

Chemnitz, 27.10.2020

Position Paper of the Psychologie-Fachschaften-Konferenz (PsyFaKo) " Replication Crisis and Open Science in Psychology "

To whom it may concern,

the German psychology student representation [Psychologie-Fachschaften-Konferenz, PsyFaKo¹] adopted the following position on the "Replication Crisis and Open Science in Psychology" during their 27th conference, that took place from the 31st May to the 3rd June 2018 in Würzburg, Germany. The adoption of this position was legitimized by 246 conference attendees from the 41 faculty-associations of German universities²:

First, we will outline the problem, then highlight the relevance of the topic for students and briefly describe solutions proposed by the Open Science movement and conclude by postulating and justifying six demands.

The replication crisis

"The first principle [of science] is that you must not fool yourself, and you are the easiest person to fool."

Richard Feynman

For some years, in the wake of the so-called "replication crisis", there has been growing evidence that a significant portion of psychological research does not produce new insight, but instead may often produce false-positive results (see, for example, Ioannidis, 2005). In 2011, Simmons, Nelson, and Simonsohn showed how standard statistical methods commonly used in psychology seem to provide evidence for apparently implausible effects: they "showed" that listening to the song "Kalimba" made their participants age. The message is simple: the current methodology of psychology (and other sciences) is prone to bias.

This problem of "false positive psychology" is fuelled by questionable research practices (QRP). John, Loewenstein, and Prelec (2012) identify ten questionable research practices. These

¹ English: Conference of Psychology-Students Councils

² Translator's note: This refers to mainly to Germany, but student's councils from Austria and Switzerland often attend the conference, too.

include reporting post-hoc hypotheses

as if they had been expected from the start (HARKing), flexible stopping of data collection as soon as significant test results are obtained, and incomplete reporting of experimental conditions or collected dependent variables. Approaches such as these are also referred to as p-hacking.

The fact that QRPs are not just a niche problem is further illustrated in a survey conducted among members of the German Psychological Society, which Fiedler and Schwarz (2016) based on the work of John et al. (2012). In this study 47% of those surveyed stated that they had practiced HARKing at least once in their careers.

This does not mean that researchers have the intention to actively falsify their results. Rather, common distortions of human thinking lead to the interpretation of incidental findings as expected effects or a biased stance towards data analysis that involves a preference for the confirmation of one's own assumptions. Bakker, van Dijk and Wicherts (2012) explain how, on top of that, our science system systematically rewards the use of questionable research practices: while significant findings are published in journals, results that suggest a null effect disappear in the file drawer (see Franco, Malhotra & Simonovits, 2014). The resulting publication bias, coupled with the low number of replication studies published, adds to the picture of science as a field in which it is difficult to distinguish false positives from true positives. Eventually, the Open Science Collaboration (2015), a large international consortium of scientists, attempted to estimate the reproducibility of psychological research through the replication of 100 studies in a mammoth project. The result emphasizes the concerns outlined above, as, depending on the criterion used, only between 36% and 68% of the original results could be replicated.

Relevance for students

As psychology students, we have a direct interest in the best possible psychological research, as research results are the most important substantial basis for the diverse professional activities after graduation. Whether as a psychotherapist, an organisational psychologist, a consultant or a diagnostician, we must be able to rely on scientific results. In many cases, the investment of large sums of money or even the health of many people depend on these results. Even the most innate interest and function of science, the advancement of knowledge, seems

to be endangered under the given circumstances.

The teaching of insufficiently secured research results in university lectures and courses represents an immense waste of resources. This affects the institutions as well as the teachers and the students. Furthermore, the struggle for reliable research practices is also highly relevant to the social function of research. As a society, we must make every effort to protect the credibility of science, given today's intense disinformation campaigns and denial of research results (such as the denial of man-made climate change). The best way to do so is through an offensive and constructive approach to the problems described above.

The Open Science movement

In response to the replication crisis, a vibrant reform movement has emerged under the title "Open Science", which has already presented promising solutions. Open Science is based, among others, on the following principles: Open Methodology, Open Source (Open Source Technology and Code), Open Primary Data³, and Open Access (Free Access to Research) (Kraker, Leony, Reinhardt & Beham, 2011).

We consider the pre-registration of scientific projects to be one of the most important concrete steps (Wagenmakers et al., 2012, Nosek et al., 2018). A pre-registration allows for early identification of problems in the design and execution of a research project. Deviations from pre-registered hypotheses and methods require justification and can be reconstructed. As this can reduce the use of questionable research methods, we expect a reduction of the proportion of false positives in the research literature. An increased adoption of pre-registrations also represents a desirable step on the path from result-oriented to method-oriented thinking.

The PsyFaKo e.V. already demanded the introduction of a pre-registration database, increased publication of replication studies and critical reflection on the publication process in two position papers back in 2012.

³ For clarification: "[Raw data are the original records, e.g. crosses on a paper questionnaire, drawings or even audio or video recordings. By primary data the first transfer of the raw data into a digital format is meant (...).]" (translated quote, Schönbrodt, Gollwitzer & Abele-Brehm, 2017, p. 22)

Germany as a location for research now has the opportunity to take on a pioneering role in the reform of psychological science through bold action. We would therefore like to address the responsible parties with concrete, constructive demands. In addition, as representatives of the German-speaking psychology students, we are committed to ensuring that the student's scope of action is also utilized in the best possible way.

Demands

Open Science in Teaching

1. Coverage in methodology classes

Addressing the so-called "replication crisis" and open research practices, including replication methods, should be a mandatory part of psychological methodological training. This includes an early general coverage and an in-depth-coverage later on.

Justification: The replication crisis marks a turning point in the history of psychological research. In order to adequately educate young scientists for the future, a comprehensive treatment of open research practices is essential from the beginning. The coverage of the replication crisis serves as an excellent demonstration of the importance of open practices (see section "The Open Science Movement"). To explore ways in which the replication crisis and open research practices fit into the curriculum best, we would welcome the creation of local taskforces involving students and local open science initiatives.

2. Coverage in classes of fundamental and applied psychology

In classes of fundamental and applied psychology, the taught findings should be critically discussed with respect to the replication crisis and the impact of the applied research practices.

Justification: A discussion of the replication crisis that is limited to methodology classes does not do justice to the significance of the topic. Lack of or dubious replicability of recognized psychological effects is relevant in terms of content and should therefore be addressed in all courses.

3. Pre-registration of theses

All empirical psychological theses, both confirmatory and exploratory ones, should be pre-registered. Exploratory findings should always be reported as such. The opportunity to practice pre-registration should be provided early on during the studies, e.g. during empirical/experimental internships.

Justification: The use of open research practices is of increasing importance to the future

generation of researchers and should already be an important learning objective in the initial empirical work. In addition, a pre-registration is an extremely valuable instrument for students in regards to structuring and clarifying scientific work. Therefore, this step would also be helpful for those students, who are not primarily interested in research. It would be practical, for example, to replace common exposés with a pre-registration based on the AsPredicted template (<https://aspredicted.org/create.php>), as the scope of this template is limited to the essentials.

4. Theses as replications

At all universities it should be possible for students to run replication studies as their thesis. This option should be fully equivalent to other theses, supported by supervisors and actively offered. The number of replications should be actively increased.

Justification: Compared to classical empirical studies, replication studies are not "second-class" studies, but rather make a significant contribution to the evidence protection of psychological research. Therefore, it is only logical to allow replications of published findings as well as possible topics for theses. At equivalent quality, theses that involve replication must be considered equivalent to other theses. Overall, it is important to recognize replications as independent scientific work and increase their number.

Open Science in Research

5. Open research practices as a hiring criterion

The application of open research practices should be introduced as a central hiring criterion for all scientific positions at psychological institutes, especially professorships. These include, in particular, 1) the pre-registration of confirmatory studies, 2) the publication of primary data as far as ethically and legally allowed, 3) the publication of complete syntax of the data analysis and 4) the open access to research results.

Justification: At the moment, the number of publications and the acquisition of funds are the central selection criteria for scientific positions⁴, especially for professorships. However, a high number of publications may also be an indicator of p-hacking and a large number of false-

⁴ Translator's note: This refers to the situation in Germany.

positive findings and is therefore only an indicator of good academic performance if all publications are based on open research practices. A one-sided focus on the number of publications has a disastrous incentivising effect: it rewards the use of questionable research methods. The use of open research methods, on the other hand, is a criterion with a desirable incentivising effect. It is only possible to draw meaningful conclusions from the number of publications if open research practices are employed. In particular, we recommend including open science criteria in job advertisements for professorships.

6. Research Funding

Whenever possible, research funding should be granted under the condition of the application of open research practices, in particular 1) pre-registration of empirical studies, 2) publication of primary data if ethically and legally allowed, 3) publication of complete syntax of data analysis and 4) open access to research results.

Justification: These criteria ensure that the funds for research projects are allocated with care and that the funded work has a high methodological quality. Thus, the greatest possible gain in knowledge can arise. The research results are also verifiable, comprehensible and accessible to the public. The latter is particularly important in view of the currently absurd situation, in which research is largely state-funded but sold back to public institutions by private science publishers for millions of euros in fees.

Conclusion

To conclude, we would like to emphasize that with our demands we aim to improve research practices, the teaching of psychology and the scientific incentive system. We hope that the local research community, including students, will quickly recognize the importance of the current developments with due seriousness and seize the opportunity to further develop psychology as a science.

Please do not hesitate to contact us if you have any further questions.

Signed, the *Konferenzrat der Psychologie-Fachschaften-Konferenz* [Executive Committee of the PsyFaKo e. V.]

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