Author’s response to reviews

Title: The importance of social environment in preventing smoking: An analysis of the Dead Cool intervention

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NOTE TO EDITORIAL STAFF: The LaTeX compilation is not working correctly despite using the BMC cls file. As instructed by the editorial office, I have uploaded the pdf with the revisions as a supplementary file. The correct file for reviewers to access to see the revisions in red with margin notes is the supplementary file described as the marked up pdf. Thank you.

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Thank you both for your comments. I believe the changes have both improved and clarified the article. Changes are presented in two ways. Red text is used to indicate changes. Margin notes link the responses below to the relevant change(s) where required.

Reviewer 1
Comment: Why include the "stochastic actor-oriented models" if they didn't converge and provide useful information? This could be deleted from the paper (though I am certain that hurts a bit, since, no doubt, these models took some effort to run!).

Stochastic actor-oriented models are the standard method for analysing network effects on behaviour change, and these models are able to distinguish between influence and selection effects. The report of the models’ failure to converge and the appendix giving details are necessary to establish that this standard method was pursued. We have revised the manuscript to better situate this approach as the appropriate method to attempt (page 7, first paragraph of section titled Statistical analysis – Change in smoking susceptibility) and extended the discussion point about network boundaries (pg 12, year).

Comment: In these remaining regression models specific to "change" over time, I think it's important in the Results/Discussion sections to reinforce that these results are adjusted for the impact of the intervention; although, unfortunately, it was not significant, given the way the paper is framed, it's important to reinforce that you accounted for any potential impact here, before addressing this set of research questions.

We have explicitly added the adjustment at the results (pg 10, adjust) and discussion (pg 12, presence).

Comment: Note, too, in Table 4, that you do have a significant finding for "smoking presence - frequently"; this was ignored in reporting, but is important, as it is consistent with cross-sectional findings, so must be a key variable for us to pay attention to, in regards to understanding susceptibility further. It's a thread that you could/should pull through further into your Discussion; both Table 2 and Table 4 provide support for the UK ban on smoking in cars where children (defined as what age?) are present. Are there other policy or program implications of this finding?

Thank you for pointing this out and these useful suggestions. The reporting of this table has been expanded (pg 10, change results) and the presence result is explicitly included in the discussion (pg 12, presence). The smoking ban in cars was introduced as a passive smoking intervention, and the potential effect on smoking behaviour exposure would be secondary. The revised
discussion is intended to clarify this connection (pg 12, secondary). Children has been reworded to “minors (aged to 18)” (pg 12, minors).

Comment: Your definition, measurement, and analysis of "diffusion" of susceptibility intrigues me. But I am not convinced that "diffusion" is the right descriptor for what you have done, as you cannot assume the potential for or existence of any "causal relationship" between one student's susceptibility and others’?

The association between the susceptibility of different students is what we are attempting to measure with the network methods in this paper. Diffusion is the term used in the network literature. We have revised the background to better link to this literature.

Comment: Rather, you seem to be simply measuring their social environment, in regards to their friends' (peer) susceptibility, in a novel and DIRECTLY OBSERVED way, given the way you've linked surveys and susceptibility constructs across students. Your other measure of peer use (friends who smoke) is about student's PERCEPTIONS. To reinforce, too, the first measure is specific to susceptibility (DIRECTLY OBSERVED), while the other is specific to smoking behavior (PERCEPTIONS). There is a body of literature specific to differences between the perceived environment and the actual (or observed) environment and their impacts, separately, on behavior; findings don't always align (like you see in your study, here!).

There are several ideas here. We have tried to avoid the perceptions versus observed issue partly because, for the purposes of social influence, it doesn’t matter whether the adolescent is correct in their belief about the smoking status of their friends. Instead, transparency is intended to distinguish between observable and unobservable influences (roughly, behaviour and attitudes). Only observable influences can be a source of behaviour modelling, with other mechanisms required to diffuse unobservable influences. While it is true that we are measuring friends’ susceptibility in an observed way (by measuring susceptibility for each student and also observing friendship), we feel it would be confusing to describe this as observable because the underlying construct of susceptibility is not something that a student would be able to observe in their friends and influence would need to be assimilated rather than modelled.

Your comment also raises the possibility of confusion between the types of friends in the Dead Cool dataset. The friends referred to in ‘do your friends smoke’ type questions are not
necessarily the friends nominated in the network data as the latter is restricted to friends in the specific school class in which Dead Cool is being delivered. It is not therefore possible to examine differences between behaviour and perceived behaviour. We had not realised this potential source of confusion and have added a note for clarification (pg 6, friends).

Comment: Therefore, I would suggest you step back and consider analyzing and writing about "diffusion" from this perspective, instead; and using another name for it. To ensure consistency/comparability, you could, instead (or in addition to) analyze peer smoking directly (instead of susceptibility), to facilitate this comparison, here.

As stated above, we have revised to better connect to the diffusion literature.

Comment: Point b would help you address "transparency" better, which you allude to in the beginning of your Discussion, but isn't, in my opinion, developed appropriately here. In regards to "source," your study only provides support, at present, for the influence of peers upon behavior; parent use was not statistically significant in your models. The Discussion could be improved with more direct and in-depth discussion of this point; why allude to a need for a parental component to the intervention, when parent use was non-significant?

While parent smoking status is not significant after adjusting for other factors, their behaviour (such as smoking in the room or car) is significant. The revisions to emphasise the presence results should make the link clearer, extending the existing phrase “but there was no attempt to educate parents so as to reduce exposure of participants to their parents' smoking” in the second paragraph of the discussion.

Reviewer 2

Comment: This manuscript reports the results of a secondary analysis of data from a school-based intervention. The topic of adolescent smoking is an important issue and the more we know about the factors that lead to it, the better we can design interventions. The data is good quality with decent measurement. The analytic methods are appropriate and correctly executed and interpreted. The conclusions follow from the results.
Thank you for this positive comment on the methods.

Comment: The two methods of analysis are a bit disjointed from each other and the network analysis sort of comes out of the blue.

The background has been expanded to better include the network diffusion literature.

Comment: The use of mixed-effects models to account for clustering by class is appropriate but one wonders if some form of clustering by school is needed as well.

Any adjustment for school is automatically included in an adjustment for class. The 20 classes were recruited from 17 schools, so there were only three schools where a school adjustment and a class adjustment would be different. Since school effects were not relevant to the outcome (beyond adjusting for them), nested models with school and class would add to the complexity of the model without changing the results.

Comment: There is no discussion of missing data except to note there was a "high level" (page 12).

Missing data was described in the first sentence in the Results: Descriptive analysis section, and reported in Tables 1 (footnote describing the source of the missing susceptible measures) and Table 3 (two lines for missing data). A reference to these tables has been added to this sentence (pg 13, missing).

Comment: There is mention that randomization was at the class level but it is not explained what randomization was used for and how such manipulation may effect this work. Such information may be in the parent study publications but such detail is needed here.
The first paragraph of the Methods section describes that classes were randomised to either the intervention or control group. This has been revised for clarification (pg 4, random). The fact that the regression models adjust for this allocation has been explicitly added in discussions of the results (pg 10, adjust) and discussion (pg 12, presence).

Comment: The authors need to clarify what unanswered questions in the extant literature this work was designed to address. It is not clear from the Introduction what this study was designed to add over and above what we already know.

The background has been revised to better link to the network diffusion literature, and expanded to clarify the novelty (pg 3 justification, pg 3 objective).

Comment: The issues of missing data and the relationship/impact of the parent study to this work needs to be clarified.

This is a summary of the comments and the response revisions are as described above.