Proposal for a workshop at the IMPS 2011 in Hong Kong Monday July 18th 2011

EQSIRT: A New Software for IRT Modeling

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Introduction

In this workshop we present a new, comprehensive and user-friendly IRT software by Multivariate Software, Inc., who have been developing the EQS software for Structural Equation Modeling.
The target group of the workshop are applied researchers who are interested in a easy-to-use software for their IRT computations. This workshop will introduce the software and will show the capabilities of the program with respect to many different IRT models using real-life use-cases. At the end of the day the participants will have a detailed overview of the software and the corresponding models such that they can do their own IRT computations using EQSIRT.

Outline of the Workshop

The first of the three modules starts with a general introduction into the software including the graphical user interface and the EQS-like syntax. We explain basic options for data handling and manipulation as well as descriptive analysis. Then, we move on with binary IRT models such as the Rasch model, 2-PL, and 3-PL. An interesting option offered by the software is the possibility to put restrictions on the item parameters (equality restrictions as well as fixing parameters onto a certain value).
With respect to classical polytomous models we are going to present the rating scale model, the partial credit model, the graded response models, and the nominal response model.
In general, the basic estimation setting is a MML approach which also allows for spline approximation of the latent trait. Optionally, item parameters can also be estimated in a MCMC way. Similarly, for the person parameters we provide ML as well as Bayesian routines. In this module we are also going to discuss relevant goodness-of-fit measures and various IRT plots.

Module 2 addresses the highly relevant issue of dimensionality assessment. We present the implementation for categorical factor analysis (FIML, MCEM, tetrachoric/polychoric correlations). Within this context multidimensional IRT extensions of the basic models addressed above are explained in detail. In the program we use MCMC to estimate the parameters.

In the afternoon, module 3 is about IRT models with covariates. We start with DIF and multiple-group computations. The core aspect of this model is a non-linear mixed-effects IRT model framework that allows for the inclusion of covariates; either as fixed-effects or random effects. This extends the framework proposed in the book by de Boeck and Wilson (2002).

Program

9:30- 9:45	Welcome and Introduction of the Workshop
9:45-11:30	Classical Binary and Polytomous IRT Models
11:00-11:45	Break
11:45-13:00	Dimensionality Assessment, Multidimensional IRT
13.00-14.00	Break
14:00-15:30	DIF, Multiple-Group Models, Mixed-Effects IRT Modeling
15.30-16.00	Beyond the Workshop and Discussion

Links:

Main R website: http://www.mvsoft.com/

Selected Books:

Baker, F. B., & Kim, S. H. (2004). Item Response Theory: Parameter Estimation Techniques. New York: Dekker.

Embretson, S. E., & Reise, S. (2000). Item Response Theory for Psychologists. Mahwah, NJ: Lawrence Erlbaum Associates.

De Ayala, R. J. (2009). The Theory and Practice of Item Response Theory. New York: Guilford Press.

De Boeck, P. and Wilson, M. (2004). Explanatory Item Response Models: A Generalized Linear and Nonlinear Approach. New York: Springer.

Reckase, M. (2009). Multidimensional Item Response Theory. New York: Springer.

Selected Articles:

Woods, C. M., & Thissen, D. (2006). Item response theory with estimation of the latent population distribution using spline-based densities. Psychometrika, 71, 281-301.

Sheng, Y. (2010). Bayesian estimation of MIRT models with general and specific latent traits in MATLAB. Journal of Statistical Software, 34(3), 1-27.

Bentler, Jennrich (2011).

He, S., Mair, P., Wu, E., & Bentler, P. M. (2011). A nonlinear mixed model approach to item response theory.