies of emotion, personality, and social cognition’ [6]. When the paper was eventually published, one of the commentaries included the statement ‘I was shocked, this is not the way that scientific discourse should take place’ [7] despite the fact that the neuroscience community had already been discussing the findings for several weeks. A more recent example involved a prominent Yale psychologist who criticised a blogger for ‘superficial online science journalism’ in his own online post that followed up on discussion of a failed replication of his priming study. Perhaps initially unknown to the prominent psychologist, the blogger was a regular contributor to the news sections in major journals and the incident was later discussed in a *Nature* article on replications in psychology [8]. A key point here is that online discussion does not take place in a separate community to the academic world – it simply takes place in a wider community, in which scientists are just one part. Nevertheless, our colleagues are no less present and active. The fact that highly cited articles on social media also become highly cited in the academic literature [2] and that scientific articles are now written in response to online debates [5] suggest that scientific discussions on the internet are more than ‘idle chatter’ and should be taken seriously.

The future

The low cost of publishing online has led to a number of initiatives to try and solve some of the perennial problems in the organisation of cognitive science research. One of the most pressing problems concerns a publication bias against studies reporting no effect, potentially distorting the evidence base toward positive findings [9]. Initiatives such as PsychFileDrawer (www.psychfiledrawer.org) are increasingly able to provide an online repository for these studies and a forum in which to discuss their significance. Niche blogs are becoming important intellectual tools,

covering areas that would normally be poorly discussed in the scientific community. For example, Retraction Watch (<http://retractionwatch.com> – written by physician turned Reuters health journalist Ivan Oransky) discusses retracted scientific papers and issues of publication validity. Increasingly, the web is being seen as an outlet for raw data or findings that may be useful but below the ‘minimal publishable unit’ for profit-driven journals. There is also a matching trend for scientific journals to directly encourage post-publication discussion, review, and feature commentary from other online sources as an alternative rapid metric of impact.

Concluding remarks

Whether we decide to be regular participants, occasional contributors or intermittent readers, the days when social media competence was optional in cognitive science are running out. Social media have become the single most effective way of gathering research news and commentary, and many debates preceding and following publication take place online. Social media are currently a frontier for scientific discussion. In common with much of the internet, there are intrusions of humour, the political and the personal, but no more so than in a good discussion at a conference dinner. In the long-term, social media hold out a great opportunity for scientists. Fundamentally, there are important similarities between principles of traditional scientific culture and on-line culture: both prioritise access to information, citation (whether to journals or via links to other online sources), and kudos for whoever does good work. Academia aspires to openness, engagement, and respect for the principles of rational discussion. Social media facilitate these. The online community is free-flowing, somewhat chaotic, and information-rich – much the same as science has ever been.

References

- 1 Van Eperen, L. and Marincola, F.M. (2011) How scientists use social media to communicate their research. *J. Transl. Med.* 159, 199
- 2 Evans, P. and Krauthammer, M. (2011) Exploring the use of social media to measure journal article impact. *AMIA Annu. Symp. Proc.* 2011, 374–381
- 3 Shema, H. *et al.* (2012) Research blogs and the discussion of scholarly information. *PLoS ONE* 7, e35869 <http://dx.doi.org/10.1371/journal.pone.0035869>
- 4 Reips, U.D. and Garaizar, P. (2011) Mining twitter: a source for psychological wisdom of the crowds. *Behav. Res. Methods* 43, 635–642
- 5 Poline, J.-B. and Poldrack, R.A. (2012) Frontiers in brain imaging methods grand challenge. *Front. Neurosci.* 6, 96 <http://dx.doi.org/10.3389/fnins.2012.00096>
- 6 Vul, E. *et al.* (2009) Puzzlingly high correlations in fMRI studies of emotion, personality, and social cognition. *Perspect. Psychol. Sci.* 4, 274–290
- 7 Abbott, A. (2009) Brain imaging studies under fire. *Nature* 457, 245
- 8 Yong, E. (2012) Replication studies: bad copy. *Nature* 485, 298–300
- 9 Vevea, J.L. and Woods, C.M. (2005) Publication bias in research synthesis: sensitivity analysis using a priori weight functions. *Psychol. Methods* 10, 428–443