Psychology 9555A. Structural Equation Modeling (Fall 2018)
COURSE OUTLINE 2018-19

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Lectures: Tuesdays 9:00-12:00 (starting Sep 11) Rm SSC 8438/40

I. 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.

II. COURSE READINGS

Textbook:

Key articles (see lecture schedule) will also be used. These will be available in the course OWL site.
III. METHOD OF 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 9. You will need to provide a brief report of the first part (the measurement/confirmatory analysis component) by Nov 6th (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 11 (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).

IV. STATEMENT OF ACADEMIC OFFENCES

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).
V. LECTURE SCHEDULE

**Sep 11. Introduction and overview**

Brown (ch 1). Introduction


**Sep 18. Building blocks: Multiple regression and factor analysis**

Brown (ch 2). The common factor model and exploratory factor analysis model.


Supplementary resources


**Sep 25. Introduction to CFA – part I**

Brown (ch. 3). Introduction to CFA

**Oct 2. Introduction to CFA – part II**

Brown (ch. 4). Specification and interpretation of CFA models

**Oct 9. CFA: Measurement and test construction**

Brown (ch 5). Model revision and comparison
Brown (ch 6.) CFA of multitrait-multimethod matrices (skim)

Supplementary resources


**Oct 16. CFA: Extensions I: Invariance, Means**

Brown (ch. 7). CFA with equality constraints, multiple groups, and mean structures


**Oct 23. CFA Extensions II: Higher-order models, bi-factor models, formative measurement, and categorical Data**

Brown (ch. 8). Other types of CFA models
Brown (ch. 9). Data issues in CFA: Missing, non-normal, and categorical data

Supplementary resources


**Oct 30. SEM Models: Mediation**


**Nov 6. SEM Models including interactions (moderation)**


**Nov 13. Latent growth/curve modeling**


**Nov 20. Multilevel CFA and SEM**


**Nov 27. Monte Carlo simulation of power**

Brown (ch. 10). Statistical power and sample size (focus on Monte Carlo section)

Mplus manual ch. 12 (Monte Carlo Simulation Studies)

Dec 4. Mixture modeling: Latent Class/Profile Analysis and Growth 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/)