

Joseph Rovetti

## Teaching Registered Reports for Psychological Science

### Core Concepts

Psychology is often referred to as a so-called “soft” science. This is partly due to the ongoing *replication crisis* in psychology, which describes how only about half of published findings in psychology successfully replicate when other researchers try to get the same result. This suggests that much of our knowledge about psychology could be wrong.

One reason for this is likely a questionable practice known as *p-hacking*, in which researchers conduct several statistical analyses until they find one that supports their hypothesis. They then report only that one analysis and neglect to mention all other “failed” analyses. This practice makes it far more likely that a statistical fluke will arise.

P-hacking is facilitated by what is considered the “conventional” path to publishing a research paper: researchers ask a research question, collect data to test that question, decide on and conduct appropriate statistical analyses, and write the paper. However, by deciding on their statistical analyses only *after* the data is collected, this allows researchers to try different analyses until one gives them the results they hypothesized.

In light of these bad practices, there has been a recent push for a different kind of research paper: the *registered report*. With registered reports, the researchers start by writing the first half of the paper—the half that includes the analyses they plan to conduct—*before* collecting any of the data. Only after this first half of the paper is approved by peer reviewers do the researchers then collect the data and write the second half of the paper. As a result, researchers are not able to hide it if they decide to change their analyses.

### Lesson Outline

Though many psychology courses use in-class experiments to develop students’ paper-writing skills, the majority use the “conventional” path to writing a research paper, which may facilitate poor research practices. With this in mind, my Great Idea for Teaching is to educate students about registered reports through an in-class experiment. This idea would be suited to undergraduate psychology students, most likely in an introductory research methods class. Below is a step-by-step description of how this could be implemented:

1. The instructor will introduce a research question to be addressed.
2. The instructor and students will design an in-class experiment to test this question.
3. Students will write the first half of a research paper (Introduction and Methods sections) as an at-home assignment, including their plans for analyzing the data. Crucially, students will write this *before* the data is collected.
4. The instructor will evaluate and give feedback on each submission, including pointing out when students’ analysis plans need rethinking or justification.
5. Once all feedback is returned, the in-class experiment designed in Step 2 will be run and the data will be collected. This data will be provided to the students.
6. Students will write the second half of the research paper (Results and Discussion sections) as an at-home assignment, including the findings of their analyses. Since analyses were already approved, students will not be able to engage in p-hacking. Instead, they will have to be honest if their results are unexpected.

### Learning Outcomes

By completing this project, students will learn how to formulate a research question, design an experiment, analyze data, and write a research paper. More importantly, doing this through the registered report format will teach them to practice these skills in a way that is rigorous and responsible. It will teach them that good science is about honesty and integrity, rather than doing whatever is necessary to get the desired result.