

PCI Registered Report Peer-Review

Registered Report Title: Evaluating the pedagogical effectiveness of study preregistration in the undergraduate dissertation: A Registered Report

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REVIEW

Thank you very much for sharing the Registered Report “Evaluating the pedagogical effectiveness of study preregistration in the undergraduate dissertation: A Registered Report” with me and for asking for feedback.

The report presents a study to assess whether pre-registration of undergraduate Psychology dissertations may have benefits on students’ attitudes towards statistics and questionable research practices (QRP) and on their understanding of open science concepts. I read the registered report with great interest and believe that the project will help answer an interesting question which is still understudied at present. The report is clearly structured and well written, and my overall impressions are positive.

Despite my positive appraisal, there are a few points I noticed which I believe may help the authors strengthen their work. Three points are more important and I detail them further below. I then follow with minor points which I present in a list in the end of this review.

Before starting with my comments, I would like to mention that I have not used Bayesian analyses and my statistical knowledge is unfortunately rather rusty, I therefore recommend that the authors do not use my absence of comments on the statistical analysis as a confirmation that the planned analysis is adequate.

Important points:

The first major point I would like to raise concerns the research questions and the way in which the project is described. As I was reading through the project, I was very confused by the comparison of the two groups, thinking to myself that the group who is likely to preregister their dissertation is also likely to study in a center where awareness to open science is markedly better. In fact, if the two groups were to be compared one to the other, I believe that the study would look at the influence of different institutions and research groups more than the influence of the pre-registration process itself. In an ideal scenario, randomly assigning a condition to each participant would avoid this problem, but I can understand that this may not be realistic, especially in a project on such a large scale. Nonetheless, even with the design kept as is, it is not until page 17 that I understood that the authors plan to compare the **difference/interaction/progress** between T1 and T2, thereby cancelling differences between prior knowledge and attitudes.

This distinction is very important and should be made clear throughout the report. For example, the hypotheses presented on page 9 fail to capture the distinction. The first hypothesis states that “Students who preregister their dissertation will have higher positive

affect towards statistics, higher self-reported competence with statistics, higher perceived value of statistics, and less difficulty with statistics at T2 compared to students who do not preregister their dissertation.” In this phrasing, the hypothesis H1 appears to only compare both groups at T2, rather than to compare the groups on their improvement between T1 and T2. The same goes for H2, where the authors mention that “Students who preregister their undergraduate dissertations will have a reduced endorsement of QRPs compared with students who do not preregister their dissertation.” While it should state that they will show a greater reduction of their endorsement of QRPs between T1 and T2 than the control group. And so forth, also for H3. The authors should make sure that the manuscript clearly explains that the results will compare both groups the difference/improvement/interaction between T1 and T2 to avoid confusion and early criticism from readers.

Also related to this point, not only is it possible that the groups differ from the baseline, it is also possible that, if the experimental group rates higher on the different variables at T1, they may show less improvement between T1 and T2 than a group who started at a lower point but is nonetheless in the most research-intensive learning-period of their degree. While I do not have a recommendation for this potential issue, I think that the authors should consider this possibility and maybe discuss whether the analysis, as it currently stands, may risk masking the full effect of preregistered reports by leaving less room for improvement overall in the experimental group. This is all hypothetical, but I thought that it should be addressed, or at least reflected upon before starting data collection. The authors should clearly explain the limitations of this non-random assignment in the ‘Risk and mitigation’.

A second important point concerns the COM-B measure and its role in answering the research question. From the report, I did not find it clear what the COM-B will contribute nor how it will be used in interpreting the data. The authors mention that the COM-B results will be used to compare groups, but I am unsure what this finding would mean about the preregistration process per se. If I understood properly, in most cases, the decision to preregister a dissertation project comes from the research laboratory or the supervisor. The COM-B could then provide information on how prepared and motivated those planning on pre-registering their study really feel, but I am unsure whether a group comparison is truly helpful. I also feel that, for the control group or those who are not planning on performing a preregistration, the COM-B questions will be highly abstract (in fact I found most COM-B questions very abstract, but I detail this point later on when discussing the ‘Study materials’). In this regard, I was surprised that the authors did not plan to use the COM-B to assess how prepared students feel about their final dissertation project (rather than about the preregistration), in which case they could do a T1-T2 comparison and see whether the preregistration helps improve the COM-B scores of the experimental group.

Finally, the last major point that I noticed in the design is the lack of knowledge about the type of dissertations that students are undertaking. It is possible that some students focus on exploratory qualitative studies or literature studies and therefore do not feel able to do a preregistration, but also do not strengthen their statistical skills and confidence in the same way as other students who conduct a more quantitative study. A few more details about the specific study type, whether the dissertation is fit for preregistration, and the training acquired between T1 and T2 (integrity, statistical, open science, etc.) would be important to capture to exclude possible confounding factors and biases.

Smaller points that are easier to address:

Note: For the sake of clarity, I added continuous line numbers to the document available in the OSF. I will refer to these page and line numbers (Pxlx) where relevant in the following points.

The abstract should mention the fact that participants are not randomly assigned to the groups, but self-assigned based on their completion of a preregistration.

P4l64 compat should read combat

P4l72 From the beginning, it is not very clear what the ‘Attitude towards statistics’ means. A few examples of points may be helpful to avoid confusion early on.

P6l109 The first sentence of this paragraph would benefit from a context setting to mention that this is in the UK since this differs in different settings.

P7l142 not clear what this sentence means. Should ‘report worries’ be ‘students worry’?

P7l147 The sentence starting with “Indeed, an undergraduate publication...” should be moved one sentence ahead, it is out of context where it stands.

P9l186 The term ‘utility’ used in this paragraph is not entirely clear, especially in the first sentence of ‘utility in.... dissertation provision’. A better term may increase readability.

P9l188 “to improve students’ ... endorsement of QRPs” doesn’t sound quite right. I believe the authors mean the opposite.

P9l190 It should be clear that T1 is always pre-preregistration. It becomes clear later on but I noted it as a question at this point in the manuscript.

P9l193 the term ‘affect of statistics’ appears to invert the roles tested, i.e., to look at how statistics impact students rather than how the student perceives statistics.

P9l195 Is “self-reported competence” with statistics different from “less difficulty with statistics”?

P9l198 Endorsement seems like the test is about self-reported behaviours, where the questions are mostly about acceptance/tolerance with or perception of QPR.

P9l200 confidence in terminology sounds like faith in. Even if wordier, it may be clearer to say confidence in their understanding of OS terminology.

P10l223 Remuneration or compensation?

P11 maybe link to the power calculation available on the OSF?

P11l238 name the university granting the ethics approval

P11l241 “ensuring they meet the inclusion criteria” → How could this be ensured? Was a registry of students consulted? Was any assurance granted?

P131268 The authors should mention that the grades are self-reported. The questionnaire also allows respondents to select ‘Prefer not to answer’. What happens in this case? Will the data be included or excluded?

P131278 From what I understood, respondents mention whether they plan to perform a preregistration at T1, and mention whether they did it at T2. Are sub-groups created for controlling the answers of participants who planned it but in the end did not do it and those who did not plan it but in the end did it? At T1 are participants allowed to answer that they do not know whether they will preregister their study or not?

P141297 This may be a standard questionnaire, but I find the term ‘sensible’ very ambiguous in this test and potentially problematic for non-native speakers (i.e., it is often mixed with ‘sensitive’, and a ‘sensitive issue could approximate ‘problematic’).

P141310 maybe add a few words to mention what an attention check is. I understood later, but it is not a term I heard very often.

P151335 “The same sample of students will be asked to complete the above measures again at Time 2” unclear that the COM-B is not included then.

P161347 I feel that asking whether participants plan on publishing in open access may also be relevant here, although an option to mention that they do not for financial reason may be needed then.

P171382 ‘additive’ effect is not so clear. I would also say that **going through** the preregistration process has an effect, rather than the process itself.

P181395 reregistration → preregistration

P231439 “Unlike with statistics attitudes...” This sentence contains many negatives and could be improved if rephrased slightly.

P241442 The section on the qualitative analysis is not clear. What will this analysis be used for? Which question will it answer or complement?

OSF Study material:

- Demographic question 8 is not discussed in the manuscript. How will this information be used?
- Attitudes towards QRP
 - o Study Design: “Collecting more data in order achieve significance” → Missing a ‘to’ and would be more accurate if phrased as “Collecting more data than planned...”
 - o Reporting & analysis QRP: “selectively reporting studies” is jargon and may be very difficult to understand by psychology undergraduate students.
- Understanding Open Science
 - o What are the descriptors used in the scale 1-7
- Brief COM-B measure

- I would recommend to avoid 0s in a scale for ease of calculation without having to turn the values in log
 - These 6 questions are extremely difficult to grasp. The ‘definition’ section should be rephrased using the second pronoun and using simpler terms and examples. As it currently stand I can anticipate that respondents will guess more than answer knowingly to these highly abstract conceptual questions.
 - As stated above, maybe consider using this scale about the dissertation itself.
- Attention check
 - Are there multiple choices to this question to make sure the participant reads through?
 - Post-only questions
 - The question starting with “If yes” should come directly under the first question, not under the question about groups.
 - Value of pre-registration
 - I would highly encourage authors to repeat the definition of preregistration at this point, and maybe every now and then in the questionnaire.

I hope some of these points will be useful to the authors. I want to congratulate the authors once again in their efforts, and welcome any follow-up questions they may have.

Kind regards,
Noémie

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