OUTLINE FOR THE POST-CONFERENCE WORKSHOP "ADVANCES IN LATENT VARIABLE MODELING USING MPLUS VERSION 7", May 23, 2013 AT THE M3 UCONN CONFERENCE

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The use of latent variables is a common theme in many statistical analyses. Continuous latent variables appear not only as factors measured with errors in factor analysis, item response theory, and structural equation modeling, but also appear in the form of random effects in growth modeling, components of variation in complex survey data analysis and multilevel modeling, frailties and liabilities in survival and genetic analyses, latent response variables with missing data, priors in Bayesian analysis, and as counterfactuals and potential outcomes in causal analysis. In addition, categorical latent variables appear as latent classes in finite mixture analysis and latent transition analysis (Hidden Markov modeling), latent trajectory classes in growth mixture modeling, and latent response variables with missing data on categorical variables. All these features are covered by the general latent variable modeling framework of Mplus.

Understanding the unifying theme of latent variable modeling provides a way to break down barriers between seemingly disparate types of analyses. Researchers need to be able to move freely between analysis types to more easily answer their research questions. To provide answers to the often complex substantive questions, it is fruitful to use latent variable techniques to combine different analysis types. Mplus is unique in its ability to accomplish such combinations. This one-day workshop discusses new types of latent variable analyses added to Mplus Version 7 and 7.1.

1 The Mplus Diagrammer
   - Path diagram as input
   - Path diagram as output
   - Path diagram without analysis or data
2 Mediation Analysis
   - Plotting Moderated Mediation using the LOOP Option
   - Causal Effects
3 Factor Analysis
   - Bi-Factor Analysis (EFA, CFA)
   - Bayesian Factor Analysis
   - Why Bayes?
   - Bayesian EFA
   - Bayesian Factor Scores
   - Bayesian CFA (BSEM)
4 Analysis of Several Groups and Clusters (Muthen's keynote address provides intro to this topic)
   - Multiple-group ESEM
   - Multiple-Group BSEM
   - Multiple-Group Alignment Optimization Based on Configural Modeling
   - Two-Level Analysis with Random Item Parameters

5 Longitudinal Analysis
    - Individual Differences Factor Analysis
    - Cross-Classified Longitudinal Analysis
6 Mixture Modeling
    - Zero-Effect Class CACE Modeling
    - 3-Step Mixture Modeling
    - Latent Transition Analysis Developments
7 Multilevel Modeling
    - Within-Cluster Multiple-Group Modeling
    - Advantages of Bayesian Multilevel Analysis
    - Meta Analysis
    - 3-Level Analysis
    - Types of Observed Variables and Random Slopes for 3-Level Analysis
    - Cross-Classified Analysis
    - 3-Level and Cross-Classified Multiple Imputation
    - Applications to Item Response Theory Modeling
8 Using Mplus within R (presented together with Michael Hallquist and Joshua Wiley)
    - Running Mplus from R
    - Reporting Mplus results in R
    - Using the R package MplusAutomation for large Monte Carlo studies

Good Mplus background training for this post-conference workshop is provided by the Kris Preacher pre-conference workshop at the same meeting, May 20, 2013: Multilevel SEM with Complex Applications (for an outline, see the home page of Mplus at www.statmodel.com). See also the videos and handouts for the Topics 1 – 9 Short Courses on the Mplus website www.statmodel.com.