SimSEM-in-R: Simulating Structural Equation Models Using `lavaan` and `simsem`
(half-day course)

Terrence D. Jorgensen
University of Amsterdam
T.D.Jorgensen@uva.nl

Instructor bio

Terrence D. Jorgensen, PhD, has taught structural equation modeling (SEM) for 8 years as an assistant professor of methods and statistics within the Department of Child Development and Education at the University of Amsterdam. His areas of expertise primarily involve SEM, multilevel modeling, nonparametric methods, Bayesian inference, and modern missing data methods. His current research involves integrating the social relations model (SRM) with SEM, in order to facilitate testing complex theories of interpersonal process using data with a social-network structure. He maintains the R packages `semTools` and `simsem`, and contributes to the `lavaan` and `blavaan` packages.

Description

Structural equation modeling (SEM) is a very general statistical technique widely used technique in social and behavioral sciences. The frequency properties of popular SEMs are often the focus of empirical investigations using simulated data, and new SEMs are often presented with a cursory Monte Carlo simulation study to verify their practical applicability.

This course explains how to conduct Monte Carlo simulations in R. Beginning with fundamental data generation from a population model that fits within the SEM framework, special attention is paid to functions provided by `lavaan` to facilitate simulation, and to the `simsem` package that includes many special features for generating complex data (e.g., fixed exogenous covariates, missing data mechanisms, random parameters) and analyzing simulation results. The `simsem` package can utilize both `lavaan` and `OpenMx` for data generation or analysis, as well as custom functions provided by the user (e.g., using M*plus* via the `MplusAutomation` package).

R syntax is provided for all path-model examples. Syntax for additional topics will be made available, including factor models, generating discrete data, and multilevel SEM. Many topics that involve the `simsem` package are included among the vignettes available at http://simsem.org/

Intended Audience

Researchers and graduate students who conduct simulation studies involving SEM. Basic familiarity with SEM and some experience with R will be assumed.

Software Requirements

All instruction and example syntax will utilize the R software. Attendees with laptops can participate more interactively. Add-on packages can be installed from CRAN using the R syntax: `install.packages(c("lavaan","simsem"))`