Reviewer’s report

Title: A simple ratio-based approach for power and sample size determination for Rasch analysis

Version: 1 Date: 2 April 2014

Reviewer: Nancy Mayo

Reviewer’s report:

These are mostly discretionary revisions.

This is a very interesting and needed paper. The mathematical and statistical parts of the paper are a bit beyond my expertise, but I would be an enthusiastic consumer of the information. So with this context, I was confused as to the context for the calculations.

The title led me to believe that this was a paper on how many subjects are needed for Rasch analysis. However, after reading the paper twice, I realized that the authors are proposing a sample size calculation for a two group comparison when the outcome is latent rather than manifest. When the outcome is latent there are additional sources of variance that need to be considered in the sample size calculation. The opening sentence of the abstract is misleading in this context.

Despite the widespread use of patient-reported Outcomes (PRO) in clinical studies, their design remains a challenge. Justification of study size is hardly provided, especially when Rasch analysis is planned.

Here a Rasch analysis is not planned, the outcome is a measure that has been created using Rasch analysis.

I understand that the added variance associate with the latent increases the sample size, however, I am a bit confused by the figure showing that as variance decreases, ratio increases. This is a bit counterintuitive for me.

The observation that sample size is a function of the variance of the latent trait and the number of items makes intuitive sense.

The paper is well written and I was able to follow the logical arguments.

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
I declare that I have no competing interests'