Reviewer’s report

Title: Fossil fuels are harming our brains: Identifying key messages about the health effects of air pollution from fossil fuels

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Reviewer: Magnus Bergquist

Reviewer's report:

Summary
The aim of the study is to test how ten messages about health implications of air pollution from fossil fuels affect peoples' concerns, attitudes, and behavioral intentions. In a survey design, participants were asked to rank their level of concern in relation to ten messages. The survey also assessed the "cumulative impact" of the ten messages on change in attitudes and behavioral intentions by a before-and after design.

Results revealed that the message communicating neurological health effects on babies and children of air pollution was most concerning, and that participants expressed stronger health risks, support and intentions after compared to before reading the ten messages.

Introduction
-I think that the authors do a great job in reviewing the literature, and identifying research gaps. As health-based messages have shown great potential in affecting people, I think the authors are on the right track in testing different types of health-based statements. I also think that adding the neurological implications are adding to past research in a nice way.

Hypothesis
-Hypothesis 1 states that the message will "...influence people in a variety of ways...". This is a highly imprecise hypothesis. Also, the hypothesis is very long and hard to understand. If the authors did not have a more clearly stated hypothesis before testing, I suggest that they reformulate the hypothesis to an explorative hypothesis.
-Also, do we know that participants "learned" about health implications? Some might already been aware of for example the neurological implications on babies and children while other "learned" about them.

Method
-Are the measures used based on past research or developed for this study? Why was these measures used? Also, the measure of behavioral intentions seems restrictive; please consider renaming this measure.
-If I understood correctly, the Weber and Popova (2012) was used to assess interpret the effect size. Could this be used in a power calculation to demonstrate that the study did have sufficient statistical power?
-How was the ten messages chosen?
-I appreciate the transparence when reporting the MaxDiff method. Still, why did the authors choose to use MaxDiff rather than a likert scale? I would appreciate a discussion about the pros- and cons about MaxDiff compared to other methods (maybe in the discussion section rather than in the method section.

Results
-Exactly what measure do the authors refer to when testing "concern"? Maybe I missed something, but this was not clear to me.
-In table 3, please consider to change effect size r and the mean difference to the standardized mean difference (Cohens d), as the simple mean difference is quite informative and the effect size r is used to assess correlations rather than mean differences. Please add standard deviations.

Questions/discussion
-I appreciated the discussion about the psychological explanations for the most concerning versus the least concerning messages. Please consider to extend this discussion.
-Good limitation and suggestion for future research section.
-I also want to stress the risk of confounders (or the question about what psychological processes that are driving concern in each message) when comparing the ten messages. The authors do in fact suggest (91-92) that level of severity and susceptibility are essential motivators for behavioral change. So, (how) do the ten messages differ in severity and susceptibility?
-Relatedly, why is the message about neurological harm on babies and children the most concerning? Might it be that these implications are perceived as more severe, or maybe that babies and children are more susceptible (independent of the source of risk i.e. pollution as well as global warming or unhealthy food consumption)?
-If so, is there something specific about pollution, or could the neurological harm on babies and children be used in other types of risks also causing neurological harm?
-As the authors refer to dual-processing model as a basis for taking personal importance of the message into account, we might expect that the effect is moderated by being a parent (especially to a baby or young children).
-The results reflect a decision process based on comparisons between messages. As the overarching research question is "what is the best way to build public support for a clean energy economy". It seems important to ask if the rank-based method is ecological or/and external valid? That is, would these results (increased concern, attitudes, and behavioral intentions) hold if people were exposed to only one message (which is what we would expect if one of these messages would be implemented in a behavioral change campaign) rather than a comparison between these messages?

Suggested references
-For a discussion about the intention-behavioral gap (Kormos & Gifford, 2014).
-For a discussion stressing that peoples perceived efficiency of persuasive messages might not correspond to the effect on actual behavior (Bergquist & Nilsson, 2016).

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Unable to assess

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.
Yes

Are the conclusions drawn adequately supported by the data shown?
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