Author’s response to reviews

Title: Selective citation in scientific literature on the human health effects of bisphenol A

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Version: 1 Date: 30 Jan 2019

Author’s response to reviews:

Response to reviewers,

We would like to thank the editor and reviewers for their thoughtful comments to our manuscript RIPR-D-18-00020, entitled “Selective citation in scientific literature on the human health effects of bisphenol A”. We have responded to all comments, made changes to our manuscript accordingly, and specify below in detail what we did. We hope that the revised paper will be accepted for publication in Research integrity and Peer Review.

Comments from the reviewers:

Reviewer #1: General:

This manuscript presents the results of a citation network analysis of published evidence of the association between exposure to Bisphenol A and human health outcomes. The authors present a unique approach to evaluate the potential for publication bias due to missing publications.

Dear reviewer, thank you very much for your time and valuable remarks about our manuscript. We will address your comments one by one in the following section.

Major:

Comment 1: Paragraph 1 in the introduction section could use some reworking for clarity and direction of ideas to demonstrate the two sides of the debate about the health effects of BPA.
This should be presented consistently through the manuscript. In the methods section, the authors again mention a hypothesis that BPA has an adverse effect on human health; however, the introduction does not seem to solidly support that hypothesis. Perhaps the authors can state in the introduction which hypothesis they are writing the manuscript from or if it matters for them to have a hypothesis in this study.

Response: Thank you for this comment. Bisphenol A is a controversial topic. According to the public opinion, BPA functions as an endocrine disruptor, which leads to a variety of harmful health effects in humans. Therefore, you could say that this is the basic hypothesis that we follow: BPA is harmful for human health. However, our study aims to answer the question whether citation bias exists in this field, where BPA was merely used as an example case study. Therefore, we are not so much interested in the question if BPA is actually harmful for health or not. Nevertheless, we recognize the need to identify a central hypothesis, in order to understand the difference between positive and negative studies. As the main hypothesis we could define: BPA is associated with harmful health effects.

In the manuscript, the following text has been added at the end of the introduction:

“It is the focus of the current study to identify which factors influence the development of knowledge by means of selective citations. The literature on BPA is used as a case study in this regard, which we chose because of its controversial nature and extensive public debate. Accordingly, we are not so much interested in the actual health effect of BPA and we will not make statements about this. For clarity reasons, we take the hypothesis that BPA has a harmful effect on human health as the starting point of this study.”

Comment 2. The methods section would benefit from additional transparency about the process undertaken. The goal being to allow other researchers to understand and replicate your process. Suggested additions would be to start with an explanation of a Citation network analysis and the specific components that this method should contain. Details are needed regarding the search strategy performed, such as date of final search and eligible years. Justification is needed as to why only Web of Science was searched. Screening methods would benefit from additional clarity. How many reviewers screened the titles? Why were titles screened separately from abstracts? Why were figures and tables screened with abstracts, separately from the full text? What were the components of the data extraction form? Consider including the form shell in an appendix or supplement.

Response: the search was conducted on the 3th of March 2017 and entailed all publications available upon that moment. We had a practical reason for only using Web of Science – Core Collection to identify literature. This is because this is the only database that enabled us to download all reference lists. This information is of key importance in setting up the citation network and in conducting the citation analysis.

This has been added to the method section with the following text:
“For practical reasons no other databases were searched, since only Web of Science – Core Collections has the possibility to download the reference lists of all publications. This information is needed to create the citation network and to perform the citation analysis.”

Furthermore, article selection was done in duplo to increase the validity and credibility of the study. We had some practical reasons for conducting the selection in two rounds, such as the great amount of publications identified with the search. We used a very broad search strategy, which was not very specific. Therefore, we knew that many of the 3,412 identified publication would not be relevant for the citation network. By making a first selection based on titles, we could already exclude a number of publications that were not relevant for the network, without having to read reading the complete publications. In the second round of the article selection, we looked at abstracts as well as figures and tables. This was done because these three elements often give a very clear idea of the focus of the publication. Because BPA is often studies together with many other chemical compounds, it was not always mentioned clearly in the abstract. By screening also figures and tables, we could be sure BPA was discussed sufficiently throughout the publication.

In the manuscript, following addition was made to the method section:

“Many publications discussed BPA together with many other chemical compounds. By looking only at the abstract it was not always clear to which extent the publication included information on BPA. By looking also at the figures and tables, we could make sure the publication contained sufficient information on BPA to be part of the network.”

Comment 3. How is the quality of the underlying citations factored into the equation of publication bias? Some citations were cited multiple times versus others that were not cited; however, there seem to be other confounding factors. It seems overstating at this point for the authors to conclude with "With these findings, we could conclude that the BPA literature seems to be mostly authority based, instead of evidence based.", when an evidence assessment is not included as part of the screening process.

Response: Thank you for this remark, to link our study to the existentence of publication bias. Of course, we agree that not publishing negative findings is of great impact on the development on knowledge. We also recognise that publication bias has more impact on the ultimate evidence base, compared to citation bias. Unfortunately, we are not aware of specific information of the amount of publication bias, or other types of reporting bias, in the literature on BPA. Therefore, we cannot make statements on the additional effect on these different types of reporting bias.

To take into account your remark on overstating the conclusion, we rephrased the final conclusion as follows:

“With these findings, we could conclude that the development of available knowledge on BPA seems to be mostly driven by authority related factors, instead of by the best available evidence.”
Minor:

Comment 1. Protocol is not publicly available. Would be helpful to have available on an open-access website or as a supplementary file.

Dear reviewer, thank you for your comment. Please note that the study protocol can be accessed from the online repository DataVerse, as was stated in the first paragraph of the method section. Additionally, the study protocol has been added to the submission as ‘supplement 2’, to be published online with the manuscript. To make this clear to the reader, the following sentence was added to the method section:

“The protocol is also available as supplementary material to this publication.”

Comment 2. Page 2, ln 58: In vitro should be italicized

Response: Thank you for mentioning this, the change has been made.

Comment 3. Page 3: Is there a citation for: "Scientific knowledge development to a large extent is driven by citations. Due to the large and growing number of scientific publications in the biomedical domain and the limitation of the maximum number of references in many journals, it is often not feasible to refer to all available relevant literature."? It seems like that would help with the credibility of the argument.

Response: this type of information is widely studied in the field of bibliometrics. The following reference was added to the statement:


Comment 4. Page 3, ln 38: Can you expand on what is meant by citation bias research "showing different results"?

Response: Recently, we have conducted a systematic review on the literature on citation bias. It appeared that citation bias had been studied in a variety of research fields, within biomedical sciences, social sciences and natural sciences, and by using different methods. With regard to the results; the majority of the studies found evidence for the existence of citation bias, but some did not find differences in citation rates between positive and negative studies and some reported mixed results. This variation in evidence reported by different studies what was meant with ‘different results’.

This was further clarified in the manuscript on page 5 by adding the following text:
“A recent systematic review has identified 52 studies on citation bias, from scientific disciplines in biomedical sciences, social sciences and natural sciences. Twenty-nine of them found evidence for the existence of bias, whereas twelve studies found mixed results and eleven studies did not find evidence for the existence of citation bias.”

Comment 5. Page 4, In 30-35: Consider moving to limitations section.

The paragraph you refer to, concerns the fact that we did not check the reference lists of the publications while identifying all publications in the network. We do agree that this is a limitation of our method, however we find it important to already address it in the method section, in order to improve transparency and reproducibility of the methodology.

Following your suggestion to mention it also as a limitation, we did add a paragraph to the limitation section in the discussion:

“A related limitation was the fact that we did not check reference lists for missing publications. This might have led to missing relevant publications. However we believe that checking of reference lists might have interfered with our research question. Checking if reference lists would only identify publications that were actually cited within the network, while still missing relevant publications that did not receive any citations.”

Comment 6. BPA, other than the first time, should consistently be written as an acronym throughout the manuscript.

Response: thank you for this remark, changes have been made throughout the manuscript.

Comment 7. Page 5: This may be more appropriate in the results section: "The study designs presented in this network were observational studies (experimental, cohort, cross-sectional and case-control studies), systematic reviews and narrative reviews."

Response: thank you for this suggestion, the sentence has been moved to the result section.

Comment 8. Further exploration of "Mixed" statistical significance in the publication network may be more informative as the reader does not know the proportion of significant vs. non-significant results.

Response: We didn’t score single findings in each publication, we only scored one study outcome per publication. We did this, because a publication can be cited each time for all of its results, and we do not know whether a citation was driven by significant or non-significant findings. As a general rule, we scored publications are mixed in case the primary research
question reported both significant and non-significant findings, for example in a crude and adjusted analysis. These publications can be cited in either way.

Comment 9. In the methods, please provide rationale for thresholds for Sample size, Number of affiliations, Journal impact factor, and Number of references. Tertiles is understandable, but what is a meaningful cut-off?

Response: Initially we aimed to analyse all determinants as continuous variables. However, due to a very large spread within each of these variables, analysing them as continuous variables led to very small effect sizes with very broad confidence intervals. To create outcomes that are more useful and easier to interpret, we chose to divide the mentioned determinants based on tertiles. By dividing the determinant in three groups, with each group containing a comparable number of publications, we could compare publications that scored relatively low, medium or high on a given determinant. We were not so much interested in concrete cut-off points, but in the chance of citation relative to each other.

In the method section we have added the following text:

“Continuous determinants that show a large range of values, which was often skewly distributed, were divided into three categories, in order to reduce the variation and create more meaningful outcomes. This included the determinants sample size, journal impact factor, authority of the author, number of references and number of affiliation. By making three categories for each determinant, each publication scores low, medium or high in relation to the other publications in the network. Cut-off points between categories were based on tertiles, to make sure each category contained the same number of publications.”

Reviewer #2: Thank you for the opportunity to review the manuscript: Selective citation in scientific literature on the human health effects of bisphenol A. Urlings et al. presented a citation network analysis on human health effect of bisphenol A (BPA). Overall, the authors included 169 publications and observed that studies showing an association have a 1.5 times greater chance of being cited compared to studies showing no association. Thus the authors concluded citation is mostly driven by positive study outcome and author related factors, such as high authority within the network. Moreover, the authors questioned also to which extent the knowledge development in human literature on BPA is actually evidence-based.

Although I have to say, that I am not an expert in the field of network analysis, I believe that the authors have performed a very good job. The paper is well and clearly written and the methods applied seem to be state of the art.

Dear reviewer, thank you very much for your compliments and your valuable remarks. In the following section we will address your comments one by one and indicate the changed made in the manuscript.
My comments are all of minor nature:

Comment 1. Please add in the Abstract type and amount of study designs across the included 169 publications

Response: The following text was added to the results section in the abstract:

“The network consisted of 63 cross-sectional studies, 34 cohort studies, 29 case-control studies, 35 narrative reviews and 8 systematic reviews.”

Comment 2. Introduction: please add information regarding tolerable daily intake (safe level) of BPA from various authorities (e.g. EFSA). It might of be interest if there are large differences between authorities

Response: We have looked at an overview of TDI levels in different countries, as reported by the WHO. This included the TDI set in Europe, the United States and Japan. All countries follow a TDI of 0.05 mg/kg body weight, based on the NOAEL level determinant in rodents.

The following text was added to the introduction:

“In 2006, EFSA has set a tolerable daily intake (TDI) level of 0.05 milligram per kilogram body weight per day. This TDI is based on a no observed adverse effect level (NOAEL) determined in rodent studies and is also accepted in other countries, such as the United States and Japan.”

Comment 3: Page 4: Search strategy. Please add date of literature search

Response: The initial literature search was conducted on March 3th, 2017.

The following sentense has been added to the paragraph on search strategy:

“All relevant publications were identified via Web of Science – Core Collections, on 3 March 2017.”

Comment 4: Although the authors presented their results in various Tables, it would be great if the authors could provide some additional Figure in the paper (e.g. PubMedID: 26888870

Response: As you might have seen in the study protocol, it was indeed intended to make a visualisation of the citation network. However, while performing the study, we learned that the programme that we planned to use for this visualisation had several limitations, which made it not possible to visualise the complete network. The main limitation was, that the programme, called CitNetExplorer, allows only a maximum number of 100 publications. Since our network
contains 169 publications, it was not possible to show the complete network in one figure. We looked at alternative programmes, but the high number of publications and citation pathways in the network made it difficult to produce a visualisation that is informative to visualise selective citation. In an effort to meet your request for a figure on the results, we have created a visualisation of a part of the network, including the 100 most cited publications.

This figure has been added to the submitted manuscript in a separate file.

As an introduction to the visualisation, the following text has been added to the results:

“Figure 2 displays a visualisation of a part of the citation network, including the 100 most cited publications. Each circle and square represents a publication, with the squares being highly cited publications with more than 30 citations each. The lines indicate a performed citation. On the y-axis, the time line is indicated, ranging from 2002 to 2017. The x-axis is solely for visualisation purposes.”

Comment 5: Figure 1: please be more specific regarding the box "Publications excluded based on full text"; The References for all these studies could be added in the Supplementary material; please provide also the exact number of studies excluded for each of the sub-reasons.

Response: Unfortunately, we did not report the exact number of excluded publications per reason, by the two researchers during the selection process. The main categories of exclusion were mentioned in the flow diagram in figure 1. In the final stage of the full text selection, mostly studies were excluded that did not contain sufficient amount of information on BPA. As mentioned before, many publications studies BPA in a wider context of other endocrine disruptors and chemical substances. With regard to your request to add also the list of references of studies excluded in the final stage of the article selection, we feel that this would be confusing to the reader, since also a list with references is provided for the publications that did get included in the network. As an alternative, we have decided to provide the list of excluded publications on our online repository, DataVerse, were it can be requested by the reader. On this repository also other important information, such as the study protocol and the data sets can be requested.