

On cumulative science

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Perception

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Changing human behaviour is difficult. Psychologists are well aware of this and have studied the impact of various approaches. For example, in the context of smoking, they have compared positive and negative framing of the warnings. In general, positive framing seems more effective (Mollen et al., 2017). Positive strategies include a focus on potential benefits (as opposed to risks) and the avoidance of personal attacks.

Poor scientific practices are a type of bad habit, where we conduct underpowered studies, misinterpret results, and generally cut corners in order to get the high of a new publication. There is now awareness, and much discussion, of this crisis of replicability in psychology. Not all fields are equally affected, and in perception, we have some advantages (precision of measurements, low individual differences, fast replications). However, even our field cannot assume to be immune to these dangers.

The framing of the replication problem has often been apocalyptic. This is indeed the metaphor used by Dorothy Bishop (2019). She listed four horsemen of the “irreproducibility apocalypse”: publication bias; low statistical power; p value hacking; and HARKing (Hypothesizing After the Results are Known). Replication attempts are useful and indeed necessary. However, and not surprisingly, they also produce defensive, and in some cases angry, reactions from researchers who feel attacked. It may be worth to focus just as much energy on what can be done in the spirit of positive framing when it comes to good practice, and on self-reflection rather than direct criticism of others.

One major problem with how we communicate findings is the fact that what is published is selective and fragmented. This situation has become worse with the trend towards fast publication and bite-size science (Bertamini & Munafo, 2012). Apart from the issue of replicability and flukes, there is also a problem of the sheer number of journals and articles. It is becoming very difficult to keep up, and to read everything that gets published on one topic.

Advances in technology, however, do offer new opportunities. Here I describe one example and some reflections.

My laboratory in Liverpool has been working on perception of symmetry for over two decades. In particular, in many studies, we have measured an event-related potential component known as sustained posterior negativity (SPN). COVID provided the stimulus and the time for the creation, led by Alexis Makin, of a systematic catalogue of all data ever collected in Liverpool about the

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SPN. It is now available on Open Science Framework (<https://osf.io/2sncj>). Importantly, it includes both published and unpublished data (6674 SPNs from 2215 participants, over 1 TB of data).

The database meets the FAIR criteria for open science: Findable, Accessible, Interoperable and Reusable. In practice, that means that any researcher can not only access the data, but they will find it relatively easy to carry out their own analyses (Makin et al., 2022).

Many laboratories around the world are in a similar situation. That is, much data is saved locally on computers or servers, and the joke is that at the time of the analysis, the exact pipeline is clear to us and to God, and after 6 months, it is only accessible to God. The pressure of academia makes it hard to find the time to document, organise and share the data. However, once one develops a good scheme for data storage and documentation, all of this information can accumulate, creating large databases. Of course, some people are by nature more organised than others, and they are systematic in how they store data. Creating this database has a cost (in time and resources), but it quickly provides a personal and pleasant sense of achievement. The next natural step is to think not just about how to make it easy for us to retrieve a study that we carried out a few years ago, but how to make it easy and open for everybody. Wicherts et al. (2011) found that shared data tends to also be good quality data. The end goal is true cumulative science.

The wheels for this new approach are now truly in motion. In the future when considering the evidence in favour of any specific effect or the characteristics of a phenomenon, we will not be confined to consult published papers. Instead, we will have access to large databases, and on these, we will be able to test old and new hypotheses. In the longer run, journals as such may become obsolete, as well as publishers. That, however, is a topic for another day.

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References

- Bertamini, M., & Munafo, M. R. (2012). Bite-size science and its undesired side effects. *Perspectives on Psychological Science*, 7(1), 67–71. <https://doi.org/10.1177/1745691611429353>
- Bishop, D. (2019). Rein in the four horsemen of irreproducibility. *Nature*, 568(7753), 435. <https://doi.org/10.1038/d41586-019-01307-2>
- Makin, A. D., Tyson-Carr, J., Rampone, G., Derpsch, Y., Wright, D., & Bertamini, M. (2022). Lessons from a catalogue of 6674 brain recordings. *eLife*, 11, e66388. <https://doi.org/10.7554/eLife.66388>
- Mollen, S., Engelen, S., Kessels, L. T. E., & van den Putte, B. (2017). Short and sweet: The persuasive effects of message framing and temporal context in antismoking warning labels. *Journal of Health Communication*, 22(1), 20–28. <https://doi.org/10.1080/10810730.2016.1247484>
- Wicherts, J. M., Bakker, M., & Molenaar, D. (2011). Willingness to share research data is related to the strength of the evidence and the quality of reporting of statistical results. *PLoS One*, 6(11), e26828. <https://doi.org/10.1371/journal.pone.0026828>