Rasch Analysis of the Mathematics Self-Concept Questionnaire
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This study used the Rasch model to assess several TIMSS 2011 student questionnaire items, which measure students’ mathematics self-concept. Nearly half of the items were in the reverse direction in the study; they shared the same measurement variable with the straightforward items. In general, all of the items were of high quality regarding the classical test theory (CTT) results and the Rasch results. However, some issues were existing. The observed order in variable map differed from the hypothesized order. And some unexpected responses were identified. The possible reason was the different psychometric properties that reverse directional items may carry.

Revision and Validation of the Rasch–Based Scenario Scales for Measuring Activity Engagement in Older Adults
Kelsey Klein, Larry H. Ludlow, and Christina Matz-Costa, Boston College

Engagement refers to the experience of connecting on a deep and meaningful level with a role. Empirical research and theory tell us that supporting the continued engagement of older adults in productive activities is beneficial to individuals, families, communities, and society-at-large. Guttman’s facet theory was utilized to frame important facets of productive role engagement followed by his sentence mapping procedure to construct and subsequently revise scenario-type items. These items formed scales designed according to Rasch measurement principles. Variable definition confirmation, cross-validation comparisons and differential item functioning analyses jointly illustrate (a) the successful revisions to the scales and (b) their utility in assessing the extent to which older adults are involved in roles/activities that enhance their physical, mental, and spiritual health.

Assessing the Validity of a School Engagement Scale-Behavioral: A Rasch Measurement Approach
Tong Shen, Boston College

This study provides a Rasch measurement framework for investigating issues related to reliability and validity of the behavioral subscale of the School Engagement Scale. The school engagement scale is a measure of high school students’ school engagement level, i.e. the extent to which high school students are involved, attached, and committed to academic and social activities in school. The Rasch analysis results indicate that although certain aspects of the scale seem to function in a psychometrically sound manner, the questions are a bit easy to endorse and do not cover a wide range of student engagement level. Suggestions for future revisions to this scale instrument are provided.

Is the 3PL model always better than the Rasch model? Simulation Results Suggest it Depends
Yiran Chen, Boston College

How many parameters should be used in IRT models is a question that has been debated for a long time. On the one hand, using more parameters often improves model fit, which is usually desirable. On the other hand, researchers argue that improving model fit does not necessarily improves the theta estimates; if so, the 3PL model is not necessarily better than the Rasch model. I used simulation to address this question. The results suggest that there is no clear winner unconditional on test characteristics. For tests that discriminate well overall (mean of the IRT discriminative indices over 1.00), the 3PL model tend to be more efficient than the Rasch model. But for tests with low-discriminating, high-guessing items, the 1PL model can sometimes be a better choice. In addition, the Rasch model yields better, or less worse, estimates for students with ability level close to zero. Therefore, if the primary purpose of the test is to differentiate students in the middle (such as drawing a line between needs improvement and proficient), one may find the Rasch model especially useful.