Reviewer's report

Title: Mokken Scale Analysis: A Practical Guide to the application and interpretation of a Non-Parametric IRT method in Empirical Research with health and well-being questionnaires

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Reviewer: Cody Ding

Reviewer's report:

The topic discussed in the manuscript would be interesting to readers of the BMC and it provides another perspective on how to conduct psychometric analysis besides conventional methods using classical test theory. But I feel that the angle and presentations of the materials may not be at its best for the readers to benefit from this manuscript. The major concerns are meant to be constructive to improve the quality of the manuscript.

1. The title of the manuscript should be changed. It said that it was a guideline. But the manuscript focuses on how to conduct non-parametric IRT based on Mokken method. I do not see any guidelines regarding any particular issues, such as a cut-off point, etc. since we know them already.

2. The manuscript is too long, and it can be shortened quite a bit.

3. This brings the angle issue of the manuscript. As it stands now, it discusses or describes Mokken model, comparison with parametric IRT models, and assumptions of Mokken model in greater details. It reads more like a textbook rather than an article. But more importantly, I do not have a clear understanding of what issues or aspects of psychometric issues are discussed after reading the manuscript. Are we talking about assumptions of unidimensionality, monotonicity, etc. or are these the aspects of the psychometric analysis we need to address? Is unidimensionality related to factor structure? If we have an instrument with more than one factor, can we still use this method?

It would be good if the manuscript could be presented in the following fashion. Of course, it is just a suggestion.

a. Discuss psychometric issues related to instrument development or evaluation.
b. Discuss methods are available for such investigation
c. Focus on Mokken models and why such an approach is advocated.
d. The aspect of psychometric issues can be investigated using Mokken model. If an instrument has more than one factor, what is the role of Mokken model?
e. Then use examples to illustrate.

There are some points needing clarification.

1. MHM and DMM needs be better explained for their role in psychometric study.
2. Relation to reliability needs to be better explained.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.