Reviewer's report

Title: Dimensionality and predictive validity of the HAM-Nat, a test of natural sciences for medical school admission

Version: 1 Date: 12 August 2011

Reviewer: Konrad Pesudovs

Reviewer's report:

This is a very interesting study that works around definitional issues of technical multidimensionality in Rasch models. The authors compare a model containing 3 theoretically different dimensions which are evidenced to be different but highly correlated. This is compared with an aggregate measure derived from the three dimensions estimated individually. I have only one concern. The authors determine dimensions using factor analysis of raw data. This is known to be a risky strategy as items can group together according to item difficulty. See Linacre J.M. (1998) Rasch First or Factor First? Rasch Measurement Transactions 11:4 p. 603. The high correlation of factors supports this contention that it is not necessarily content that is being grouped. They should revisit this approach performing Rasch first followed by principle components analysis of the residuals to ensure they have correctly separated their dimensions. This should clarify the issue.

Otherwise this is a very interesting study into a novel entry test for a medical program. This paper should reach a broad readership.

Specific issues

P4. Did the test really increase course completion from 23% to 86%? I find it very difficult to believe that your course previously had a 23% completion rate.

P6. Only 74% of the cohort is included in the study. What happened to the rest?

P12. “Scale selection by item-criterion correlation”. Why not do this with a splitting of the data into a development and test phase also so you can evaluate this approach.

Table 3. Please present the CI of the ORs.

Level of interest: An article of outstanding merit and interest 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