Reviewer's report

Title: A framework for power analysis using a structural equation modelling procedure

Authors:

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Reviewer: Keith Widaman

Level of interest: A paper of considerable general medical or scientific interest

Advice on publication: Accept after discretionary revisions

I believe that all comments listed below should be considered compulsory. Most are fairly minor. I have suggested that the author do some things differently; if he does not wish to do so, I would like to hear the reasons for failing to make changes I requested. Given this, please consider all comments as calling for compulsory revisions -- even if the author does not change the ms. (if he gives reasons for not making certain changes, then he has addressed my comments).

Please note: the ms. was not paginated, so I paginated the ms., beginning with the title page as p. 1, the abstract page as p. 2, and so forth.

1. p. 3, middle of page: The first formula for p should be qualified by stating that this formula gives the number of nonredundant elements in S and M, the covariance matrix and vector of means, respectively.

2. p. 3, just past middle of page: The description for the second formula for p should be changed. Specifically, the formula gives the number of nonredundant elements in S, the covariance matrix, not the number of nonredundant elements in the model.

3. p. 4, line 5: I think this expression should read "When r < p, ...", not "When r > p, ..."

4. p. 4, middle of page: The authors stated that "In a path diagram, a box represents a variable, a ..." This should be qualified in the following way: "In a path diagram, a box represents a manifest or observed variable, a ..." Also, the author never mentioned that circles or ellipses are used to represent latent variables. Even if no models discussed in the present papers include latent variables, this should still perhaps be mentioned - and the author could refer to other work on more advanced models that have latent variables.

5. p. 4, paragraph beginning "The model that is estimated ...": The author stated that a curved, double headed arrow represents a "correlation" between two variables. If the variables are not standardized, it is more usual to say that a curved, double headed arrow represents a covariance between two variables.

6. p. 4, footnote 1 at bottom of page: The author should use the terms t-value and z-value rather than t-score and z-score, as the use of the latter terms could lead to confusion.

7. p. 9, top of page: The discussion of the model in Figure 7 and its presentation seems rather confusing. The author included two triangles in this figure and that seems confusing to me. Can the
author cite some previous source to justify this approach? If not, could the figure be redrawn to be easier to comprehend?

8. p. 10: It seems to me that some, even rather brief description of the results presented in Table 3 is needed. At present, there is none, and interested readers might get confused.

9. p. 11, footnote material at the bottom of the page: The author stated that "To calculate the distribution when the null hypothesis is true, we must ..." This statement is in error. When the null hypothesis is true, you just look at a table of the chi-square distribution. But, it would be correct to say "To calculate the distribution when the null hypothesis is false, we must ..." Also, later, the author referred to an "expected meaqn [sic] square"; clearly "meaqn" should read "mean."

10. p. 12, middle of page: The author referred to a Figure 8, but I saw no Figure 8 included with the ms.

11. p. 12, bottom of page: The author stated that the standardized univariate effects were set equal to .5 and the three correlations among the dependent variables were fixed at .8. But, in Table 5, it appears that the correlations among the three dependent variables were fixed at .2, not .8. Am I missing something here?

12. p. 13, top of page: The author mentioned three separate tests: two univariate tests of each parameter and a multivariate test of the two parameters. But, with three dependent variables, wouldn't there be four (not three) separate tests: three (not two) univariate tests of each parameter and a multivariate test of the three (not two) parameters?

13. p. 17 and following: The Mx script file is well done, but the author may need to include more explanatory material so that readers will be able to understand just what is going on. This comment applies to the remainder of the ms., as a good deal of material is presented here with little explanation, and even interested readers may get lost rather quickly.

14. As a final, general comment, I think that the author should also mention that there is another major competing approach to estimating power for structural models. This alternative approach was presented first by MacCallum, Browne, and Sugawara (see article in the journal Psychological Methods, 1996, Vol. 1, pp. 130-149). They take a very different approach to estimating power in the context of structural modeling. The MacCallum et al. approach is very different and adding much discussion of their approach might take the present ms. far afield. But, to provide a more sophisticated review of the literature, the author should at least mention the MacCallum et al. approach as another, competing approach to estimating power.

**Competing interests:**

None declared.