Reviewer's report

Title: Item response theory analysis of cognitive tests in people with dementia: a systematic review

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Reviewer: Terry E Goldberg

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This is an interesting study about the applicability of Item Response Theory (IRT) methods in order to improve detection of people with dementia disorders through cognitive tests. This article carefully reviews the only 4 studies that have been published and have applied IRT methods to cognitive tests in dementia.

IRT parameters could be useful on improving the information deduced from a test, and could aid in identifying those items of a given scale are most sensitive to detecting changes in cognition. However, as present knowledge in this particular field is limited to the 4 studies, this review should be taken as a preliminary approximation to the subject.

Major Compulsory Revisions follow:

1. It would be helpful if some limitations of the approach were discussed. One example is the implicit assumption that one test taps a single latent construct. What about in those tests or test batteries in which multiple domains/factors are assayed?

2. Similarly no IRT measure has been cross validated and directly compared to the clinical measures. Thus it is unknown if this approach is truly advantageous.

3. Can the authors comment on older Chapman and Chapman arguments about how to ensure equivalent difficulty level and true score variance across tests in order to identify differential deficits that are relevant here?

4. Some comment on industry’s interest in the approach should be made.

Reviewed by,
Jesus J. Gomar
Terry E. Goldberg

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.