IQB
Forschungsdatenzentrum

Introduction to SEM in R

FDZ Herbstakademie / Autumn Academy 2025

- Dozierende*r / Lecturer: Dr. Daniel Schulze (Charité Berlin)
- Termin / Date and Time: Montag/Monday, 15.09.2025, 9:00 – 17:00 h

Abstract

Structural Equation Models (SEMs) offer a wide range of applications. They are not only employed for causal inference but also allow for the simultaneous analysis of multiple dependent variables as well as the incorporation of latent (i.e., not directly observable) constructs.

Latent variables can be validated within the SEM framework through factor analysis (or item response models), making measurement modeling an important subdomain alongside the overarching structural model. For group comparisons or regressions at the structural level, the issue of measurement invariance is therefore of particular importance.

In addition to a theoretical introduction, this workshop aims to convey basic skills in the practical application of SEMs. In hands-on exercises using R, real-world datasets from educational research, psychology, and medicine will be used to specify models, evaluate model fit, and illustrate how to report results.

Inhalte / Contents

- Applications of SEM: Causal inference, multiple dependent variables, latent constructs
- Model specification: SEM as a system of regression equations
- Model fit: Hypothesis testing vs. data description
- Measurement models: Classical test theory and item response theory as SEMs
- Model assumptions: Normality, categorical variables, sample size
- Practical exercises in R with contemporary datasets: Model specification, model fit, result presentation

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KULTUSMINISTER KONFERENZ

Voraussetzungen / Previous knowledge required

Basic knowledge of R.

Literatur / Literature

Bühner, M. (2021). *Einführung in die Test- und Fragebogenkonstruktion* (5. Aufl.). Pearson Deutschland.

Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). Guilford Publications.

Software / Software requirements

R. Packages: lavaan, tidySEM