

Structural Equation Modeling for Longitudinal Data

7-8 September 2026

University of Geneva, UniMail Building, Room M2020

Description

The workshop discusses first the basics of structural equation modelling (SEM) and its applications within the R environment (packages used include psych, lavaan, semPlot). Then, we discuss SEM for two-occasion data (e.g., pretest-posttest; wave 1-wave 2). Finally, we conclude with multiple-wave data typical of panel studies (i.e., fewer than 10 waves).

Each theme is illustrated via empirical examples in R. Participants are thus asked to install the R environment with the mentioned packages before the workshop.

Previous knowledge of multiple linear regression analysis is needed. Knowledge of multivariate methods is helpful but not necessary.

Instructor

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Monday, September 7, 2026

- **9:00 – 10:30 Lecture: Basics of SEM**

10:30 – 11:00 Coffee break

- **11:00 – 12:30 Examples: simple linear regression, exploratory factor analysis, confirmatory factor analysis (1.intro.lavaan.R)**

12:30 – 13:30 Lunch break

- **13:30 – 15:30 Practical exercises: cross-sectional confirmatory factor analysis (on exercise or own data – 2.exercise.lavaan.R and 2.exercise.lavaan.corr.R)**

READINGS (one or two articles to read before the module):

Hoyle, R. H. (1995). The structural equation modeling approach: Basic concepts and fundamental issues. In R. H. Hoyle (Ed.), *Structural equation modeling* (pp. 1–15). Sage Publications.

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1–36.

Additional articles:

Flora, D. B., LaBrish, C., & Chalmers, R. P. (2012). Old and new ideas for data screening and assumption testing for exploratory and confirmatory factor analysis. *Frontiers in Quantitative Psychology and Measurement*, 3, 55.

<https://doi.org/10.3389/fpsyg.2012.00055>

Bollen, K. A. (1989). *Structural equations with latent variables*. John Wiley and Sons.

<https://doi.org/10.1002/9781118619179>

Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, 11, 320–341.

Tuesday, September 8, 2026

- **9:00 – 10:30 Lecture: SEM for 2 and more waves of assessment**

10:30 – 11:00 Coffee break

- **11:00 – 12:30 Examples: Latent Change Score Model and Latent Curve Model (3 . long . SEM . R)**

12:30 – 13:30 Lunch break

- **13:30 – 15:30 Practical exercises: Try models discussed on own data?**

READINGS (one or two articles to read before the module):

McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology*, 60, 577–605.

<https://doi.org/10.1146/annurev.psych.60.110707.163612>

Additional articles:

Ghisletta, P., & Mason, F. (2025). Latent vs. Manifest Variable Analyses to Test Group Differences in a Two-Group Randomized Pretest-Posttest Design. *Structural Equation Modeling: A Multidisciplinary Journal*, 32(6), 986–999.

<https://doi.org/10.1080/10705511.2025.2519198>

Ghisletta, P., Mason, F., von Oertzen, T., Hertzog, C., Nilsson, L.-G., & Lindenberger, U. (2020). On the use of growth models to study normal cognitive aging. *International Journal of Behavioral Development: Methods and Measures*, 44(1), 88–96.

<https://doi.org/10.1177/0165025419851576>