Reviewer's report

Title: An Empirical Comparison of Methods for Analyzing Correlated Data from a Discrete Choice Survey to Elicit Patient Preference for Colorectal Cancer Screening

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Reviewer: Axel C. Mühlbacher

Reviewer's report:

Objective and study perspective:

This article compares statistical methods to analyze DCE, focusing on the within-patient correlation. Data is obtained from a survey with a two-stage design. The preference data is conducted through a well-designed and interesting survey. Decisions are based on six attributes and the corresponding levels. The experimental design meets all criteria. The objective of the study and study perspective are clearly defined. Funding sources are clearly acknowledged. The underlying study design and experimental design are appropriate and state of the art.

The design allows for the investigation of binary, categorical and bivariate outcomes of the experiment data. Following statistical models were used:

Binary outcome
1. logistic regression with clustered robust standard error
2. random-effects logistic regression
3. logistic model using generalized estimation equation (GEE),
4. probit regression with clustered robust standard error,
5. randomeffects probit regression
6. probit regression using generalized estimating equation (GEE)

Categorical outcomes
1. multinomial logistic model with clustered robust standard error,
2. random-effects multinomial logistic model
3. multinomial probit model with clustered robust standard error.

bivariate outcome
1. probit model (two choices were treated as two binary outcomes).

Major Compulsory Revisions

Decision context: Differences are obtained through the specific design of the survey. This survey used a two-stage design. The opt-out alternative is which is
often seen as a more realistic approach to the decision-making context. First respondents are asked to make decisions based on the six treatment attributes. After having made this decision, they are given the chance to “opt-out”. This design is excellent to predict the uptake of screening test (more realistic would be the integration of the opt-alternative).

In the context of the research question stated above, this specific experiment might lead to two different decisions by the respondents. The decisions that are based on the treatment characteristics will provide information about preferences for different treatment characteristics. The second decision could be seen as a statement regarding the approval of the screening itself.

If respondents in principle do not favor screening tests, the decisions are more or less independent of the decision in stage one. Therefore it might be interesting for the reader to have more information on the populations voting for or against the screening (15 % always opting out and 48 % always taking the screening test). Please analyze attitudes and/or sociodemographic variables for the populations who choose to opt out (page 14). Do the results vary in these subgroups?

Minor Essential Revisions

Respondents: The total number of subjects analyzed was 468. Each subject completed 10 choices. The design was blocked into 4 different surveys. On average 117 respondents in each block. Please provide the actual number of respondents for each block. Power calculations before conducting the research study are almost impossible; still the reader of this article might be interested if the number of respondents was sufficient to answer the research question. Please discuss this in the method section or as a limitation in the discussion section.

Cost attribute: Table 2a and 2b show inexplicable coefficients for the price attribute. The middle level ($250) is least relevant. Some more explanation for the reader would help. How could this be explained?

Sensitivity: Also the coefficients show that respondents favor low sensitivity. Some more explanation for the reader would help. How could this be explained?

Page 16: Conclusions are, that small within-cluster correlation can result in the use of a simple logistic regression. High within-cluster correlation is seen as a reason for sensitivity analysis. Would it be possible to give more recommendations on how a systematic approach would look like (as a final summary of the work done in this paper)?

Discretionary Revisions

Report results: The complexity of the many statistical models makes it difficult to read and understand. For the clarity of the method section and the result section it might be beneficial to drop statistical methods (eg. 1 or 2 from the binary outcomes).
Number of statistical methods:

Page 4: McFadden was introducing the basics of the statistical methods in 1974. As far as I know two papers of Louvriere and Woodworth (1983) and Louvrier and Hensher (1982) introduced discrete choice experiments in Marketing.

Page 8: Random utility theory usually refers to indirect utility functions (indirect utility due to price and income).

The conclusion could refer to findings in light of other studies.

The article needs some formatting before being published (i.e. dots, size of letters and commas).

**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' below.