Workshop Proposal
for
IRT Analyses Using the Statistical Software R

Topic of the Workshop

The workshop will give an introduction into the use of R, the R programming environment RStudio, and the TAM package, a powerful function package within R to conduct item response theory (IRT) analyses. Using these tools, we will go through all steps necessary to do an IRT analysis, and you will directly apply them either on a language test data provided to all participants or on your own data set that you bring to the workshop.

Intended Learning Outcomes

At the end of the workshop you will have the basic knowledge about how to:

- use R and RStudio to prepare data for statistical analyses,
- use the functions of the package TAM to do IRT analyses, and
- know important analyses and criteria to decide on the validity and reliability of a test.

Further, at the end of the workshop you will have a full stack of R syntax, which you can then easily adapt to re-use it for any future IRT analyses.

Contents Covered in the Workshop

Introduction to RStudio

- How to load, save and run R syntax
- How to install additional function packages
- Tips & tricks

Introduction into R

- Import and export of data sets
- Applying functions
- Re-coding data
- Data structures in R

IRT Analysis

- Estimation: How to calibrate uni- and multidimensional Rasch models using TAM.
- Model fit: How to decide on the dimensionality of a given test.
- Item analysis, part I: How to investigate the dimensional fit of items.
- Item analysis, part II: How to investigate the fairness of items across different groups using differential item functioning.
- Person analysis, part I: Differences between the possible estimates (WLE, EAP, …) and how to select the appropriate estimate for your analysis.
- Person analysis, part II: The advantages of models using background data (also called background or regression models) and how to implement them.

Methods you will engage the participants in

The workshop will be fully hands-on. All participants will work on their own R analysis project and will conduct the presented steps directly on their own project using their brought laptop computers (all participants need to bring a laptop). Individual problems or differences in the analyses will be shared and discussed across all workshop participants, so a large variety of possibly arising cases and resulting recommendations is shown, and all participants benefit from the discussion of these cases and get experience beyond the cases currently occurring in their data set but possibly occurring in future situations. To do so, the workshop is accompanied by a Google Hangout Session, allowing participants at any time to share their screen and show their current results. Also, the Google Hangout will be used to share code snippets and examples at any point in time.

Background or Prior Knowledge of Participants

Participants should have a basic knowledge of statistics (e.g., meaning of p-values, standard deviation, normal distribution).

Pre-Workshop Activities

Each participant should download and install the following programs on the computer he will use at the workshop:

- R (http://cran.us.r-project.org/)
- RStudio Desktop (Open Source License; https://www.rstudio.com/products/rstudio/download/)
- Notepad++ (https://notepad-plus-plus.org/download/v7.5.8.html)

If a participant is not familiar with the basic concepts of IRT, he or she should complete the following conceptual introduction to IRT (a video tutorial of about 60 minutes in total): https://www.youtube.com/playlist?list=PLJNUIJnElUzDmrIPunMyF3tTvIHb65wNb

Each participant is encouraged to bring his own test data set he wants to analyze (the file format is not important).

Maximum Number of Participants

30

Suitability to Run Such a Workshop

See curriculum vitae and list of publications attached.