

Reflections from the 2018 SYNERGY meeting on 'Promoting Scientific Integrity in Health Psychology Research and Publishing'

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Introduction

As a theoretical and empirical discipline, health psychology is reliant on robust evidence adopting rigorous research designs and methods aimed at understanding the determinants, processes, and mechanisms that relate to health outcomes, broadly defined. The research

process is a well-trodden path beginning with the identification of a health problem or research question; followed by generation of testable hypotheses designed to address the problem or answer the question, often with reference to theories based on previous knowledge; development of fit-for-purpose research designs to test the hypotheses, collect data using rigorous methods, analyse the data and draw inferences, again often referencing and updating theory; and finally disseminating the findings in (preferably) peer reviewed outlets (Chambers et al., 2014; Nosek & Lakens, 2014). This process forms the cornerstone of generating evidence that will inform future research and feed in to practice and, therefore, reliability and precision of findings is expected to be paramount, and rigorous assessment and evaluation of findings disseminated is key to this trustworthiness.

However, the career pathway of an academic researcher, with its dependence on output quality, usually judged by relatively arbitrary metrics like impact factors, numbers of outputs, and the need to demonstrate novelty and that one is 'carving a niche' in the field, can lead to certain practices that introduce bias in the publication processes, which can result in misleading findings and hinder scientific progress. For example, ambitions to publish in high quality outlets (usually journals) drives competition for journal space which, in turn, means those determining what gets published (usually journal editors) must be selective in what gets published. Criteria for this selectivity includes methodological rigor, and sound research design, but there is a disproportionate emphasis on novelty and the need for findings that confirm hypotheses and support theory. The latter emphasis means that null findings, and findings that replicate previous findings, are not considered of high value and high priority. These problems have been starkly exposed in recent years through high profile 'failures' of replication of key psychological effects, previously thought to be robust. Coupled with this, there have been numerous cases demonstrating prevalence of dubious research practices, likely driven by the need for hypothesis confirming findings and statistically significant results. Issues that have been raised in relation to replication of findings have resulted in questions being raised over the reliability and trustworthiness of scientific data in disciplines like psychology. This 'replication crisis' has resulted in calls for revisions in the ways in

which research evidence is produced and published.

During the 2018 European Health Psychology Society (EHPS) Synergy Expert Meeting (20-21 August 2018, Galway, Ireland)- a meeting organised annually to facilitate collaborative discussion between health psychologists- it was discussed how to promote scientific integrity in health psychology research and publishing. The goal was to discuss issues relating to the problems identified in the high-profile replication failures in psychology (Hagger et al., 2016; Open Science Collaboration, 2012; 2015), the incidence of dubious research practices, and other issues relating to improving scientific integrity in the discipline. In this report, we summarize some of discussions held during the course of the meeting, and identify some of the potential suggested solutions, with particular focus on the role of transparency and open science.

The Emergence of Open Science

Some questionable research practices that have been exposed in current times have included the withholding findings or, in particular, withholding results that do not confirm an expected hypothesis; searching for statistical significance, for example, adding more covariates or varying the variables included in an analysis; and retrospectively fitting explanations to data (termed 'hypothesizing after results are known'- HARKing). Often these practices are conducted with the focus on publication and meeting the expectations of high-ranking outlets, without a deliberate intention to 'do the wrong thing'. There are, of course, some cases of deliberate fabrication of data (e.g., Diederik Stapel's studies; Levelt, Drenth, & Noort (2012)), although these are likely to be relatively rare. Nevertheless, dubious research practices subvert the research process, and can lead to misleading or erroneous conclusions when judging a body of work in health psychology.

Moreover, the high-profile failures to replicate can be attributed to these kinds of dubious research practices.

Numerous solutions have been offered to minimize incidence of dubious research practices, and ensure maximum integrity and trustworthiness in psychology, and other sciences, and address the 'replication crisis' head on. Solutions have been offered through a collection of research practices known as 'open science'. During the SYNERGY meeting, experts discussed issues relating to open science. Experts agreed that open science practices were essential to maximize the integrity of health psychology research, and suggested that by encouraging open science in our discipline we can lead the way in producing evidence that is trustworthy.

The starting point is to define open science. Open science is defined by the European Commission (2019) as: "*A new approach to the scientific process based on cooperative work and new ways of diffusing knowledge [...] shifting from the standard practices of publishing research results in scientific publications towards sharing and using all available knowledge at an earlier stage in the research process.*" Key open science practices identified by consensus of the SYNERGY experts included: (1) preregistration of study methods including sampling, measurement, statistical power (if relevant), design features, and analysis or treatment; (2) full disclosure of study materials and data (de-identified), and analysis output (e.g., making these materials available via a publicly accessible repository such as the Open Science Framework); and, (3) making outputs publically accessible via open access publishing or making preprints available on a public repository (e.g., psyarxiv - <https://psyarxiv.com/>). Collectively these practices not have the effect of minimizing dubious research practices, but also have the effect of focusing the researcher on the essential components of the research methods and design, and the importance of transparency. The SYNERGY

experts also highlighted the need for all of those involved in the research process, from those producing the evidence –researchers and their teams– to those involved with determining its dissemination (e.g., journal editors) and those involved in supporting the research (e.g., universities, funders), to support and actively encourage and engage in open science practices. It was noted that guidelines had been provided to ensure that journals are provided with guidance of minimum and ideal levels of transparency and openness, such as the TOP guidelines (Nosek et al., 2015).

Benefits and Barriers to Open Science in Health Psychology

In reviewing the current literature on the benefits of transparency and open science, and with what was discussed among the SYNERGY experts, support for the arguments towards this movement can be summarised in the following factors: *efficiency* through improvements in the effectiveness and productivity of the research system, *quality and integrity* through wider evaluation and scrutiny of research findings by the scientific community, *economic benefits* through better access to research results, *innovation and knowledge transfer* through the re-use of data, *public disclosure and engagement* through promoting awareness and engagement among citizens, and *global benefits* through promoting collaborative efforts and faster knowledge transfer (for full details see <https://www.fosteropenscience.eu/content/what-are-benefits-open-science>; see also <http://rsos.royalsocietypublishing.org/benefits>, <https://www.leru.org/publications/open-science-and-its-role-in-universities-a-roadmap-for-cultural-change>, <https://www.openscience.nl/en/open-science/why-open-science/index>). These benefits are not solely targeted at those involved with producing research

and its dissemination (e.g., scientists, researchers, funders, journal editors), but also extend to the wider community and stakeholders in research such as social, educational, and government organisations; local and national authorities; and professionals, citizens, and end-user groups. This is because part of open science is to allow ready access to, and use of, scientific information for the benefit of wider society.

Arguments in support of open science practices seem reasonable and strong, especially for those in favour of such movements, and members of the open science community (e.g., the Center for Open Science - <https://cos.io/>) have paved the way to greater transparency by making resources on open science readily available. However, a shift to greater transparency and open science requires a culture change for successful implementation at all levels of the research process. Stakeholders in research need to move from traditional research models and psychological science practices to adopting new values and operating systems which, to date, have not been extensively tried and tested over time (see <https://www.leru.org/publications/open-science-and-its-role-in-universities-a-roadmap-for-cultural-change>). Reservations and scepticism toward this movement of transparency and open science should be recognized and acknowledged. These barriers were identified in discussions during the course of the SYNERGY meeting, but it was also clear that the barriers to transparency and open science in health psychology are speculative, and there is need for research to identify the barriers and facilitators among all key stakeholder groups to engaging in open science.

The current literature on open science suggests that implementation of open science practices will require real culture change at all levels of the research process and that all stakeholders need to be committed to change for open science to become a routine set of practices within the research process (see <https://www.leru.org/publications/open-science-and-its-role-in->

universities-a-roadmap-for-cultural-change). This will not happen overnight, and perhaps at this stage there needs to be an acceptance that only some stakeholders may invest in change, but over time change will happen, albeit slowly, with an end goal that open science will become the norm. As outlined in the document on 'open science and its role in universities: A road map for cultural change', many challenges exist in embracing and adopting this movement including issues of copyright, costs, data privacy, metrics on evaluation, non-universal commitment, and more, but the most difficult foreseen is culture change. This is notwithstanding more personal beliefs and realities including openness at early stages resulting in possible loss of competitive advantage and difficulties to applying for patents as well as citizen or professional misunderstandings and interpretations of scientific findings (<https://www.openscience.nl/en/open-science/why-open-science/index>). In sum, although benefits to adopting a new model of transparency and open science are well-voiced, many challenges exist to its uptake. This is where we need to have clear strategies to lead the future in the movement toward greater transparency and use of open science practices.

Solutions and Recommendations

Despite the challenges to open science, the SYNERGY experts agreed that the benefits by far outweigh the detriments. The group agreed on a number of clear recommendations that might form the basis of a future position statement and guideline document on open science for health psychology. These include:

(1) 'Totally' open science. Advocating a 'farm to fork' approach to open science, meaning that open science principles should be worked in to all stages of the research process from inception to publication. This means that researchers need to

assume transparency in materials and data as well as pre-registration of methods, data collection procedures, and results from the outset. This approach is consistent with the idea of a 'culture' of open science and transparency.

(2) Education. Providing the current and future generation of researchers with resources and training on open science principles and practices, and develop means to best disseminate these recommendations e.g. through health psychology degree programs, workshops at conferences.

(3) Publishing. Societies, such as the EHPS, working with editors of their journals to implement open science principles in journals and, in so doing, assist in providing authors with guidance on how to meet minimum open science requirements when it comes to conducting research to be submitted to the journals – the journals could be seen as leading the way in open science principles. Examples include the inclusion of a 'registered report' article type and compulsory data sharing (with exceptions for certain data types).

(4) Advocacy. Societies, such as the EHPS, playing a leadership role in advocating open science and research integrity to the community through its flagship ventures (e.g., encouraging open science in annual conferences) and links with the community. The focus should be on encouragement and advocating advantages of open science rather than a pressuring, didactic approach.

Conclusion

The SYNERGY expert meeting convened to discuss various issues relating to open science and research integrity. The issues are topical give high profile issues with replication and dubious research practice. The experts identified key issues relating to open science, discussed numerous issues and controversies, identified important practices needed to improve transparency and openness in research in health psychology, and made recommendations

on possible solutions and future directions.

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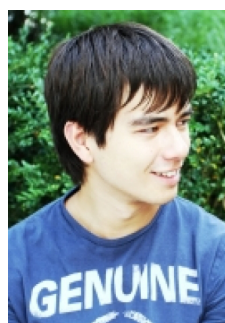
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