Author’s response to reviews

Title: From intervention to interventional system: Towards greater theorization in population health intervention research

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Author’s response to reviews:

Dear Editor in chief,

We thank all the reviewers for their comments. They allow us to improve our manuscript. We took into account all of commentaries and suggestions. You could find all of our revisions in red color in the manuscript.

Please, consider these point-by-point revisions:

Comments from Editor in chief

We recommend that you ask a native English speaking colleague to help you copyedit the paper.

=> Authors’ answer: An English native speaker helps us to write this revised version of the manuscript

Please remove the individual subheadings from your ‘Abstract’ to adhere to our Submission Guidelines Please remember to make these changes to both Abstracts (the one within Editorial Submission System as well as the one within the main Manuscript file).

=> Authors’ answer: As recommended, we changed the subheadings in the abstract and in the text
The email address provided for the corresponding author is different on the ‘Title Page’ when compared to the one entered within Editorial Submission System

=> Authors’ answer: Done (page 1)

Include the email addresses for all authors on the title page. The corresponding author should still be indicated.

=> Authors’ answer: Done (page 1)

Please include a ‘Declarations’ heading within your Manuscript. This should be placed after the ‘List of abbreviations’ and right before ‘Ethics approval and consent to participate’

=> Authors’ answer: Done (page 10)

Please change your ‘Availability of data and material’ statement to ‘Not applicable’

=> Authors’ answer: Done (page 10)

In your ‘Competing interests’ we noticed you mention ‘BMJ’. Could you please clarify whether this is a simply typo?

=> Authors’ answer: We revised the manuscript (page 10)

Please move your Figure caption (Figure 1: The interventional system) down so it is placed after the ‘References’ section, under ‘Figure legends’ heading

=> Authors’ answer: Done (page 13)

Reviewer 1

It is overambitious. Far too many challenges are taken up for a single paper (partly a matter of the ridiculously tight strictures on word length in health/medical journal, I know).

A reader on the periphery of the arguments will struggle because of the high level of abstraction.
We added some examples of our research projects to illustrate our words: GREEN-City, TC-REG, EE-TIS. We added them page 8-9, 1225, 178, 212.

- We simplified the talk, summing up it in two main claims: 1/the need for considering an interventional system, with its key functions defined as the mechanisms, and 2/the need for theorization within intervention and evaluation designs. You could see this in abstract, the conclusion and in these parts of the main text: page 5 l 106 - 114 ; page 8-9 l 194 - 231

- To help the reader, we hope, we simplified and rewrote all the text in a more pedagogical way.

The main issue is the lack of substantive examples. To actually win these arguments requires concrete, practical examples of research.

Reviewer 2

The call for greater involvement of practice and end-users appears more as a last minute add on, but is worthy of being unpicked and discussed further if the authors have the interest. The role of practice is especially important in exploring and surfacing the mechanisms by which interventions are enabled (through local adaptation perhaps) to exert their impact on the outcomes of interest, and so I would welcome more discussion of this - e.g., why and how it happens, how it can be helped to happen better, and what are the implications for research and evaluation methods.

=> Authors’ answer: We agree, this aspect deserves further development, and maybe one specific paper focused on this topic. But, as the first reviewer said, our manuscript is already ambitious and goes over many challenges. Hence, we chose not to develop this part but we tried to illustrate it by the example of TC-REG project page 9 l 225 and references about TDE and combined trials with TDE. Thus, readers could refer to it in order to understand why and how to proceed.

The 'others' that are referenced subsequently include Hawe as one of the co-authors, and the seminal 'events in systems' paper was first authored by her (Hawe P, Shiell A, Riley T.
Theorising interventions as events in systems. Am J Community Psychol 2009; 43: 267 - 276.). The 'events' paper was among the first to redefine interventions in terms of the systems in which they were implemented.

=> Authors’ answer: We totally agree, thank you. We revised the manuscript and added the reference page 41 74

The discussion of the role of trials in the face of complexity is a little ambiguous. Some authors reject outright the use of trials in the face of complexity. Others claim there continues to be a role for trials, albeit a circumvented one. I sit firmly in the latter camp, and it is not clear where in this debate the authors stand, yet I believe this is an important aspect of the need for greater theory and hybridisation to improve intervention design, implementation and evaluation.

=> Authors’ answer: The authors think the choice between both paradigms depends on the questions asked. Hence, we have developed both: TDE without trial and trials integrating TDE or contributive analysis. We specified our position in the text page 91 231

Reviewer 3

The concern about the transfer of "effective behavioral interventions (EBI)"developed under ideal conditions and its transferability to other contexts and real-world settings was raised first by the US Centers for Disease Control and then further developed by the US National Institutes of Health (see R.G. Glasgow et al. (2012). National Institutes of Health Approaches to Dissemination and Implementation Science: Current and Future Directions, American Journal of Public Health). Implementation science is now the focus of NIH grants, books and an extensive bibliography, none of which is cited by these authors.

=> Authors’ answer: Thank you. We added the reference page 61 127 (=> ref 22).

There is no clear definition of what is meant by context.

=> Authors’ answer: A definition of context is provided page 41 78 - 81. We hope our rewriting makes that clearer.
The paper then addresses 'causal chains" and "mechanisms" but no clear point is made. A third definition of an interventional system adds little to this reader's understanding of the point to be made

=> Authors’ answer: A definition of causal chains is provided page 4 l 92. Three definitions of mechanisms are provided page 4/5 from l 96 to l105. We propose ours (I) in order to establish a generalist definition, which fits with the definition of the interventional system page 5 l104-105. We rewrote the definition of the interventional system and explained it more pedagogical page 4 from l 88 to l 95. We hope our rewriting makes that clearer.

The authors make a good point that the emphasis on the gold standard of experimental design ignores context and that there is a need to explore contextual factors both in the initial intervention design and its transferability and scaling up. However they fail to tell us how that could be done. The authors make the point that well-developed theory can contribute to understanding the intervention system but again do not describe how that can be accomplished. The Newton and climate change examples are unhelpful

=> Authors’ answer: We agree. It is difficult to explain all of the procedures/methodologies of using theories in evaluation and intervention designs within only one paper. Moreover, the first reviewer highlighted the need to synthetize the ambition developed in this paper. Nethertheless, in order to provide some elements, we tried to add few methodological elements page 8 l194-211 and, if the reader wants to go further, we gave some examples with our published protocols: EE-TIS, TC-REG, GREEN-CITY. We also added references of TDEs and combined trials with TDE explaining also these methodologies. We hope it could be helpful.

We removed the Newton and climate change examples.

The argument for interdisciplinary collaboration ("hybridization of knowledge") is now well accepted in public health. The authors focus on the way collaboration will bring together practitioner and user knowledge but leaves unclear how this will address context.

=> Authors’ answer: We rewrote this paragraph page 9 l 218-231 : Users and practitioners could contribute to designing the intervention theory. We also provided an example of a way to associate them, with TC-REG project. And we gave some avenues with for example the seminars/workshop.

The paper is highly abstract, does not lay out a clear argument and fails to provide case examples that could illustrate points and provide methodological guidelines.
Authors’ answer: We simplified our words along the text. We provided some examples and give more precisions on methodological avenues along the text. But this paper is not a guideline, only a synthesis of challenges and some clues and examples to take up them. We hope our rewriting makes that clearer.

We know that each challenge described in this manuscript deserves further development (including methodological guidelines). But the objective of this paper is actually to go over and synthesize the main challenges. We intend to write others manuscripts, which will detail each of challenges with practical examples, extracted from our researches. Nevertheless, we tried to simplify the talk, rewrite the manuscript and provide some examples to make it less abstract. We hope that these corrections could meet your expectations and make this work acceptable for publication in your journal.

Remaining at your disposal for any further, all the authors approved this revised manuscript.

With best regards, on behalf of the authors,

Linda Cambon