

Title: Workshop: IRT Modeling – Theory and Applications in R

Instructor: Thorsten Meiser

Abstract:

The workshop provides an introduction into Item Response Theory (IRT) with basic and advanced models for dichotomous and polytomous items. For dichotomous items the topics include the Rasch model and extensions with two, three and four item parameters. Concerning polytomous items, we discuss the partial credit and rating scale model, generalized partial credit model, graded response model and multidimensional nominal response model for items with categorical and ordinal response formats. In addition, we give an overview over IRTree models, mixture IRT models and partitioning methods for the analysis of parameter heterogeneity. The models are outlined with their formal model equations, theoretical assumptions and implications, estimation techniques, and statistical testing procedures. Empirical applications and practical exercises illustrate the use of the various IRT models with current R packages.

Basic literature:

Böckenholt, U., & Meiser, T. (2017). Response style analysis with threshold and multi-process IRT models: A review and tutorial. *British Journal of Mathematical and Statistical Psychology*, 70, 159- 181.

Debelak, R., Strobl, C., & Zeigenfuse, M. (2022). *An introduction to the Rasch model with Examples in R*. Boca Raton, FL: CRC Press.

De Boeck, P., & Wilson, M. (2004). *Explanatory item response models*. New York: Springer.

Chalmers, R. P. (2012). mirt: A multidimensional item response theory package for the R environment. *Journal of Statistical Software*, 48(6), 1–29.

Embretson, S. E., & Reise, S. P. (2000). *Item response theory for psychologists*. Mahwah, NJ: Lawrence Erlbaum.

Organisation:

Videos (about 10 hours) and one meeting (about 5 hours, digital or on campus)

Credits: 2 workshop days