Author’s response to reviews

Title: The limitations to our understanding of peer review

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Version: 1 Date: 23 Jan 2020

Author’s response to reviews:

Response to reviewers

Dear editors,

Herein is our response to the peer reviewers for our manuscript, “The limitations to our understanding of peer review”, submitted to Research Integrity and Peer Review All edits to the previous version can be seen using the tracked changes that we made. We have accommodated virtually every single one of the suggestions to various degrees, and are grateful to the editor and the reviewers for taking the time and care to help us improve this paper. We also have incorporated additional changes based on both public and private comments made on the preprint version of this paper. We believe that the MS is now much stronger, thanks to these efforts.

Major changes that we have made include:

• Adding a Methods section
• Adding an introductory section to the Discussion
• An almost complete rewrite of the Abstract
• Restructuring so that the Table and text are more congruent
• The Table itself has been reworked substantially
• Restructuring of much of the core content in light of the restructuring

We have also made sure to include any relevant literature that has been published since our original submission. Below, we provide our response to the points made by all reviewers. Our responses are in bold. [NOTE THAT THIS CAN ONLY BE SEEN IN THE ATTACHED RESPONSE FILE]
Editors Comments

Abstract:

conferring legitimacy on research while distributing academic capital and prestige on individuals – I am troubled by this part of the first sentence and I would welcome it being rewritten – peer review is maybe (wrongly) perceived to provide a quality approval or “legitimacy”, but as we know it isn’t as simple as that - editor(s) or committees make the final decision, publication venue often is the seal, and retractions remind us that each seal even in the same publication venue is not of the same quality. As for academic capital – what do you mean by this? Costs associated with peer review or the boost to the career due to having a paper published, and finally, while peer review may provide some prestige – in some –communities it does not – or it provides everyone the same amount of prestige, while in others it is considered an obligation and not a prestige.

We have edited the whole Abstract now for clarity.

1. Programmatically analysed – I find this to be unclear – what does programmatically mean – it seems to imply a specific method that can be replicated – I would lose that word

   a. Edited for clarity.

2. We distill this – do you mean you distill the major gaps, or the analysis, if later maybe be better to say – By looking into core themes of peer review, namely XXX, we provide our analysis and the major gaps of each core.

   a. Edited for clarity.

3. We use this to present a guide for the future of peer review, and the development of a new research discipline based on the study of peer review. – I would prefer this to almost be the last sentence, and for you to include some of the major gaps identified, especially those of high priority, as well as mention of the difficulty grading you provide.

   a. Edited for clarity.

Introduction:

1. These gaps - remove these, you haven’t specified yet which gaps exist. Additionally, please move the sentences following this one to the new section on methodology.

   a. Edited for clarity.
2. What we emphasise is the need for a rigorous – Please remove this whole paragraph, and specify the objective of this study – by combining what it is you want to achieve with this article in 1 or 2 sentences – e.g. the objective was to identify gaps, and provide recommendations for the future research. Also state you provide a difficulty and priority estimate.

   a. Edited into a new final paragraph for the Introduction section.

Methods

1. Include a section on methodology that specifies how you conducted your review (even if it states literature known to the authors), and how you determined difficulties, as well as priorities. Additionally, mention here how you came to decide upon these core themes. While I would welcome that you provide for each item in Table 1 a reasons why you find a specific item to be easy or hard, or low, mid, high priority – that might be too much to ask of you – but a general description on what priority and difficulty levels mean or imply would be welcome. Also perhaps a comment on what do you see happening if a specific item becomes researched - does high priority mean that you think it will greatly influence the field or science in general, or our knowledge of peer review.

   a. Edited and integrated into a new Methods section.

2. I provided comments for specific items in the table (attached) and below.

   a. The Table has been almost completely redone to address the many useful comments here.

Discussion

1. Rename to results and discussion – as these are supposed to represent your analysis as well as deliberations around them.

   a. Edited.

2. Write a short paragraph which introduces the major themes, and have a link here to table 1. I would prefer to see it at the beginning of the paper, and have the Table 1 as the main referral for readers and a summary of all you say afterwards. Additionally, I would suggest several changes to the table:

   a. Done. Based on the changes to the Table too, we have restructured some elements of the MS.

   a) Please have the same number and titles of sections as you do in the table 1
a. Done.

b) Perhaps rename Item in Table 1 to Topics recommended to be researched, and Topics to Aspects of Peer Review. Include in the legend below the table, a short statement on what difficulty and priority levels imply.

a. Done.

c) Number of times a paper is rejected before acceptance – to me does not belong to editorial accountability – One editor can only reject a paper once – while this information is interesting in the inquiry of how scientific publishing works – I wonder is it that you are interested in the percentage of all research that will eventually be published, or the question of – when does peer review actually highlight such problems of the paper that authors stop sending it elsewhere, as opposed to giving up after several desk rejections – see also comments on this item in the table – and consider removing it either completely, or put it in Other section

a. We have removed this section for now. It sets us on a slippery slope to discussing a number of relevant factors within scholarly publishing, and we choose to remain focused for now.

d) Impact of decisions on reviewer recruitment – I do not know what you mean by this item – even after reading the text – what decisions are you taking about and how are those related to the recruitment process? The following item is How editors select reviewers (this I consider u mean where they find them, and what characteristics they are looking for, how often are they reused) So please expand this a bit and clarify. Additionally, while I dislike mentioning my own work – if you want you could tell authors that a list of tools for reviewer selection that can be used by the reviewers are listed in a review of automation tools in publishing I conducted:

https://www.zonmw.nl/fileadmin/user_upload/1_Automation_Report_FINAL.pdf

a. For the sake of simplicity, we have removed this for now and clarified related topics. Thank you for sharing this report too.

e) Impact of decisions on epistemic diversity – Again I am puzzled by this one, can you clarify a bit – do you mean accept/reject decisions, or also reviewer selection and running of journal – if so in the table please specify editor role, or manuscript decision, or reviewer selection decisions…

a. We have made this clearer in the text accompanying the Table now.

Specific comments per section:
Editorial accountability

1. Justifications for editorial rejections (either ‘desk’ rejections or following peer review) are rarely given or automated, and poorly known despite being….– I would suggest adding after this sentence, something like: An analysis of those across a wide range of journals and disciplines could….
   a. Done.

2. needed into the general study of acceptance rates – consider adding: , especially as authors will very often search for another journal or venue to have their paper published when rejected by a single journal
   a. Edited.

3. Please expand a bit on the Impact of decisions on reviewer recruitment – see d) above
   a. We have removed this section now too, along with in the Table.

Editorial biases

4. Please remove this subtitle, and have it under one editorial subtitle, either Editorial accountability and biases or Role of Editors
   a. Done

5. rather than it being derived from a mandate from the masses – this seems to imply you disagree with editorial power – Is this different in science from PI or head of department roles, additionally, perhaps elaborate more on possible alternatives.
   a. This is actually a quote from Monty Python about power imbalances in society. We have edited for clarity.

6. Their decisions are largely subjective and based on individuals and their relative competencies and motivations, including how they see their journal fit within the present and future research and publishing landscape. – I suggest adding: and on the impact or prestige they predict the paper will have on their journal.
   a. Done.

7. how an editor might decide to signal to authors which reviewer comments are more important to address and which can be overlooked. – I would also, and how editor distinguishes between the two (editor vs reviewer expertise), and this together should probably be an item in the table.
8. Finally, I would add that there is a lack of information on how many editors peer review papers assigned to them, and how editorial review differs from peer review. Only guidance out there is that an editor should disclose the fact if they peer reviewed the paper (as I have done here).

a. Indeed, we greatly appreciate such a thorough review from the Editor here! We have added in a comment about this.

9. I would also recommend stating that we know very little on the Influence of publishers, editorial boards, and readers on editor’s decision making. And perhaps you could add that to the table too.

a. We have added this in now, also based on the comments of another.

10. Also what about - Factors that affect editors’ impartiality and impact of that impartiality – we know that there are country, language and other biases that influence editorial decisions.

a. Yes, this is a potentially huge and hyperdimensional issue to raise.

11. Also – what about – How many papers are solicited by editors, and are those treated differently.

a. We feel the number of things could be potentially infinite depending on how granular we get. We have added in a note about this though now.

Subjectivity and bias of reviewers

1. You talked of subjectivity in the editorial aspects, why is there more need to emphasize subjectivity here? I would suggest merging this with Role of the Reviewer into one category. You could also consider having the following subtitles and table sections:

Role of editors

Role of reviewers

Role of authors

Role of publishers

a. This makes much more sense and we have amended it now, also based on other comments made.
2. There are many topics in the table that you do not address in this section – please do mention them
   a. We have made a lot of changes to this section now accordingly. However, a lot of the items in the Table are very similar or essentially duplicates of those for editors, and we made a point of trying to reduce repetition.

3. Also consider saying something about, factors influencing inter-rater reliability, and recommendations
   a. Done, and this is mentioned in the functionality section of the MS too.

Blinding in peer review

1. Rename to Type of Peer Review and a section of it in the table (I added a suggestion on topics, please do rewrite and expand as you see fit)
   a. Done.

Notions of expertise

1. It isn’t clear that this subtitle relates to reviewers or to the type of peer review, please merge it where it belongs, and consider removing it or moving some sections to the next section on quality.
   a. We have killed off this section now and integrated relevant content into the other sections.

What does peer review actually do?

1. Remove that subtitle
   a. Done.

2. We are often unable to discern whether peer reviews, are more about form or matter, - change to It is often unable to…
   a. Keeping this one as it is for the sentence to make sense.

3. I would recommend mentioning the lack of good tools to measure quality of peer review - 10.1186/s12874-019-0688-x
   a. Added.
4. As well as: 10.1186/s12916-019-1347-0, A Scoping Review on the Roles and Tasks of Peer Reviewers in the Manuscript Review Process in Biomedical Journals – you mention the protocol, but it's out now
   a. Nice spot, added in now.

Role of the reviewer and How reviewers conform to journal policies
1. Please remove these subtitles, and put them under role of reviewer one big that you merge with the upper one for reviewers
   a. Done.

Social and epistemic implications of peer review
1. I would move this whole section to the Functionality and quality of peer review, perhaps I see it wrongly, but to me that is the social and epistemic functionality of peer review
   a. No, you’re right. It should be more about ‘impacts’ of peer review. Consequences. Have edited this now for clarity, and in the Table.

Innovations in open peer review services and platforms
1. I think also this is a too long section, and should fall under the type of peer review, or type and method of implementation of peer review – so I would suggest shortening it and relating it to the mechanisms of conducting peer review
   a. We have edited this section now, and in accordance with the restructured Table.

Researcher attitudes towards open peer review
1. This section to me is too long, and should be under the type of peer review. It doesn’t seem to belong to a paper that try to identify all gaps in research on peer review – its seems to say with the length this is the biggest one, and while I agree that open peer review should be the end goal, all those questions you pose can be asked of other types of peer review. Including pre-publication (preprint) and post-publication peer review
   a. Yes, you’re right. We have edited this section now to be clear.

What should the roadmap for future peer review research look like

Personally, I think the focus should rather be on value added by peer review, and less on researcher attitudes toward open peer review – if a value is added, despite the type or innovation
method, researcher attitudes will change when they are convinced about this – or rather peer review will die if it is shown that the value added is too small.

This is an interesting discussion, and reminds me of the ‘chicken or the egg’ problem. A lot of potential innovations don’t happen because of researcher apathy/indifference towards peer review; which simultaneously means that gathering data on the impacts of different forms of peer review is difficult and biased based on the nature of those who might opt for more ‘progressive’ forms of peer review.

Again, my hope is that you will take the reviewers and my own extensive comments as benign and enthusiastic suggestions of those working in this filed who wish to see it grow and improved, so that your resubmitted version is soon published in our journal.

We have taken all of these helpful comments in and incorporated them into the MS with equal enthusiasm. Thanks, Mario!

Reviewer #1:

In their manuscript, the authors give an overview of current studies and knowledge on editorial peer review, identifying major gaps in our theoretical and empirical understanding of it. They subsequently divide these gaps in six core themes, providing an assessment of both the difficulty and priority of filling them. Thereby the authors aim to use their analyses as a guide for future studies on peer review.

The authors provide a detailed and comprehensive overview of current studies about, and results regarding, journal peer review. This obviously constitutes a very relevant topic to the readership of Research Integrity and Peer Review. I believe their systematic account of current knowledge, and the lack thereof, of peer review may well become a valuable source to guide studies within this field for the upcoming years. I therefore think the manuscript should definitely be considered for publication in Research Integrity and Peer Review.

We thank the reviewer for their generally positive overview of our MS.

Nevertheless, I have several points that the authors may want to address in order to clarify or improve their manuscript:

1. While the authors provide a detailed and seemingly quite comprehensive overview of studies on peer review, they inevitably missed out on some (relevant) sources and important knowledge. Even though I do not want to suggest that the authors should include more studies (they probably have their reasons for sticking to this selection), I would like to see some justification for their method of finding/selecting studies to include in their overview. Some methodological justification of how the authors went about finding literature and how they established their categorisation of six major themes (editorial accountability, subjectivity and bias of reviewers, etc.), might help to
understand how well the authors managed to cover the entirety of peer review studies and where some gaps in their overview should be expected.

a. We have now added a Methods section to show how we went about this study. You are right, that we have inevitably missed out a large number of published studies here. However, our intention was not to systematically document these, or provide a meta-synthesis of some sort, as suitable sources for this already exist. We do think that the next logical step here would be to conduct a full systematic review of our entire global knowledge of peer review, so that we can begin to rigorously quantify the gaps in our knowledge.

2. I believe the overview of current studies and gaps in our understanding of peer review is very convincing; I was less convinced by the authors' ranking of research topics with respect to priority and difficulty. Again, I believe that some explanation about how the authors derived their prioritization of research questions might improve the quality of the manuscript. I was wondering on what criteria they based their decisions of what topics have priority and which are most challenging to study.

a. You are right again here, that these rankings of difficulty and priority will be largely subjective. We have made this clearer now, and also briefly described how we reached decisions here.

3. Role of Editors: The authors seem to conceptualize a single, uniform role of editors. However, in many journals (especially those affiliated with the large commercial publishers), many different 'sorts' of editors are involved. These people might have different job titles at different journals/publishers, but they in any case include editors-in-chief, managing editors, associate editors, editorial assistants, etc. Hence to speak of 'the editor', seemingly referring to a single person with a well-defined set of tasks, might be a bit too simple. I think it would be worthwhile to distinguish some of these roles and add a description of the diversity of editorial tasks.

a. Nice spot, and thank you for pointing this out. We did have some discussion of the different ‘types’ of editor in an earlier draft of this MS, but it seems to have been stripped out. We have now added a note at the beginning of this section now to make this clearer.

4. Notions of expertise (pg. 7): I think this is a very interesting subsection, covering a topic that generally receives little attention in studies on peer review. However, I believe it could be meaningfully elaborated on a bit further. For instance, I think there are some noteworthy differences in what expertise is required to review articles in STEM or SSH subfields (which has been a major theme in the work within the ENRESSH network, of which one of the authors is a member). While I do not intend to have the authors include a full analysis of expertise (this would clearly be outside the scope of this manuscript) I think it would add to the quality of their paper if they
include a description of different notions of expertise and how these may be required to meaningfully review a paper in different contexts.

a. Based on the comments from the editor, we have actually killed off this section now and incorporated into the rest of the text. We have added some mention of this now into the section on the function of reviewers.

5. Role of 'wider society': Both in their introduction and abstract the authors mention issues in 'wider society' affecting peer review, but this topic only has a very minor role in the remainder of the manuscript. While I think this is an interesting connection to explore, I do not think the authors currently sufficiently do this. Therefore, I would suggest to either remove a mention of this topic from the abstract/intro (as not to raise false expectations among readers) or further develop this theme in the remainder of the manuscript.

a. We have killed off mention of this in the Abstract now. A discussion on the links between scientific legitimacy, peer review, scholarly communication, and public understanding of science is probably a bit beyond the scope of the present MS. We have left in just one mention to emphasise the increasing importance of science with respect to, for example, the UN Sustainable Development Goals, which seems to becoming an increasingly concrete message.

6. The role of automation in review: One aspect of peer review that seems to be increasingly important, but is yet missing from the authors' manuscript, is the role of automation in peer review (or the editorial process). With the introduction of several scanners (e.g. plagiarism, statistics, image manipulation) and even some suggestions to make review fully automated (i.e. without human interference, based on some AI mechanism), the role of 'peers' in peer review is increasingly questioned. I think this is a sufficiently important issue to warrant a (brief) discussion in this manuscript.

a. Conveniently, Mario was the Editor for this paper, and has made similar comments too which we have included.

7. A last, and a relatively minor, point relates to the section on Peer Review and Reproducibility. The authors state that 'this raises the question whether peer review should be reproducible', but subsequently seem to continue with the conviction that it should be. I think this is a quite controversial issue, with at least some scholars believing that peer review is inherently not reproducible due to inevitable differences in backgrounds and perceptions of reviewers (I remember being part of a very interesting discussion about this with Mario Malicki and some of the people mentioned in the acknowledgement of this manuscript).

a. This is an excellence point, and we have made sure to clarify this section.
8. I think the position taken by the authors is justifiable, though I think it would be good to mention that this is a controversial issue and perhaps to include a short discussion of the different perspectives on it.

a. Thank you, we have done this now throughout to highlight areas of tension more clearly,

Reviewer #2:

By presenting the status quo of peer review, authors are providing a road map to its future in a review article.

In general most of the topics presented in the manuscript and suggested solutions/best practices are already addressed at length in a paper written by H. Allen et.al.: https://onlinelibrary.wiley.com/doi/pdf/10.1002/leap.1222

Thank you to the reviewer for their comments. We partially agree with this comment regarding Allen et al. (2019), and believe that this article is important. However, our study differs quite a bit from this article. Allen et al. focus more on the practice of peer review, and suggest principles and practical recommendations to improve it. Our study is focused more on delimiting the gaps in our knowledge that underpin these principles and practices, and thus while connected, is conceptually different. We note though that there is quite a lot of overlap between these things though, as it is only possible to gather a lot of data on peer review by actually performing it. We have made sure to cite this paper now more clearly in this regard too (we had already cited the preprint too but not the updated version).

The only new angel in the manuscript is open peer review as the potential solution to the listed issues. But without addressing its complex impact on different communities and career progress of academics in different ranks it is hard to accept this solution. The manuscript also lacks a robust argument in favor of open peer review for all disciplines. Their call to data sharing is crystallized in PEERE data sharing protocol and its manifesto at length. Most of their suggested transparency items listed as bullet points in section 'what does peer review actually do?' were items PRE-val used to verify for the end user of the content and showcase on the article page if it has gone through the peer review process and provides information that is vital to assessing the quality of that process. It seems the service ceased to exist after being acquired by AAAS. However, it can still be cited as the original idea.

In this MS, we don’t advocate for open peer review as a solution to problems with ‘traditional methods’. We agree with the reviewer that it is an incredibly complex topic, and definitely requires further research across different disciplines. Our call for data sharing is focused around peer review in general, and not just the ‘open’ elements of it.

Authors mention lack of studies on the topic of peer review but fail to first define what do they mean by peer review, and how external peer review is distinguished from editorial office and
editors role. Some items briefly discussed in the manuscript such as reproducibility crisis and clear reviewer instructions fall mostly under the editorial office and editors' responsibility.

The reviewer is quite right that we do not define what we mean by review. Indeed, we do not think this is our position to, and one of the core conclusions of our paper is that a consensus definition on peer review is something required. We have made this clearer now in the conclusions.

Although there is a lack of study on this subject using peer review data, there are however good survey studies showing how different academic communities define peer review and perceive its impact. Studies such as:


and


these large-scale surveys address in details both questions posed in this manuscript about the role of the peer review in the process of scholarly communication and the perception of its impact. They also show how researcher attitude towards open peer review has evolved since 2009 which could compliment the somewhat skewed survey results presented in the manuscript (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0189311).

Thank you for pointing out these surveys from Sense about Science. In this MS, our aim was not to provide a summary of all existing research, as that would require substantial effort, and much has already been done in the form of meta-syntheses on this topic. We instead focus on using these bits of knowledge that we do have on developing a further understanding of researcher attitudes across different communities. We have tried to make this clearer now in this section.

Authors suggest publishing peer review as a potential solution to understand the impact of peer review. It seems they only consider the accepted paper peer review reports. It is important to notice the impact of peer review on rejected manuscripts, where peer review reports won't necessarily be available. But even in the case of accepted papers, a large-scale PEERE study of the peer review data of open peer review practices shows no significant impact of the practice on the quality of peer review reports:

G. Bravo et.al.: https://www.nature.com/articles/s41467-018-08250-2

In general the manuscript does not specifically address the rejected-manuscripts and the impact of peer review or any of its suggested transparency schemes on this group of manuscripts.

This is an excellent point, regarding review reports of unpublished/rejected manuscripts. We have made sure to include a comment on this now.
It also misses the topic of bias in peer review from different perspectives such as gender or ethnicity and how their suggested road map would address it.

For example, Y. Reingewertz and C. Lautmar discuss at length the editor and editorial bias toward author affiliations (see https://doi.org/10.1016/j.joi.2017.11.006 and references therein). The manuscript is also missing the impact of author-suggested reviewer bias and it is not clear how their suggested roadmap can address the existing bias in author-suggested reviewer (see for example: https://onlinelibrary.wiley.com/doi/abs/10.1002/leap.1166)

We actually mention the problem of editorial and reviewer bias throughout the MS and in a number of different contexts. Our updated roadmap now is explicit about collecting more data on these problems. We note that simply gathering data on bias is not sufficient to eliminate it, but it can help by forming the basis for protocols to help mitigate it in the future.

Another missing item in the manuscript is the impact of blinding policies on quality of peer review which could complement the author's suggested transparent peer review policy but it is not present.

We discuss the issues regarding blinding in depth throughout the MS.

Authors briefly mention slow peer review is mostly working against innovation and rapid dissemination of findings based on the assumption of journals being the only possible medium of research output dissemination. They also provide example of 'Nobel-quality' research being desk-rejected. First, taking a broader perspective shows for example that Computer Sciences community have proved the opposite by choosing conferences as the medium. Second, if authors would provide a clear definition of peer review and the role of editors and editorial offices in the process they might use such examples to criticize the editorial process and not the peer reviewers. But providing examples of editors' desk-rejects as an evidence for inefficiency of peer review is a big leap.

As above, we elected not to attempt to define peer review in this MS, as we do not believe we have that authority. We use the example of Nobel researchers specifically in the context that peer review does, in some cases, reject what later is found to be ‘high impact’ or ‘innovative’ research. We follow this up immediately after by saying that we need further insight into this issue, and related questions.

Authors also oversee the issue of incentive mechanism in research and its impact on peer review. They briefly discuss the lack of uptake of post-publication peer review but miss to address the reason in light of pressure to publish.

We do mention in several places issues regarding incentives for peer review. However, we do not discuss the pressure to publish, as we believe this is quite distinct from pressures to peer review.