

## **Publish and still perish?**

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### **Abstract**

This opinion comments on a recent trend in science showing a proliferation of published material, while at the same time citation rate seems to drop faster than ever. It is suggested that the faster pace of scientific publication on the internet poses new challenges for the whole research community.

From the beginning of my postgraduate research I have heard colleagues stating the well-known principle “publish or perish”. This phrase describes one of the hallmarks of scientific work: publishing your research results in professional journals. In this way, we reach our target audience, present and exchange ideas and views, and ultimately make a name for ourselves as an independent scientist.

As a consequence, researchers spend much of their time and energy getting their own work out to the world. This is part of our everyday work and along with an increasingly connected international community it has resulted in a large pool of research output. But is the community still listening? This is an important issue as we are limited in our reading and cognitive capacities. For example, a recent survey showed that researchers may already have reached a plateau of reading around 22 articles per month (see [www.libvalue.org](http://www.libvalue.org)). This leads us to the crucial question whether the currency of science, i.e. research articles, is heading for deflation. Or in other words, are we developing a culture of “publish and still perish” where important scientific contributions easily remain unnoticed in the mass?

Let us consider two key indications. Bornmann and Mutz (2014) recently presented an e-paper

on arXiv that has been accepted for publication in the Journal of the Association for Information Science and Technology. They report an exponential increase of the growth rate in global scientific output per year starting from 1980 and peaking around 8-9% in the year 2012. Opposed to past studies, this work included webpages and datasets in addition to articles and books. The bibliographic metric used was any contribution in the Web of Science (Thomson Reuters) that has been cited by another publication within this database. While the ~10% growth rate is not a new finding in itself, it still illustrates the apparent proliferation of scientific publications nowadays.

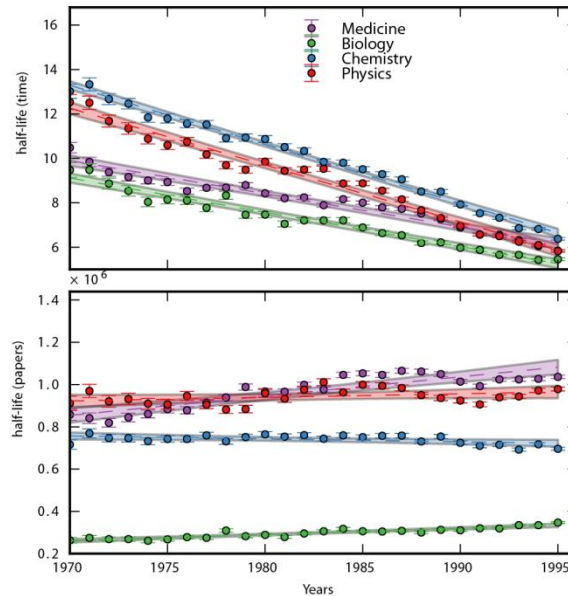
The second report I like to mention is entitled “Attention decay in science” (Parolo et al., 2015). A team of academics and industry partners analyzed the time line of citations a given article receives over the years. This “life cycle” was evaluated for millions of papers from the fields of clinical medicine, molecular biology, chemistry and physics. The resulting trends of citations a given article receives over time revealed an exponential decline of citations in most of the cases: the peak is reached 2-7 years after publication and subsequently citation rate decreases dramatically. The data also showed that more recent papers reach their peak faster

and also drop more rapidly in citation rate when compared to older papers.

If the mass of publication does make our work less relevant, why do we actually follow this trend? There are several reasons in my view. I remember that when I started in science my supervisors often told me to target high-impact journals. I do not want to enter the discussion of the best metric for scientific quality here. But to my experience, young researchers were given some time to develop and follow a research line. The rationale often was that one article in journal x is worth five articles in another journal y. Although renowned journals still will advance your career, times seem to be changing. Nowadays I often hear that as a postdoc one should publish at least four to five articles per year. With funding resources constantly declining, the number of publications is actually getting more and more important. This has resulted in what I like to call the hunt for Hirsch index (h-index, Hirsch 2005), a bibliometric measure relating the number of publications to their respective number of citations received. Applying for PhD funding? One or two papers may not be enough. Are you on the transition from postdoc to faculty member? Well, h-index of 16 should be your minimum goal. This may sound a bit provocative and I believe h-index is one of the better attempts to quantify performance. Nevertheless, it reduces our research very much to the amount of publications and puts a lot of pressure especially on young postdoctoral investigators. One reason is that h-index increases with your scientific age: the longer you are in the business the bigger your network, the more articles you will have published and the longer the time period to receive enough citations. So instead of targeting one of the rare high-impact papers, young fellows are forced to quickly generate a certain mass of publications. The consequences are an emerging culture of fragmenting results that would be better kept together. We are often

tempted to split a coherent study into separate papers, posters or case studies. This fragmenting may, however, result in even less citations and ultimately prevent scientific progress.

So is science dying out? No it is not, and I do not want to paint a gloomy picture. In fact, the study of Parolo and colleagues (2015) has an important addition: normalizing time in terms of the numbers of papers published in a period (instead of considering only the time period itself) revealed that citation curves decline at a similar rate throughout the last decades (Fig. 1). This is equivalent to a faster pace of science: more articles are published in short time intervals and the overall access to these (online) media has dramatically improved. In fact, the decay of access to information on webpages is a well-known phenomenon (Dezsö et al., 2006; Wu and Huberman, 2007) and not limited to scientific data.



**Figure 1. Half-life of papers.** Progression of the half-life, i.e. time after which citation rate drops below 0.5 of its maximum, in terms of absolute time in years (upper panel) and in terms of number of publications from the peak of citation to half-time (lower panel). Modified with permission from Parolo et al. (2015).

The message I would like to bring across is that we need to be aware of this “attention economy” as Klamer and Dalen have called it (2002). The new ways of spreading information by e-papers, blogs and online journals offer a platform for all of us to exchange results in a hitherto unprecedented speed and extent. On the other hand, our capacity to read and rethink new input is naturally limited. Thus, I believe the challenge of any kind of scientific publishing on the internet is all the more to ensure a high quality of contributions. Rather than relying on a single number of a bibliometric index, researchers and publishers need to agree on a certain standard for any kind of scientific output. This development of a new publishing culture could also imply personal sacrifice: limiting the amount of material submitted and even overthinking the diversity of journal landscape. Only then we will manage to keep up with the true advancements within our research fields and we will be able to publish and not perish.

## References

Bornmann L., Mutz R. (2014): Growth rates of modern science: A bibliometric analysis based on the number of publications and cited references. <http://arxiv.org/abs/1402.4578v3>

Dezső Z.,Almaas E., Lukács A., Rácz B., Szakadát I., Brabási A.L. (2006): Dynamics of information access on the web. *Physical Review E* 73 (6):066132.

<http://dx.doi.org/10.1103/PhysRevE.73.066132>

Hirsch J.E. (2005): An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences U S A* 102(46):16569–16572.

<http://dx.doi.org/10.1073/pnas.0507655102>

Klamer A., Dalen H.P.v. (2002): Attention and the art of scientific publishing. *Journal of Economic Methodology* 9 (3): 289-315.

<http://dx.doi.org/10.1080/1350178022000015104>

Parolo P.D.B., Pan R.K., Ghosh R., Huberman B.A., Kaski K., Fortunato S. (2015): Attention decay in science. <http://arxiv.org/abs/1503.01881v1>

Wu F., Huberman B.A. (2007): Novelty and collective attention. *Proceedings of the National Academy of Sciences of the USA* 104 (45): 17599-601.

<http://dx.doi.org/10.1073/pnas.0704916104>