

Promoting research reproducibility: introducing registered reports in ST-OPEN

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As an overlay journal, ST-OPEN aims to increase the research capacity of the University of Split and other higher education institutions by mobilizing early career researchers. To achieve this, we set our focus on transforming graduation theses into research articles (1). A key mission in that process is to promote open and reproducible science. Research reproducibility, one of the core aspects of the scientific approach, can be defined as the ability to achieve similar or nearly identical results using comparable materials and methodologies (2). A recent study has pointed out that the vast majority of research may not be reproducible and thus not have the desired impact on science and the community (2). Since ST-OPEN strives to follow global innovations in scientific publishing, we are open to exploring and testing new approaches to im-

proving the research quality in the published work and the journals' impact. Therefore, we decided to introduce a new article format – registered reports – to increase the quality of the articles we publish. Registered reports are research articles that have been peer-reviewed and, in principle, accepted for publication at a protocol stage, before the data have been collected and analyzed (3). The authors are obliged to conduct a study based on the approved (i.e. reviewed and published) protocol, while the journal has to publish the final version of the article after subsequent expert peer review confirms that the study had been executed per the protocol (Figure 1).

Registering a research protocol is an important step in reducing publication bias, i.e. the preference towards publishing positive results (4). Conceptually, registered reports reflect the core components of the research process; aims and hypotheses are developed based on cumulative knowledge, resources are used appropriately to decrease research waste, and publishing does not depend on the direction or significance of the results. With the current exponential growth of scientific publications (5), we could expect that any approaches focused on decreasing research waste and evidence synthesis would be prioritized. Despite this, only a small number of scholarly outlets have adopted registered re-

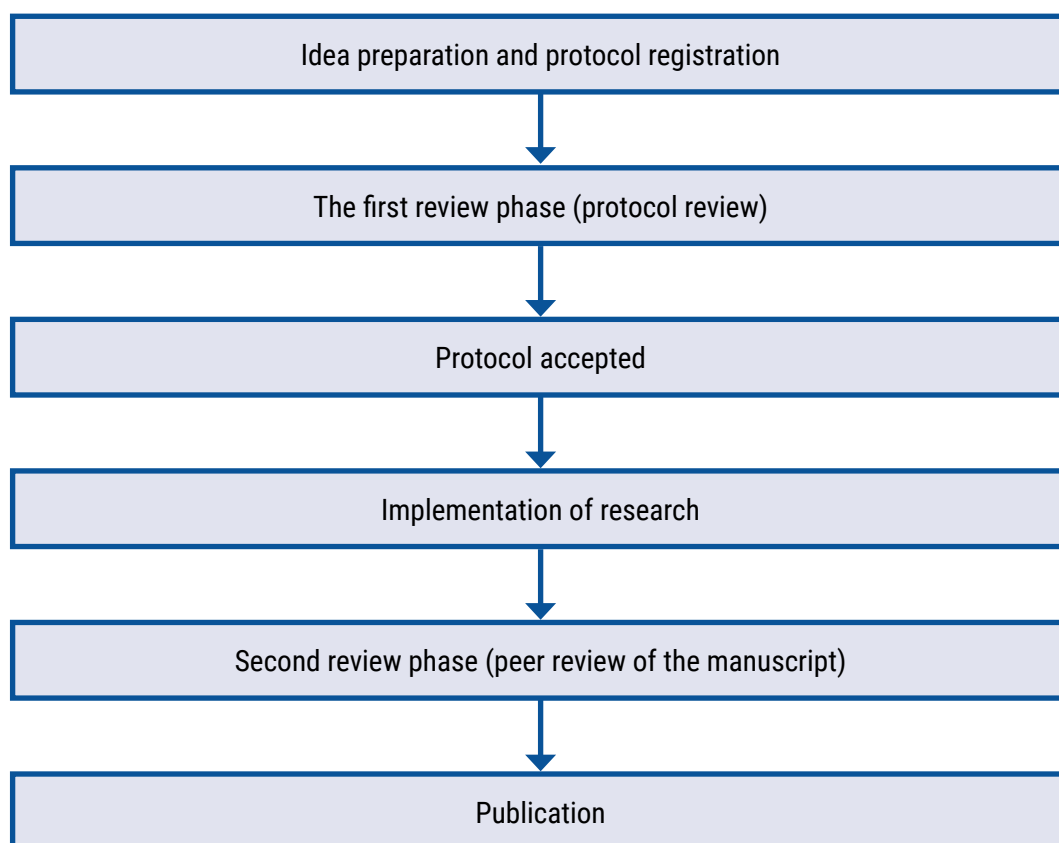


Figure 1. Flowchart diagram of a registered report from idea to publication.

ports as a publication format. Journals focused on experimental psychology were the first to do so in the social sciences and remain on the forefront of such trends (6). Biomedical journals, meanwhile, have yet to turn to registered reports (6), but have already accepted the idea of protocol publication (7) and have been mandating the registration of clinical trials in public registries for years (8). Considering this, our opinion is that the number of journals publishing registered reports will significantly increase in all scientific disciplines in future.

In our recent large-scale study on peer review, we found that methodological flaws were more related to submission rejections, while statistical problems were more related to revisions (9). Another recent study that assessed 26 meta-analyses pointed out that adopting registered reports may reduce research waste and make research outcomes more relevant to end users (10). Taken as a whole, this would mean that journals would benefit from assessing studies at the protocol stage, as this would enable them to resolve potential methodological challenges in advance. This process is similar to the submission of a study to an ethics board for ethical approval, where experts assess the proposed protocol for any potential ethical issues and can return it to the authors for revision. In the same way, the reviewers of a registered report protocol may ask its authors to modify the methods and/or analyses planned in their proposal.

In our work with early career researchers and their supervisors, we similarly noticed that some graduation theses with attractive ideas have not been published due to methodological issues that could have easily been solved before the start of the research study, at the

protocol development stage. For that reason, from its sixth volume (year 2025), ST-OPEN will welcome submissions of registered reports from all fields of science. Our acceptance of the protocol does not oblige researchers to publish their complete articles in our journal; rather, our aim with this initiative is to increase the quality of research by starting our collaboration with the authors at the planning stage. We also hope this will make the researchers in question more receptive to criticism of their study, since they had not yet collected or analyzed any data, or submitted a completed manuscript to a journal. Shifting the review process to an earlier stage may also increase the reproducibility of the published research findings, since all registered reports need to submit their data alongside the article. The publication of the protocol also reduces the pressure on researchers to 'achieve' statistical significance in their study, because the article will be published regardless of the results, provided that the study has followed the registered protocol. Pre-review at the protocol stage may also help identify if there is already sufficient evidence to draw conclusions on the proposed research problem, especially in relation to the practical implementation of research findings, thereby allowing the researchers to redirect their efforts to new, unanswered research questions. We hope that supervisors at the University of Split and its collaborating institutions will encourage their students to submit the protocols of their thesis as it is being developed, thereby helping raise awareness about the need for research transparency in the process. The instructions for authors who want to submit a registered report to ST-OPEN are already available on its website (11).

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