The behavioural challenge of the COVID-19 pandemic: indirect measurements and personalized attitude changing treatments (IMPACT)

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Final acceptance: 13 August 2020

Note: Reports are unedited and appear as submitted by the referee. The review history appears in chronological order.

Note: This manuscript was transferred from another Royal Society journal with peer review.

Review History
RSOS-201131.R0 (Original submission)

Review form: Reviewer 1

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No
Recommendation?
Accept with minor revision (please list in comments)

Comments to the Author(s)
As with my previous round of comments, this is generally a clear, useful and convincing piece of research. Also as before, the exception is the initial Chicken Game, which is unnecessary for a piece that already has a lot going on in terms of the number of different treatments in play, and unconvincing on its own terms. It is far from clear that individuals perceive their decisions on social distancing and the like as a problem of strategic interaction. The preference ordering of the outcomes which defines the game is also open to challenge, e.g. the claim that unilateral adherence leads to "an unpleasant situation".

Decision letter (RSOS-201131.R0)
We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Dr Fischer

On behalf of the Editors, I am pleased to inform you that your Manuscript RSOS-201131 entitled "The behavioral challenge of the COVID-19 pandemic: Indirect Measurements and Personalized Attitude Changing Treatments (IMPACT)" has been accepted for publication in Royal Society Open Science subject to minor revision in accordance with the referee suggestions. Please find the referees' comments at the end of this email.

The reviewers and handling editors have recommended publication, but also suggest some minor revisions to your manuscript. Therefore, I invite you to respond to the comments and revise your manuscript.

• Ethics statement
If your study uses humans or animals please include details of the ethical approval received, including the name of the committee that granted approval. For human studies please also detail whether informed consent was obtained. For field studies on animals please include details of all permissions, licences and/or approvals granted to carry out the fieldwork.

• Data accessibility
It is a condition of publication that all supporting data are made available either as supplementary information or preferably in a suitable permanent repository. The data accessibility section should state where the article's supporting data can be accessed. This section should also include details, where possible of where to access other relevant research materials such as statistical tools, protocols, software etc can be accessed. If the data has been deposited in an external repository this section should list the database, accession number and link to the DOI for all data from the article that has been made publicly available. Data sets that have been deposited in an external repository and have a DOI should also be appropriately cited in the manuscript and included in the reference list.

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• Competing interests
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• Authors' contributions
All submissions, other than those with a single author, must include an Authors' Contributions section which individually lists the specific contribution of each author. The list of Authors should meet all of the following criteria; 1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published.

All contributors who do not meet all of these criteria should be included in the acknowledgements.

We suggest the following format:
AB carried out the molecular lab work, participated in data analysis, carried out sequence alignments, participated in the design of the study and drafted the manuscript; CD carried out the statistical analyses; EF collected field data; GH conceived of the study, designed the study, coordinated the study and helped draft the manuscript. All authors gave final approval for publication.

• Acknowledgements
Please acknowledge anyone who contributed to the study but did not meet the authorship criteria.

• Funding statement
Please list the source of funding for each author.

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Because the schedule for publication is very tight, it is a condition of publication that you submit the revised version of your manuscript before 05-Aug-2020. Please note that the revision deadline will expire at 00.00am on this date. If you do not think you will be able to meet this date please let me know immediately.

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When submitting your revised manuscript, you will be able to respond to the comments made by the referees and upload a file "Response to Referees" in "Section 6 - File Upload". You can use this to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the referees. We strongly recommend uploading two versions of your revised manuscript:

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Once again, thank you for submitting your manuscript to Royal Society Open Science and I look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Kind regards,
Andrew Dunn
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

on behalf of Dr Christina Demski (Associate Editor) and Essi Viding (Subject Editor)
openscience@royalsociety.org

Associate Editor Comments to Author (Dr Christina Demski):
Associate Editor: 1
Comments to the Author:
One of the original reviewers has now commented on the revised manuscript and has recommended acceptance with minor revision. In particular, the reviewer is still not sure whether
the Chicken game logic is necessary for the development of the paper and whether the same argument could not be made more simply as well. This may be because the Chicken game is scarcely mentioned after the introduction so could be better integrated in later sections. I would therefore like to ask you to provide a clearer and more elaborated rationale to the editorial team and the reviewer as to why you would like to keep it. Alternative (or in addition) you may want to remove it or integrate its relevance beyond the introduction.

Reviewer comments to Author:
Reviewer: 1

Comments to the Author(s)
As with my previous round of comments, this is generally a clear, useful and convincing piece of research. Also as before, the exception is the initial Chicken Game, which is unnecessary for a piece that already has a lot going on in terms of the number of different treatments in play, and unconvincing on its own terms. It is far from clear that individuals perceive their decisions on social distancing and the like as a problem of strategic interaction. The preference ordering of the outcomes which defines the game is also open to challenge, e.g. the claim that unilateral adherence leads to "an unpleasant situation".

Author's Response to Decision Letter for (RSOS-201131.R0)

See Appendix A.

Decision letter (RSOS-201131.R1)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Dr Fischer,

It is a pleasure to accept your manuscript entitled "The behavioral challenge of the COVID-19 pandemic: Indirect Measurements and Personalized Attitude Changing Treatments (IMPACT)" in its current form for publication in Royal Society Open Science.

COVID-19 rapid publication process: We are taking steps to expedite the publication of research relevant to the pandemic. If you wish, you can opt to have your paper published as soon as it is ready, rather than waiting for it to be published the scheduled Wednesday.

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Thank you for your fine contribution. On behalf of the Editors of Royal Society Open Science, we look forward to your continued contributions to the Journal.

Kind regards,
Andrew Dunn
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Appendix A

Response to Referees

In response to comments from the reviewer and the editor, regarding the role and importance of the Chicken game, we introduced the following changes:

1) We explain that the Chicken game highlights two important aspects: (i) It suggests that the behavioral challenge of reducing the effective reproductive number $R$ matches the motivations of the involved individuals. Hence individuals’ behavior is not only the problem, but, given appropriate interventions, may actually become the solution. (ii) Since the Chicken game is a member of a category of games termed Similarity Sensitive Games, cooperative behavior may be induced simply by raising the perception of similarity with other players.

2) We improved the description of the Chicken game in the caption of figure 1, and added another reference describing the cooperative nature of the Chicken game (Kun, Á., Boza, G., & Scheuring, I. (2006). Asynchronous snowdrift game with synergistic effect as a model of cooperation. Behavioral Ecology, 17(4), 633-641).

We revised the explanation of the preference ordering of the outcomes, specifically the explanation of the unilateral own-adherence payoff, now described as “being constrained by keeping health regulations while the other player is not. This is indeed an imbalanced and unfair outcome. Nonetheless, knowing the other player does not adhere, makes self-adherence even more valuable (as the alternative is to switch to no-adherence and obtain an even lower payoff)”. We have also revised the following description, explaining that “Since the game is symmetric, the intersection of the two Maxi-min strategies (i.e.: mutual cooperation) may be regarded as the natural outcome of the game (Rapoport and Guyer, 1966). Importantly, the game is also a Similarity Sensitive Game (Fischer, 2009, 2012), hence the higher the perception of similarity with the opponent the more likely one is to adhere to health regulations.”

3) In the description of our interventions we clarify that “Subjective Expected Relative Similarity (SERS): shows that cooperation in Similarity Sensitive Games (SSGs) such as the Chicken game, does not only depend on the expected payoffs, but also on the extent of perceived strategic similarity with the other party.
4) We return to the role of the Chicken game in the discussion, specifically to the congruence between the perspective of the individual and the perspective of the group and its role as a Similarity Sensitive Game, a game where cooperation follows the parties’ perception of similarity with each other. The text in the revised discussed explains that “Analysis of the structure of the social dilemma underlying the situation, specifically the choice between adherence and non-adherence, revealed a typical payoff structure of a Chicken game. This showed that in theory individuals’ adherence to health regulations is congruent with the public goal of reducing the effective reproductive number R. Since the Chicken game is a Similarity Sensitive Game, it also motivated one of the interventions, namely the addressing of similarity with the opponent as a means towards increased cooperation and enhanced adherence to health regulations.”

We hope these revisions provide a clearer and more elaborated rationale for the role of the Chicken game and its inclusion in the study. We strongly believe that grounding our study on a game theoretic model that is built around the notion that ‘what you do affects my behavior and what I do affects yours’ is important conceptually and strengths the paper. Hence our desire to maintain its inclusion.