Author’s response to reviews

Title: Development of the Informed Choice in Mammography Screening Questionnaire (IMQ): Factor structure, reliability, and validity

Authors:

Maren Reder (maren.reder@uni-bielefeld.de)
Eva-Maria Berens (eva-maria.berens@uni-bielefeld.de)
Jacob Spallek (jacob.spallek@b-tu.de)
Petra Kolip (petra.kolip@uni-bielefeld.de)

Version: 3 Date: 11 Sep 2018

Author’s response to reviews:

Dear Dr. Barke:

Thank you for giving us the possibility to submit a revised version of our manuscript.

Reviewer reports

Paola Mosconi (Reviewer 2): This article describes the validation process of the IMQ, Informed Choice in Mammography Screening Questionnaire. It is a very long and complex manuscript and a flowchart describing and summarizing all the steps, and the number of subjects considered, could be very useful for less expert readers.

MR: Thank for this comment. We have made the analysis steps more clear under statistical analysis (ll. 239-244). The n delivering a valid response has been added for each item in Table 1. The n of the scales, index and singular items correlated has been added to Table 3. We refrained from depicting a flowchart because the analysis steps do not involve participant flow.

Reviewer 2: Some points need to be clarified before the final publication: - It is important to have, as supplementary file, the final version of the questionnaire, items and related response
choice, in English language. This could be a useful tool for the readers and for possible future utilizations.

MR: An English translation of the questionnaire has been added as additional file 1. Please note however, that this was done without backtranslation or any other form of ascertaining the validity of the English version of the questionnaire.

Reviewer 2: The gap between the time of data collection, 2013-2014, and the time of submission for publication should be justify by authors.

MR: The following overview depicts the time from data collection until today:
- October 2013 to July 2014: data collection
- August 2014 to June 2015: data analysis and writing of the manuscript
- July 2015 to February 2016: manuscript submitted to BMC Public Health, with the final response “that despite much effort we have been unable to obtain an appropriate referee for your manuscript in a timely manner”
- March 2016 to August 2017: addition of item response theory analyses and rewriting of the manuscript
- since September 2017: manuscript submitted to BMC Psychology

Reviewer 2: The figure 3 reports N6: there is not correspondence with the table 1

MR: Thank you for this comment. You are right, N6 does not exist, we are sorry for this typo. N6 is N5 and N5 is N4 (see Table 1).

York Hagmayer (Reviewer 3): Review PSYO-D-17-00088R2

I'm grateful to act as a reviewer for this manuscript again. I appreciate the revised background and methods section that are very accessible to readers now. For this review, I will focus only on the results section and conclusions. The authors do an excellent job in running and reporting
the planned analyses. At first sight, the findings seem to be mixed as only the attitude scale turned out to have good psychometric properties. However, I would like to go back to the primary aim of the authors. Their primary aim was to develop and evaluate an instrument to assess informed choice in mammography screening. According to their definition, informed choice requires sufficient knowledge, and a behavioral intention that is in line with the person's attitude. Hence, an instrument would have to provide a reliable and valid assessment of attitude, knowledge, and intention. The results show that this is the case for attitude. Good factor loadings, good model fit, good reliability, and a positive relation to behavioral intention were established empirically. Intention is basically measured with a single item. The only empirical result reported by the authors is that intention is related to actual participation \((r=0.54)\), which is good. There is no information on re-test-reliability. The IRT analyses for the knowledge index showed that after removing a single item, the scale is unidimensional, which is good. On the negative side, the results also show that a 2 parameter model, which allows for differences in discriminability, is needed to account for participants' responses. As the authors point out themselves (p. 15) this finding indicates that a summary index is not appropriate to assess women's knowledge. But this is what the authors proposed (summary index >3 = sufficient knowledge, p.8)). I think it is important to discuss this point in more detail and show what would be required to appropriately assess women's knowledge.

MR: Thank you for this helpful comment. The information how to dichotomise the attitude scale and knowledge index has been moved to the discussion section (ll. 474-482 and ll. 488-491) and is further disputed in light of the results. We also make it clear in the discussion now, that the index cannot be calculated as originally intended in the Methods section, but that a weighted index has to be calculated.

Reviewer 3: Going beyond their primary aim, the authors also assess two additional factors (norms and barriers) that are important according to models describing the formation of behavioral intentions (e.g. the theory of reasoned action). It turned out that the scale for barriers was not reliable, discrimination indices were poor, but the model fit was acceptable. To my surprise, it turned out that barriers were positively(!) related to behavioral intention. I cannot make sense of this finding (more barriers lead to higher intention to participate ?). But I might have missed some recoding going beyond what was described on page 8. If the relation is in fact positive, I think the whole scale needs to be questioned.

MR: Thank you for this comment. Instead of using the overall barriers scale with all barrier items, we now used the 2 factors that resulted from our CFA and contained only the items with
favourable item statistics for assessing validity (see Table 3). We therefore, now correlated the two barriers scales assumptions (B1, B2, B3, B6) and importance (B10, B11) with the other components.

Reviewer 3: With respect to norms, the results show a good internal consistency, but a not so good model fit, despite acceptable factor loadings. In the discussion, the authors report that there were many missings, which might have affected the results. In addition, I would like to point out that there was apparently very little variance. In general a vast majority of people giving advice seem to provide a positive recommendation for screening. The low variance may be one reason for the rather low correlation of norms and behavioral intention.

MR: Yes, this is true. We made this more clear in the discussion (Il. 513 - 516).

Reviewer 3: Given that barriers and norms are not an integral part of informed choice, and the respective scales have some problems, I wondered why these scales are part of the new instrument. I see that it would be of practical value (e.g., for GPs) to assess the barriers a woman encounters and the advice she receives. For research purposes, it would also make sense to keep these scales. But they are not necessary to assess whether a choice was informed or not. I think it is important to make this clear in the paper.

MR: Thank you for this comment. We made this more clear in the discussion (Il. 450 - 454).

Minor Points

Reviewer 3: Given that missings might cause problems for the statistical analyses, more information on their number would be helpful.

MR: Overall, 5,293 datasets were analysed. Missing values differed from item to item. The n delivering a valid response has been added for each item in Table 1. Since for knowledge, all missing responses were coded as wrong answers, for all items 5,293 datasets were analysed. The n of the scales, index and singular items correlated has been added to Table 3.
Reviewer 3: Table 1 provides an excellent overview. I think it would even be more helpful, if Cronbach Alpha and factor loadings would also be added to the Table. This way, everything would be depicted at a single spot. Thereby, the figures for the factor loading could be omitted.

MR: Thank you for this comment. We amended Table 1 and discarded Figures 1 to 3.

Reviewer 3: On page 11 the authors say that they expected intention to have a low correlation with attitude, barriers, and norms. This was surprising to me. The theory of reasoning action, which the authors cite as a background, would not do so. Especially with respect to attitude, it seems strange to expect a low correlation. If the correlation would be low, informed choice would be expected to be rather rare even when women have perfect knowledge.

MR: Thank you for this comment. We made it more clear in the methods section (ll. 298 - 301) which cut-offs we regarded as small, medium and large correlations. We also cited some correlation coefficients from a recent meta analysis (ll. 304 – 307).

Reviewer 3: In Table 3 the authors report correlations of attitude, barriers, norms, knowledge, and intention. It would be very interesting to include the correlations to actual take-up of screening into the table.

MR: We included uptake in Table 3.

Reviewer 3: In addition to the correlations reported in Table 3, it would be interesting to see how well attitude, norms, and barriers taken together predict intention (e.g., by running a logistic regression). Given that the scales have a low correlation, they may predict intention quite well.

MR: We included a logistic regression analysis in the results section (ll. 431 – 438).