Reviewer's report

Title: The influence of societal individualism on a century of tobacco use: modelling the prevalence of smoking

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Reviewer: Jamie Tam

Reviewer's report:

This is a well-written, novel contribution to the tobacco use modelling literature. Whereas previous models of tobacco use have relied on micro-level data on smoking behavior, the authors use a theory-driven approach to consider the broader social mechanism by which individuals choose to initiate or quit smoking in modeling the smoking epidemic across different countries. It is impressive that their overall predictions about smoking prevalence in relation to collectivism/individualism corresponds well with the data. The authors adequately address important limitations of their model, including its inability to account for population heterogeneity and the role of social networks in the utility function.

Major Compulsory Revisions

1. The diagram in Figure 2 is rather convoluted and difficult to follow with the text. For example it is unclear what is meant by some of the lines and arrows displayed until much later in the paper. The initial description for Figure 2 (p. 3 line 29 – p. 4 line 2) lists steps that do not explicitly correspond with what is displayed in the figure. (Why is “Tobacco use data” linked to “IDV”? Does “Tobacco use data” predict the relationships in phases ii and iii? Or does the box for ‘predict’ only refer to the smoking prevalence model?) The paper would be improved by moving some of the writing describing the model phases from the Results section (p.8-9) into the Methods section.

2. As an alternative to the diagram, Figure 2 could be replaced with a table outlining specific steps in the modeling process for each phase: Model specification, Phase (i), Phase (ii), and Phase (iii). This would clarify the stages of model development and improve readability, especially for readers of the journal who lack modeling backgrounds.

Minor Essential Revisions

3. Figure 2 is first introduced with no further explanation (p. 2 line 33) until later (p. 3 line 29 – p. 4 line 2). Consider moving “Figure 2 summarizes our approach graphically” on page 1 line 33 to page 3 line 29.

Discretionary Revisions

4. The authors use publications on the health effects of smoking as a proxy for utility derived from smoking (page 4 line 45). The authors could also describe
how the decline in individual utility over time (discounting as shown in Figure 3b) corresponds with the general trend in growth in the number of scientific articles being published overall and with ‘tobacco fatigue’ in recent decades. That is, the tendency for the public to derive increasingly less utility from new information about smoking over time due to knowledge saturation.

5. In Appendix B, additional information about sensitivity analyses conducted would improve model transparency. The authors state that several model assumptions were tested—which assumptions in particular? What ‘various’ combinations of local and global parameters were investigated, and what were the specified bounds?

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.