**R-Lavaan: Confirmatory Factor Analysis (CFA) and Extensions**

**Course Dates:**

2 days, 6 hours/day; 20.3. – 21.3.2018

Single day course available for users wanting to use their own data and models; 22.3.2018 7 hours .

**Place:** Centre of Giessen (Unterer Hardthof)

**Fees:** For academics 400 Euro two day course, 200 Euro for additional third day 3 plus 19% VAT

 For nonacademic 600 Euro 2 day course, 300 Euro for Day 3 plus 19% VAT.

**Min / Max participants:** 8/20

**Time Schedule:**

9:00 – 10.30am; 11:00 – 12:30am; 1:30 – 3:00; 1:30-5:00pm

50% theory including theoretical exercises and 50% practical exercises with prepared data-sets and input files.

Teaching language: German or English, dependent on participants; slides and materials English.

In the breaks, tea, soft drinks and fruit will be offered

**Instructors:**

**Dr. Monika Heinzel-Gutenbrunner** (MH Statistik and Competence Centre Statistics FREELANCE https://www.4freelance.de/competence-center/cc-statistik/ )

**Prof. Dr. Peter Schmidt** (University of Giessen and Competence Centre Statistics FREELANCE)

**Abstract:**

Social scientists, psychologists, biomedical researchers, epidemiologists, economists and scientists of other fields often collect data that are measured by multiple indicators. To develop and test multiple item scales, using either a quantitative or ordinal data confirmatory factor analysis is a useful tool. Furthermore it is shown how measurement invariance can be established between groups and countries and/or over time to allow comparisons of means and regression coefficients over groups and time points.

**This course gives an overview of confirmatory factor analysis from an application point of view.**

It covers:

 Confirmatory Factor Analysis (CFA) and Simultaneous Confirmatory Factor Analysis (SCFA) Multi-Group Confirmatory Factor Analysis (MGCFA), measurement invariance (MI), higher order confirmatory factor analysis and Multi Trait Multi Methods (MTMM) Models. In the course, various examples from value research and attitude research from the European Social Survey (ESS) will be used. We will exclusively rely on the package “lavaan” as part of the open source software R- for all exercises. Concluding, a detailed discussion of the command syntax and the interpretation of the output will be given.

**Who should attend:**

Social scientists, psychologists, geographers, biomedical researchers, epidemiologists and economists and scientists of other fields

**The following knowledge is recommended as a prerequisite:**

* Descriptive and inferential statistics
* Basic knowledge of regression analysis and exploratory factor analysis .
* Basic knowledge of R, which is sufficient to use the R package lavaan, can be acquired in the first session of our course. Participants, who already have basic knowledge of R, can drop the first session and get a reduction of the course fee.

**Participants should take home the following issues:**

* The ability to understand, interpret and explain the output from lavaan.
* An understanding of the conceptual foundations and basic formulation of CFA models.
* An appreciation of the advantages and disadvantages of CFA as compared with exploratory factor analysis.
* Strategies for developing and testing scales including higher order factor models and MTMM models.
* The ability to use CFA to test for measurement invariance in survey, experimental, quasi-experimental and panel data
* A good understanding of the difference between exploratory and confirmatory approaches.

**Computing:**

The course will use lavaan for all examples. *Prior knowledge of the software is not necessary. The input data of the examples are sent to the participants before the course starts.*

**Materials:**

Participants will receive the slides of the course, which frees them from taking notes. In addition, they will receive additional articles with CFA applications in digital format.

**Software Requirements:**

Download R if you do not already have it installed, download packages lavaan, semTools, semPlot

We also recommend downloading [RStudio](https://www.rstudio.com/products/rstudio/download/%22%20%5Ct%20%22_blank) (License: AGPL v3). All this software is free.

**Hardware Requirements:**

Please bring your own laptop

**Extended and single day course available:**

A third day can be booked from those who want to prepare and run CFA with their own data and wishing to get continuous support from the two instructors to set up and modify their models. This includes the support how to transform data from STATA and SPSS into data files that can be read by lavaan.

This third day can be also booked as a single day for those, who have been trained in lavaan at earlier occasions and only want support for running their own models

**Booking: via email to Peter Schmidt** **Peter.Schmidt@sowi.uni-giessen.de**