Author’s response to reviews

Title: Personally perceived publication pressure - Revising the Publication Pressure Questionnaire (PPQ) by using work stress models

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Version: 1 Date: 27 Feb 2019

Author’s response to reviews:

Dear Dr Kowalczuk,

Thank you for your kind words and reviewers’ recommendations to improve our manuscript. Below we respond (in italics – if visible) to each of the points the reviewers raised. To prevent any confusion, we separated reviewer’s points into different comments, each of which starts with “Comment #.” If we quote from the manuscript, we use “[START QUOTE]” and “[END QUOTE]” to demarcate which parts came from the manuscript. In the manuscript, revised sections are marked by track changes.

Reviewer #1: The authors of the paper have designed a new version of a Publication Pressure Questionnaire by including new subscales. It is a timely and relevant publication as publication pressure as research can increasingly be characterized by more stress and subsequent burn out symptoms. It is a well designed and competently crafted study on which I have just a few questions:

Comment #1. Representativeness. Both the pilot study and the larger study on academic research climate in Amsterdam show signs that it does not represent the academic community well. I miss a response rate of the official study, it is heavily biased towards women and researchers in biomedicine, and approximately half of your respondents are PhD students. It suggests that the authors’ connections with biomedicine are better than the other disciplines or that their method of distributing the questionnaire has some weaknesses. Please add more information on this process and the sample outcome and offer potential explanations of this bias.

Response: Thank you for your encouraging reply and for directing our attention towards the response rate and potential response bias. We have included the official response rate in the results section on p. 16, lines 328-9, as is quoted below:
A total of 7549 academic researchers were invited to participate in the study, of which 1063 completed the full PPQr (14%).

To address the response bias, we have done two things. First, we assessed the representativeness of our sample comparing it to publicly available statistics on academics in The Netherlands. Second, we tried to estimate the impact of the possible bias by determining the measurement invariance across subgroups.

Since we have data on how many researchers were from the biomedical field in our population of academic researchers working in Amsterdam (namely 56%), we can check whether the percentage of respondents from biomedicine is representative for the population we invited (53%). This would indicate only a small overrepresentation of biomedical researchers.

To assess the over-representation of PhD students, we compared our data to the data publicly available by the VSNU (The Association of Universities in the Netherlands; see https://www.vsnu.nl/personeel-in-dienst-van-universiteiten.html). As biomedicine has no public data on researchers per academic rank, we excluded all researchers that indicated working in biomedicine from our sample, and only considered academic researchers employed at the University of Amsterdam and the Vrije Universiteit Amsterdam. The VSNU data shows that 30% of researchers is working on a PhD (41% in our sample), 42% employed as postdoc or assistant professor (38% in our sample) and 28% of associate and full professors (21% in our sample).

Finally, public data from the VSNU on female academics at universities estimates 39% of researchers to be woman, whereas non-biomedical female participants made up 57% of our sample.

Still, these differences would only be a problem if the PPQr would be understood differently by researchers of different disciplinary fields, academic ranks, or gender. To check this, we conducted confirmatory factor analyses for the full sample and for the abovementioned relevant subgroups.

A full report of the CFA and subsequent measurement invariance analyses would be beyond the scope of the paper. Still, we do want to inform the reviewer about the results. A simple three factor model did not fit satisfactorily (CHISQ(132) = 1126.9, RMSEA = 0.086) because a few inter-item correlations were somewhat higher than expected under the simple model. After accounting for these violations of local independence, which are inconsequential for PCA’s and reliability, the fit was satisfactory (CHISQ(128) = 565.8, RMSEA = 0.057). This model also yielded satisfactory fit to each of the subgroups (men and women, four disciplines, and five academic ranks). Moreover, hypotheses of invariance across subgroups were not rejected according to RMSEA and ECVI difference tests.
We have adjusted the Results section on p.17 lines 337 until 351 accordingly. In addition, we included the low response rate and the risk of bias as a limitation in the Discussion section on p. 20-21, lines 448-459. Both these sections are given below:

[START QUOTE]

To assess the internal structure of the PPQr, we conducted a principal components analysis. The three-component solution explains 50% of the variance, and the scree-plot also indicates a three-component solution. The pattern matrix shows that each item has the highest loadings on its own component, see Additional file 5. In addition, we conducted confirmatory factor analyses which showed that a three-factor model fitted the data of the full sample satisfactorily, and that the same three factor model also fitted the data of each of the subgroups of men and women, four disciplines, and five academic ranks.

Corrected item-subscale correlations for Attitude ranged between .40 and .50. For Stress, this was slightly higher .43 and .60. For Resources item-subscale correlations were between .37 and .50. Cronbach’s alphas were 0.80, 0.78, and 0.75 for Stress, Attitude, and Resources, respectively. We also calculated Cronbach’s alphas for subgroups of men and women, four disciplines, and five academic ranks, but subgroup results did not substantially deviate from the full sample results. Correlations between the subscales were 0.46 between Stress and Attitude, 0.44 between Stress and Resources, and 0.39 between Attitude and Resources.

Secondly, the response rate (14%) can be considered low. This could increase the chance of a response bias, which occurs when responders differ critically from non-responders. Statistics on female academics in The Netherlands indicate women make up 39% of the academic workforce, whereas 57% of our participants identified as female. Similarly, national statistics indicate 30% of academic researchers are currently enrolled as a (non-biomedical) PhD candidate compared to 41% in our sample. Yet, this would only indicate response bias if the PPQr items were understood differently depending on one’s subgroup. Since the CFA model fit did not differ significantly between different subgroups, we conclude that this should not affect the validity of the PPQr

[END QUOTE]

Comment #2. The work-home pressure (page 18 and Table 4 in the appendix) shows up as a prominent predictor of burnout. From my own impressions, research and conversations with women I suspect that gender plays an important role in this matter. Do the authors have more information on this? Did they, e.g., check for interaction effects in Table 4 with gender?

Response: We repeated our analyses with gender added as an effect modifier and found no interaction effects of gender. This is in line with research demonstrating that both male and female academics experienced work-home conflict (1). For the interested reader, this is now clarified in additional file 4 and is given below.
Table 4. Regression model to predict Emotional Exhaustion (outcome variable) as measured by the MBI.

<table>
<thead>
<tr>
<th>Model</th>
<th>R2</th>
<th>Variables included</th>
<th>β coefficient</th>
<th>Standard deviation</th>
<th>p-value</th>
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<tr>
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<td>Constant</td>
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<td>.257</td>
<td>.511</td>
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<td></td>
<td>Work-home Interference</td>
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<td>.000</td>
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<tr>
<td>2</td>
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<td>Constant</td>
<td>2.283</td>
<td>.598</td>
<td>.000</td>
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<tr>
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<td>.106</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>.598*</td>
<td>Social Support</td>
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<td>.122</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Constant</td>
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<td>.005</td>
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<td></td>
<td></td>
<td>Publication Stress</td>
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<td>.107</td>
<td>.024</td>
</tr>
</tbody>
</table>

* Increase in R2 was significant (p = .017). No other variable significantly improved the explanatory value.

# Note: we also investigated interaction effects of gender but these were not significant.

Comment #3: Smaller points:

I would suggest to replace the Dutch reference on the facet method (29) by an English source as your paper should offer assistance to the international community.

Typo in Table 1: Conbach should be Cronbach

Response: Many thanks for noting these mistakes. We have replaced the reference with an international reference and adjusted the typo in Table 1.

Reviewer #2: I am most thankful for the opportunity to review this manuscript, which I have read with great pleasure. This study revises the Publication Pressure Questionnaire (PPQ) and
tests it for reliability and validity. The study is well designed, the paper well-structured, and the results well-presented.

Comment #1. The weaknesses of the study are acknowledged and the conclusion is positive with respect to the revised PPQ's reliability and validity. In particular it is argued that the PPQr is useful in identifying academic researchers at risk for developing burnout symptoms. However, not knowing whether it is the burnout that makes researchers experience publication pressure or the other way around, it is not clear how the researchers can draw this conclusion.

Response: Thank you for your reply and for pointing out the unclarity in our reasoning. You are correct that based on cross-sectional data only, it is impossible to draw the conclusion that high PPQr scores predict burnout. However, even if the exact relation is unknown, a high PPQr score could still function as a red flag that this academic may be experiencing burnout, because there is some way in which the two are related. We have nuanced our conclusions accordingly, see the abstract, discussion section p. 18-19, lines 385-400, and conclusion on p.21, lines 468-469. For convenience, the relevantly adjusted parts of the discussion and conclusion are given below:

[START QUOTE]

Hierarchical regression analyses indicated that publication pressure was strongly related to burnout, hence a researcher who perceives higher publication pressure may be more likely to develop burnout symptoms. With the PPQr, this relation becomes even more apparent than with the PPQ as its correlations with the MBI subscale emotional exhaustion are stronger than the PPQ (r = .34 for the original PPQ and r = .62 for the PPQr).

However, work-home interference was more strongly related to burnout in our sample (r = .728 and r² = .53, p < .001, see Appendices Table 4). This can be expected as work-home interference is known to be directly associated with burnout (40). Nevertheless, adding publication stress to the hierarchical regression model significantly increased the explained variance, emphasising its importance besides other burnout markers.

Conclusion

The PPQr is a valid and reliable measurement instrument. It covers the complex construct of publication pressure better than its predecessor and can measure publication pressure among researchers from all disciplinary fields. PPQr scores are strongly related to emotional exhaustion scores.

[END QUOTE]

Comment #2. Some details: We are informed about how many started the questionnaire and how many provided adequate answers, but the reader may want to know how many were invited.
Response: Many thanks for pointing this out. We have included the response rate in the Results section that includes the number of invitees on p. 16, lines 331-332. For convenience, it is also given below:

[START QUOTE]

A total of 7549 academic researchers were invited to participate in the study, of which 1063 completed the full PPQr (14%).

[END QUOTE]

Comment #3. The respondents are still dominated by biomedicine. The initial study used a single sample for both item selection and reliability and validity analysis. This weakness is addressed in the reliability study. However, the academics are still dominated by biomedicine.

Response: This is true and would be a concern if researchers from different disciplines would interpret the items differently which would diminish validity. To assess whether researchers from non-biomedical fields interpreted the items differently, we conducted confirmatory factor analyses and investigated measurement invariance across the biomedical and non-biomedical subgroups. Since there were no relevant differences between biomedical- and nonbiomedical researchers, we conclude that the validity need not be threatened by this overrepresentation from biomedical researchers in our pool of respondents. We clarified this on p. 17 lines 343 until 352:

[START QUOTE]

In addition, we conducted confirmatory factor analyses which showed that a three-factor model fitted the data of the full sample satisfactorily, and that the same three factor model also fitted the data of each of the subgroups of men and women, four disciplines, and five academic ranks.

Corrected item-subscale correlations for Attitude ranged between .40 and .50. For Stress, this was slightly higher .43 and .60. For Resources item-subscale correlations were between .37 and .50. Cronbach’s alphas were 0.80, 0.78, and 0.75 for Stress, Attitude, and Resources, respectively. We also calculated Cronbach’s alphas for subgroups of men and women, four disciplines, and five academic ranks, but subgroup results did not substantially deviate from the full sample results. Correlations between the subscales were 0.46 between Stress and Attitude, 0.44 between Stress and Resources, and 0.39 between Attitude and Resources.

[END QUOTE]

Comment #4. As acknowledged in the paper, role-conflicts and evaluation criteria are relevant as explanatory alternatives to publication pressure, and it can be argued that not investigating these
closer is a weakness of the study. However, this may be the task of a new research project and a new publication.

Response: You are right in that one, ideally, had also inquired the role-conflicts and evaluation criteria of the respondents alongside their publication pressure to then assess which factor is most relevant. However, this was not feasible in our study. To meet your concerns, we have elaborated on these weaknesses on p. 19 in the Discussion section, lines 394-403. For convenience, we pasted the relevant section below.

[START QUOTE]

It could be that publication pressure is determined by factors currently not included in the PPQr; two particularly important ones being the acquisition pressure and pressure from teaching duties. Along these lines, role-conflict (the reasoning here is that since people have a limited amount of time and multiple tasks or responsibilities, when one task requires major attention, the other tasks suffer since there is simply no more time or attention left) is known to be a predictor of work stress. In this situation, the internal role conflict would regard academics to both be good researchers and good teachers. We did not measure role-conflict in our study, yet it seems plausible that role conflict would lead to burnout and not so much publication pressure per se. We encourage future research into the relationship between evaluation criteria and role conflict in relation to publication pressure.

[END QUOTE]

Comment #5. Another weakness, which is also acknowledged, is that burnout may result in experienced publication pressure and not the other way around. This is a highly relevant objection that should be addressed. However, it is reasonable to argue that this is beyond the scope of the present study.

Response: Thank you for pressing us on this issue as the exact relation between burnout and publication pressure deserves more attention than in the initial manuscript. We have elaborated on this on p. 19-20, lines 423 until 430, in the Discussion section where we further describe possible relations. However, a full disentanglement of the exact relation is beyond the scope of the current study. We hence encourage longitudinal research into this matter.

[START QUOTE]

Finally, it could be that researchers with burn out symptoms experience more pressure and annoyance from the current publication system because of their symptoms, so in this conceptualisation burnout precedes publication pressure. Alternatively, since there is an abundance of research indicating that high job demands lead to burnout, it could be that both publication stress and burnout are the both result of another variable via some mediation relation. We cannot exclude these possibilities based on our data and would encourage
longitudinal investigation into this matter so to confirm that publication pressure precedes burnout or vice versa.

[END QUOTE]

Comment #6: All in all I think this makes a fine contribution to the literature and the development of relevant instruments to measure challenges to academics.

Response: Thank you for your kind words.

Sincerely, also on behalf of my co-authors,

Tamarinde Haven

Vrije Universiteit Amsterdam