

Course Outline

The course shows how a causal theory can be represented by a path diagram and translated into a structural equation model, and how the model can be estimated and tested with MPLUS graphics computer program.

In the first week, we deal with confirmatory factor analysis (CFA) relating single or multiple indicators to latent variables. Different specifications of measurement models are tested via CFA as a special case of a structural equation model (SEM).

The second week comprises both the structural model and the measurement model. In this week topics include moderation and mediation, MIMIC models and multi-group comparisons.

On the last day we would like to discuss participant's presentation.

Week 1: CONFIRMATORY FACTOR ANALYSIS

Date: 02.07.2012. Overview of the whole course. Causality and empirical research, notation, the generalized latent variable model and different types of models, theory testing, use of the MPLUS manual, example from SEMNET and Course material. PRACTICAL SESSION: MPLUS and the logic of its use. Confirmatory Factor Analysis (CFA) with one measurement model. Preparation of **EXAMPLE 1:** (input file: NL2.dat). Tradition and Conformity value with four indicators. Computation and Interpretation of model 1. Model-Modification.

Essential Reading:	Brown chapter 3; Byrne 2012 chapters 1 and 2; Davidov/Schmidt 2007; Muthén & Muthén 2010 chapter 1,2.
Additional reading:	Davidov/Schmidt/Schwartz 2008; Marsh et. al. 2009.

Date: 03.07.2012. Foundation of CFA: Process of linear causal modelling, types of input, assumptions, Equality constraints, formalization, formative vs. reflective indicators, typology of models, Maximum Likelihood Estimation (ML).

PRACTICAL SESSION: Preparation of CFA **EXAMPLES 2a (parallel), 2b (tau-equivalent) and 2c (congeneric):** (input file: NL2.dat). Output interpretation and Comparison of models.

Essential Reading:	Brown Chapter 7, 238-265; Byrne 2012 chapters 3 and 4; Schmidt/Hermann 2011.
Additional Reading:	Muthén & Muthén 2010 chapter 4,5.

Date: 04.07.2012. Restrictions, Identification, Model Modifications, Global and Detailed Model Fit, Power Analysis, Simultaneous Confirmatory Factor Analysis (SCFA). Model Modification with J-Rule. PRACTICAL SESSION: Preparation of **EXAMPLES 3a and 3b:** (input File: NL2.dat). Simultaneous Confirmatory factor Analysis and its modification: Tradition/Conformity, Universalism and Attitude toward immigration. Examination of detailed and global model fit.

Essential Reading:	Brown chapters 3, 4 and 5; Byrne 2012 chapters 3 and 4; Davidov/Schmidt/Schwartz 2008.
Additional reading:	Davidov/Schmidt 2007; Marsh/Hau/Wen 2004; Muthén & Muthén 2010 chapter 4,5; Saris et. al. 2009; Saris/Knoppen 2009.

Date: 05.07.2012. Types of Errors, Reliability and Validity Estimates in Confirmatory Factor Analysis (CFA), Variance decomposition, MTMM Models, Multiple Group Confirmatory Factor Analysis (MG-CFA). Configural and metric invariance in cross cultural research.

PRACTICAL SESSION: MGSCFA. Preparation of **EXAMPLE 4:** (Benelux_noMissing.dat) Multiple group comparisons (MGCFA) due to BENELUX countries.

Essential Reading:	Brown chapter 7; Byrne 2012 chapter 7; Davidov et. al. 2008; Steinmetz et. al. 2009.
Additional Reading:	Chen 2007; Davidov/De Beuckelaer 2010; Muthén & Muthén 2010 chapter 5; Sijtsma 2009.

Date: 06.07.2012. SCFA with intercepts and latent means, higher order CFA, Multitrait-Multimethod model(MTMM) and its parametrization. Metric and scalar invariance in cross cultural research.

PRACTICAL SESSION: **EXAMPLE 5:** (Input Files: Benelux.dat) CFA with means: Subgroups Belgium, Netherlands, Luxemburg. Output interpretation.

Essential Reading:	Brown chapters 6, 7 and 8; Byrne 2012 chapters 5, 8 and 10; Muthén & Muthén 2010 chapter 5.
Additional reading:	Byrne/Stewart 2006; Davidov et. al. 20110; Steinmetz et. al. 2009; Zick et al. 2008.

Week 2: STRUCTURAL EQUATION MODELS

Date: 09.07.2012. Structural Equation Models (SEM) with latent variables and multiple indicators: Specification, identification and estimation. Causality and equivalent models. Typology of model testing. “The two step strategy“. Specification Search and Model Modification revisited. Theoretical exercise 6.

PRACTICAL SESSION: Preparation of a full SEM: Values and attitudes toward immigration. **EXAMPLE 6:** (Input File: NL2.dat). Output interpretation.

Essential Reading:	Byrne 2012 chapter 6 ;Davidov et. al. 2008b; Schmidt/Hermann 2011.
Additional Reading:	Anderson/Gerbing 1988; Muthén & Muthén 2010 chapter 5.

Date: 10.07.2012. Model testing and model modification. Detailed and global fit measures. Interpretation of parameters. Feedback models. Decomposition of effects. Bootstrapping for testing indirect and total causal effects. Mediation. Theoretical exercise 7. Discussion of examples 6.

PRACTICAL SESSION: SEM with decomposition of effects, feedback and mediation. Preparation of **EXAMPLES 7a, 7b and 7c:** (Input File: NL2.dat) Output interpretation.

Essential Reading:	Marsh et al.2004; Muthén & Muthén 2010 chapter 5; Muthen 2012 a.
Additional Reading:	Berry 1984; Graff/Schmidt 1982; Mc-Kinnon 2006; Saris et al.2009.

Date: 11.7.2012. Multiple group comparison and interaction effect, moderation. SEM with multiple groups and latent means: Model specification and estimation. MIMIC Models. Differential Item Bias. MIMIC Models with higher order factors, Latent Means and Intercepts. Theoretical exercise 8.

PRACTICAL SESSION: SEM, multiple groups without and with latent means and intercepts (BENELUX): Preparation of **EXAMPLES 8a, 8b and 8c:** (Input File: Benelux.dat, Benelux_noMissing.dat). MIMIC-Model Output interpretation.

Essential Reading:	Byrne 2012 chapter 9; Davidov et. al. 2008b.
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<u>Additional Reading:</u>	Muthén & Muthén 2010 chapter 5; Davidov et. al. 2011; Ganzeboom 2009; Yang-Wallentin et. al. 2006.
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Date: 12.7.2012. Autoregressive models, cross-lagged models, latent growth curves, missing values. Discussion of examples 8a and 8b.

PRACTICAL SESSION: MIMIC-model with the additional causal factors and FIMEL estimation: education, age and gender. Preparation of **EXAMPLE 9:** (Input File: NL2.dat). Output interpretation. **EXAMPLE 10 (optional):** (Input File:). Cross-lagged model: authoritarianism and anomia.

<u>Essential Reading:</u>	Byrne 2012 chapter 12; Muthén & Muthén 2010 chapter 6,11; Schlueter et. al. 2007.
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<u>Additional Reading:</u>	Duncan/Duncan/Stryker 2006; Finkel 1995; Schaefer/Graham 2002; Wagner et. al. 2011.
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Date: 13.7.2012. Presentation of the SEM models of the participants using datasets from their projects. 15 minutes Power Point Presentation, 5minutes discussion