6th GESIS Summer School in Survey Methodology
Cologne, August 2017

Syllabus for Short Course B: “Introduction to Data Analysis Using Mplus”

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Date: August 3-4, 2017
Time: 09:00-13:00, 14:00-16:00
Course starts Thursday morning at 09:00

About the Instructors:
Matthias Blümke is a senior researcher at the GESIS – Leibniz-Institute for the Social Sciences, and enrolled in a study program of medical biometry/statistics. He studied psychology at the Universities of Trier and Heidelberg, and earned his doctoral degree in 2006. In his research and service at GESIS, he is concerned with the validation of items and construction of questionnaires for social surveys. His research interests include methodological challenges such as between-group equivalence of measurement models, as well as substantive research questions with regard to basic human traits, values, and cognition including psychological resources, and behavior-in-context.

Daniel Danner is a senior survey methodologist, researcher, and head of the team “Scale Development and Documentation” at GESIS – Leibniz-Institute for the Social Sciences. He studied psychology and economics at the University of Heidelberg (2003-2008). He earned his doctoral degree with a thesis on “Cognitive Ability beyond IQ” (2011). After working for a strategic management consultancy, he joined GESIS in 2012. His research interests include measurement quality, response styles, and the relationship between cognitive and non-cognitive skills.

Clemens Lechner is a senior researcher in the Department of Survey Design and Methodology at GESIS – Leibniz-Institute for the Social Sciences. He studied Developmental Psychology and Sociology in Jena and Warsaw (2005-2011), and he earned his doctoral degree at Jena in 2014. He was a postdoctoral fellow in the international “Pathways to Adulthood” program, working at the Center for Applied Developmental Science in Jena. His research interests concern the interplay of personality and contexts – from macro to micro – in shaping human development across the lifespan. He currently focuses on the effects of educational contexts on personality development and is concerned with methodological challenges in the assessment of self-reported personality.

Selected Publications:
Short Course Description:
This short course introduces the statistical software Mplus. Mplus is one of the most widely used software packages for analysing latent variable models. The main objective of this course is to understand the basic features of Mplus, its syntax, and the appropriate work flow. Participants will learn how to prepare and load their data, become familiar with the structure of Mplus input and output files, and learn how to write Mplus syntax of simple and more complex latent variable models. Rather than introducing specific statistical models, the course will focus on the more general task of handling the Mplus software and equip participants with the skills needed to implement their own statistical models. The participants are expected to be familiar with the general idea of statistical analysis and basic regression models. Basic knowledge about factor analysis is helpful. Aspects such as specifying models, choosing appropriate estimation methods, and handling missing data will be covered.

Keywords:
Mplus, statistical software, structural equation modelling

Course Prerequisites:
- No previous knowledge of Mplus is assumed.

Target Group:
Participants will find the course useful if:
- they want to apply latent variable or structural equation modelling
- they are interested in extending their technical skills and are curious about a powerful statistical software
- they attend one or more of the following courses at the GESIS Summer School
  - Course 2: Introduction to Structural Equation Modeling
  - Course 6: Structural Equation Modeling for Longitudinal and Panel Data
  - Course 7: Assessing Measurement Quality

Course and Learning Objectives:
By the end of the course participants will:
- know how to prepare data for Mplus analysis
- be able to understand and write Mplus syntax for basic and more advanced (latent variable) models
- be able to interpret Mplus output

Organizational Structure of the Course:
This short course consists of about 6 hours of instruction per day. The course work is split into lectures and exercises. Special attention is given to the hands-on training. The instructors will be available for individual consultation during the exercises and after the lecture.

Software and Hardware Requirements:
None. GESIS will provide participants with access to soft- and hardware.
Long Course Description:
This course teaches you how to use the statistical software Mplus. Mplus is a syntax based software that allows estimating latent variable models such as basic confirmatory factor analyses or more complex multi-group structural equation models. We start with a broad overview of the general syntax elements. We devote some time to the appropriate work flow of preparing your data and transferring them into an Mplus-compatible file format, and we discuss typical obstacles. The second day is reserved for more advanced models such as longitudinal models, models with multi-group comparison, and constrained models with freed or fixed parameters or correlated errors. Furthermore, we will work with the Mplus-Diagrammer. This short course is an applied course on the software and you are more than welcome to bring your own data and research questions along. Please let us know in advance by emailing your questions and problems, so we might cover them in class. This course will not go into detail about the respective methods and their specifics, but rather emphasize how to use Mplus software properly.

Day-to-day Schedule and Literature:

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<thead>
<tr>
<th>Day</th>
<th>Topic(s)</th>
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<tbody>
<tr>
<td>1</td>
<td>The Mplus syntax</td>
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<td>Preparing your data and creating Mplus readable files</td>
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<td></td>
<td>Basic commands</td>
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<td>Read and interpret your output</td>
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<td><strong>Suggested reading (suggested, yet do not have to be read before the session):</strong></td>
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<tr>
<td></td>
<td>Muthén &amp; Muthén (1998–2012): Chapter 1, 2, 5</td>
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<td>Christ &amp; Schlüter, 2011: 1-30</td>
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<td></td>
<td>Geiser (2011): Chapter 1, 2</td>
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<td>2</td>
<td>Latent variable models</td>
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<td>Multi-group comparison</td>
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<td>Advanced latent variable modelling with model constraints</td>
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<td></td>
<td>Mplus-Diagrammer</td>
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<tr>
<td></td>
<td><strong>Suggested reading:</strong></td>
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Preparatory Reading:

For participants who understand German:

Additional Recommended Literature:

For participants who understand German: