Course Syllabus
Psychology 9555A. Structural Equation Modeling (Fall 2017)

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time and location: Tuesdays 9:00-12:00 (starting Sep 12) Rm SSC 8438/40

Course Description

My aim in this course is to help you develop a solid conceptual and theoretical understanding and ability to use SEM and its extensions correctly and effectively in your own independent research. Although no prior experience with SEM is required, experience in multiple linear regression, factor analysis, and psychometric principles of reliability and construct validity is required. The course topics include the foundational concepts of the measurement and structural models, confirmatory factor analysis (CFA), traditional path analysis, and basic principles of model building including specification, identification, estimation, hypothesis testing, and modification. Topics also include applications and extensions of SEM such as scale construction and validation, mediation and moderation, multi-group analyses, item response theory, measurement invariance and bias, latent growth modeling and mixture modeling. Students will have the opportunity to work on projects tailored to their research interests and needs. Mplus is the software package used for demonstration in the course, but students are free to use other programs such as R or EQS. Prerequisite: must have taken Psychology 9540 (Research Design) or obtained the permission of the instructor.

Evaluation

60%: Six lab assignments. Six assignments will be distributed throughout the course to help you gain hands-on experience with SEM analysis. These assignments will consist of running analyses, interpreting results, and writing short (one to two page) reports.

40%: Individual project. You will be required to conduct analyses for an individual project. This project will be divided into two parts: (1) an evaluation of the measurement model (similar to a confirmatory factor analysis) and an evaluation of the complete model including measurement and structural components. For the complete SEM model you will be required to include one of the following: (1) a mediation analysis (2) a moderation (interaction) analysis, (3) a multi-group analysis, (4) a longitudinal analysis, or (5) another SEM application approved by the instructor. You will need to use a real (or simulated) data set, develop hypotheses/research questions, conduct the SEM and related analyses, interpret the results and write a report of the results and your interpretations and conclusions. You will have the choice between:

1. using a large data set that I can provide
2. providing one yourself (approved by the instructor)
3. creating a simulation data set as part of a research proposal (I will explain this option).
Note that you will need to have your topic no later than Oct 10. You will need to provide a brief report of the first part (the measurement/confirmatory analysis component) by Nov 7th (worth 20%) and the complete research report (written as an APA research article but with greater emphasis on the Results and Discussion sections) with syntax and output in an Appendix by Dec 12 (one week after the last class) (worth another 20%).

Late work. Please inform me ahead of time if you anticipate not meeting a deadline for a legitimate reason. Otherwise, there is a 5% deduction per day for a late assignment (including the project).

Readings

Listed below are two textbooks and a series of key articles that I use in the lectures. Rather than make any of these mandatory, I leave it up to you to purchase one of these textbooks if you find them useful. Some of my past students have found the Kline textbook challenging, but it is considered one of the best accessible and comprehensive textbook on SEM. I am also listing the book by Kelloway (2015) as an alternative (see references below) which is less comprehensive but simpler and focuses on Mplus, which we will use extensively in the course. I will list several key articles on each lecture topic. These are articles that I incorporate and reference in my lectures and that are good supplementary resources for those who want a deeper understanding of particular procedures in SEM.


Schedule, Topics, and Reading References

**Sep 12. Introduction and overview**

Kline (ch 1, 2)

Kelloway (ch 1)


**Sep 19. Building blocks: Multiple regression and factor analysis**

Kline (ch 3, 4)


**Sep 26. Steps in SEM**

Kline (skim to get the big picture of the entire SEM process; ch 6, 7, 8, 9, 10, 11, 12)

Kelloway (ch 2, 3)

**Oct 3. Introduction to CFA**

Kline (ch 13)

Kelloway (ch 5)


**Oct 10. CFA: Measurement and test construction**

Kline (ch 13)


**Oct 17. CFA: Extensions (Invariance, Means)**

Kline (ch 15 pp 369-374, ch 16)


**Oct 24. Intro to the full SEM model**

Kline (ch 14, 18)

Kelloway (ch 6, 7)

**Oct 31. Mediation in SEM**

Kline (ch 14, 18)


**Nov 7. Moderation in SEM**

Kline (ch 17 pp 424-437; skip Kenny-Judd)


**Nov 14. Latent growth/curve modeling**

Kline (ch 15 pp 374-392)

Kelloway (ch 8)


**Nov 21. Multilevel SEM**

Kline (ch 17 pp 444-450)

Kelloway (ch 9)


**Nov 28. Monte Carlo simulation of power**

Mplus manual ch 12 (Monte Carlo Simulation Studies)


**Dec 5. Mixture modeling**


Additional Resources


Manuals/guides are also available for other programs such as AMOS, EQS, or R. See me for further details.

N2Mplus. This is an application that is extremely useful for converting SPSS and EXCEL data files into the data format for Mplus. The download is available at: [http://www.danielsoper.com/n2mplus/](http://www.danielsoper.com/n2mplus/)