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The multiplicity of analysis strategies jeopardizes replicability: lessons learned across disciplines

Sabine Hoffmann, Felix Schönbrodt, Ralf Elsas, Rory Wilson, Ulrich Strasser and Anne-Laure Boulesteix

Note: Reports are unedited and appear as submitted by the referee. The review history appears in chronological order.

Review History

RSOS-201925.R0 (Original submission)

Review form: Reviewer 1 (Amy Orben)

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No

Recommendation?
Accept with minor revision (please list in comments)

Comments to the Author(s)
The manuscript integrates understanding across multiple disciplines to present a framework around analysis multiplicity. It does so with, what I think is, complete success. I thought this manuscript was carefully written, clearly argued and of importance to a broad scientific audience. I would therefore recommend it for publication.

There are a couple of minor points that the authors can decide whether they think would improve the manuscript:
1. I would suggest the authors might want to lengthen their figure headings slightly (e.g. Fig. 1 and 2), as readers often read those separately to the paper and at the moment they are not self-explanatory.
2. On page 7 there were two instances where the structure of sentences made the argument less clear than it could have been. For both "method uncertainty" and "sampling uncertainty" the authors did not use the keyword till at the very end of the description/definition of it. E.g. "Finally, specifying a model and parameter values is not sufficient to run the actual computations – a specific implementation and computational method must be chosen, or even developed, before a statistical model can be estimated or predictions from a mechanistic or agnostic model derived. Again, there is a multitude of options without clear guidance or a definitive choice on the method that will provide the most suitable answer to their research question: researchers encounter here *method uncertainty* [55]." While this might seem elegant, it is very difficult for the reader to follow. I would suggest always to use the keyword as early as possible and then subsequently define it in the following sentence(s).
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6. Page 10, line 56: I think "Steps to make ones .... Replicable" would be better as its own section, rather than part of the list ("e)") as it is not in Figure 4.

With best wishes,
Dr Amy Orben

Decision letter (RSOS-201925.R0)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Dr Hoffmann

On behalf of the Editors, we are pleased to inform you that your Manuscript RSOS-201925 "The multiplicity of analysis strategies jeopardizes replicability: lessons learned across disciplines" has been accepted for publication in Royal Society Open Science subject to minor revision in accordance with the referees' reports. Please find the referees' comments along with any feedback from the Editors below my signature.

We invite you to respond to the comments and revise your manuscript. Below the referees' and Editors' comments (where applicable) we provide additional requirements. Final acceptance of your manuscript is dependent on these requirements being met. We provide guidance below to help you prepare your revision.

Please submit your revised manuscript and required files (see below) no later than 7 days from today's (ie 02-Mar-2021) date. Note: the ScholarOne system will 'lock' if submission of the revision is attempted 7 or more days after the deadline. If you do not think you will be able to meet this deadline please contact the editorial office immediately.

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Thank you for submitting your manuscript to Royal Society Open Science and we look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Kind regards,
Anita Kristiansen
Editorial Coordinator

Royal Society Open Science
openscience@royalsociety.org

on behalf of Professor Zoltan Dienes (Associate Editor) and Mark Chaplain (Subject Editor)
openscience@royalsociety.org

Reviewer comments to Author:
Reviewer: 1

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Author's Response to Decision Letter for (RSOS-201925.R0)

See Appendix A.

Decision letter (RSOS-201925.R1)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Dr Hoffmann,

It is a pleasure to accept your manuscript entitled "The multiplicity of analysis strategies jeopardizes replicability: lessons learned across disciplines" in its current form for publication in Royal Society Open Science.

You can expect to receive a proof of your article in the near future. Please contact the editorial office (openscience@royalsociety.org) and the production office (openscience_proofs@royalsociety.org) to let us know if you are likely to be away from e-mail contact -- if you are going to be away, please nominate a co-author (if available) to manage the proofing process, and ensure they are copied into your email to the journal.

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Thank you for your fine contribution. On behalf of the Editors of Royal Society Open Science, we look forward to your continued contributions to the Journal.

Kind regards,
Royal Society Open Science Editorial Office
Royal Society Open Science
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on behalf of Professor Zoltan Dienes (Associate Editor) and Mark Chaplain (Subject Editor)
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Appendix A

Response to Reviewers: The multiplicity of analysis strategies jeopardizes replicability: lessons learned across disciplines

March 9, 2021

Reviewer 1 Dr Amy Orben

The manuscript integrates understanding across multiple disciplines to present a framework around analysis multiplicity. It does so with, what I think is, complete success. I thought this manuscript was carefully written, clearly argued and of importance to a broad scientific audience. I would therefore recommend it for publication.

We are grateful to the referee for her careful evaluation of our submission, her valuable comments and her helpful suggestions, which contributed to a significant improvement of the quality of the paper. All comments have been addressed, and the manuscript has been revised accordingly.

There are a couple of minor points that the authors can decide whether they think would improve the manuscript:

1. I would suggest the authors might want to lengthen their figure headings slightly (e.g. Fig. 1 and 2), as readers often read those separately to the paper and at the moment they are not self-explanatory.
   ✓ *Thank you for this suggestion. We revised the manuscript accordingly.*

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✓ Thank you for these helpful suggestions. We revised the manuscript accordingly.

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✓ Thank you for this comment. We revised the caption of Figure 3 accordingly.

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✓ Thank you for these suggestions. We added Table 1 to provide short descriptions for each type of uncertainty and replaced Figure 5 with Table 2. Concerning Figure 4, we think that the implementation that is most helpful for readers is to keep it as a Figure but to provide a link to an interactive and clickable webpage where they can find additional references for each solution.

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