



EDUC867– ADVANCED STRUCTURAL EQUATION MODELING
Spring – 2019

Time: Thursdays 1:30pm-4:30pm

<i>Professor:</i> Dr. Zachary Collier <i>Office:</i> Willard Hall 221 <i>Email:</i> collierz@udel.edu	<i>Office Hours:</i> By appointment
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Class webpage:

The class webpage contains the syllabus, readings, grades, datasets, and class handouts

Prerequisites: EDUC 812: Regression and Structural Equation Modeling

Course Description: This course addresses structural equation models that are typically not covered in an introduction to structural equation modeling class, as well as methods of methodological research about structural equation modeling.

Objectives: To familiarize students with the equations, estimation, assumptions and applications of advanced structural equation models; To familiarize students with the methodology of research about structural equation models.

Outcomes: Students completing the course will be able to use advanced structural equation models to analyze data, understand methodological research about structural equation models, and plan and execute methodological studies about structural equation models.

Method of instruction: This advanced course will be delivered with a combination of lectures, student discussion, student presentations, and computer-related activities. It is expected that students read the assigned articles in advance of each meeting and are prepared to discuss the readings.



Topics

Monte Carlo studies in SEM

Power analysis in SEM

Advanced topics in model fit assessment

SEM with complex survey data

Multilevel SEM

Latent transition analysis

Factor mixture models

Growth mixture models

Advanced latent growth models

Latent interactions and quadratic terms in SEM

Course Requirements

Homework Exercises: You will receive three data analysis problems, one for each of the first three topics. The homework exercises can be completed individually or with a partner. **The first exercise is due by 5pm on the date of the third class meeting. The second exercise is due by 5pm on the date of the sixth class meeting. The third exercise is due by 5pm on the date of the ninth class meeting.**

Prerequisites

Literature review and presentation: Each student will make a presentation related to a structural equation model. The presentation consists of a literature review of five methodological articles published between 2013 and 2019. The presentation should provide the contribution of each paper, how the papers connect with previous research and with each other, a critical review of the limitation of each paper, and a description of unanswered research questions in the field addressed by the papers. The presenter should prepare a PowerPoint presentation. Each presenter will have 30 minutes to deliver the presentation, which will be followed by discussion. The presenter should post the text of the literature review to the classmates one day in advance of the presentation, and provide printed handouts of the PowerPoint slides at the day of the presentation.

Research Project: The students will submit a final individual paper, which will take the format of a conference submission for the Annual Meeting of the American Educational Research Association (AERA). There are two types of paper: Methodological and applied. EMS students are required to complete the methodological paper. The methodological paper does not need to contain results, but preliminary results would strengthen the paper. The applied paper should contain at least preliminary results. For the methodological paper, possible goals are to use theoretical analysis and simulations to compare different statistical methods, evaluate the robustness of a statistical method to violations of assumptions, and evaluate the performance of a statistical method in conditions commonly encountered in applied research. For the applied paper, design, conduct, and report an application of one statistical method discussed in class. The applied paper has to be an original analysis of a dataset and cannot be a replication of an analysis previously published or presented at a conference. The paper should follow the style described in the Publication Manual of the American Psychological Association (APA), or a style specific to the student's field. If you are a non-EMS student, then by Monday, April 8, 2019, you are encouraged to submit results showing that your measurement model fits adequately. **All students are required to provide an abstract of their final project by Friday, March 22, 2019, for feedback by the instructor and the classmates. The final project is due on the last day of class.**

*Please note that using structural equation modeling methods is unlike using other statistical methods. There is no guarantee that the model you propose will fit the data. In fact, there is no guarantee that the estimation procedure will converge for the model you propose. You may have to make changes to the model and this may take substantial time and effort on your part. Do not leave the data analysis to the last few days before the paper is due.

I will evaluate the paper by using criteria typically used to judge papers submitted for publication.

1. Is there a good rationale for the research? (Fitting models for no apparent purpose will count against the paper as will failure to fit models that are needed to answer the research questions).
2. Is the data collection clearly and adequately described?
3. Are the models appropriate models in light of the research questions?
4. Are the results presented clearly and in appropriate detail?
5. Are the results interpreted correctly?
6. Are the conclusions clearly justified by the results?

Here are two references that may be helpful in writing your paper:

Hoyle, R.H. & Panter, A.T. (1995). Writing about structural equation models. In R.H. Hoyle (Ed.), *Structural equation modeling. Conceptions, issues and application*, (pp. 158-177). London: Sage Publications.



Boomsma, A. (2000). Reporting analyses of covariance structures. *Structural Equation Modeling*, 7(3), 461-483.

Course Grades

All work will be scored by using the following 23-point scale:

<i>Grade</i>	<i>Interval</i>
A	21-22
A-	19-20
B+	17-18
B	15-16
B-	13-14
C+	11-12
C	9-10
C-	7-8
D+	5-6
D	3-4
D-	1-2
F	0

An overall data analysis score will be obtained by averaging the individual homework exercise scores. A total score will be obtained by averaging the overall data analysis score, the literature review and presentation score, and the score on your paper. Unless a computational error has been made, grades will not be changed after the end of the semester.

Class Attendance

Attendance will not be checked or graded, but you are responsible for the content of all classes, including issues raised in the spontaneous class discussions. If you must miss a class, please request notes from your classmates. As a matter of mutual courtesy, please let the instructor know when you're going to be late, when you're going to miss class, or if you need to leave early.

Extensions on deadlines for assignments

Assignments not turned in by will suffer a penalty of 5% per day late. Students who have personal circumstances preventing the completion of an assignment by the deadline, such as conference presentations, athletic competitions, religious holidays, and illness, should explain these circumstances to the course instructor prior to the assignment's due date, or as soon as possible thereafter. Extensions of deadlines to turn in assignments may be achieved in private consultation with the instructor.



Academic Integrity

Please familiarize yourself with UD policies regarding academic dishonesty. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment, to re-submit the same assignment for different classes, or to allow or assist another to commit these acts corrupts the educational process. Students are expected to do their own work and neither give nor receive unauthorized assistance. Complete details of the university's academic integrity policies and procedures can be found at <http://www1.udel.edu/studentconduct/policyref.html> Office of Student Conduct, 218 Hullihen Hall, (302) 831-2117. E-mail: student-conduct@udel.edu

Harassment and Discrimination

The University of Delaware works to promote an academic and work environment that is free from all forms of discrimination, including harassment. As a member of the community, your rights, resource and responsibilities are reflected in the non-discrimination and sexual misconduct policies. Please familiarize yourself with these policies at www.udel.edu/oei . You can report any concerns to the University's Office of Equity & Inclusion, at 305 Hullihen Hall, (302) 831-8063 or you can report anonymously through UD Police (302) 831-2222 or the EthicsPoint Compliance Hotline at www1.udel.edu/compliance. You can also report any violation of UD policy on harassment, discrimination, or abuse of any person at this site:

sites.udel.edu/sexualmisconduct/how-to-report/

Faculty Statement on Disclosures of Instances of Sexual Misconduct

If, at any time during this course, I happen to be made aware that a student may have been the victim of sexual misconduct (including sexual harassment, sexual violence, domestic/dating violence, or stalking), I am obligated to inform the university's Title IX Coordinator. The university needs to know information about such incidents in order to offer resources to victims and to ensure a safe campus environment for everyone. The Title IX Coordinator will decide if the incident should be examined further. If such a situation is disclosed to me in class, in a paper assignment, or in office hours, I promise to protect your privacy--I will not disclose the incident to anyone but the Title IX Coordinator. For more information on Sexual Misconduct policies, where to get help, and how to reporting information, please refer to www.udel.edu/sexualmisconduct. At UD, we provide 24-hour crisis assistance and victim advocacy and counseling. Contact 302-831-1001, UD Helpline 24/7/365, to get in touch with a sexual offense support advocate.

For information on various places you can turn for help, more information on Sexual Misconduct policies, where to get help, and reporting information please refer to www.udel.edu/sexualmisconduct

Inclusion of Diverse Learning Needs

Any student who thinks he/she may need an accommodation based on a disability should contact the Office of Disability Support Services (DSS) office as soon as possible. The DSS office is located at 240 Academy Street, Alison Hall Suite 130, Phone: 302-831-4643, fax: 302-831-3261, DSS website (www.udel.edu/DSS/). You may contact DSS at dssoffice@udel.edu



Non-Discrimination

The University of Delaware does not discriminate against any person on the basis of race, color, national origin, sex, gender identity or expression, sexual orientation, genetic information, marital status, disability, religion, age, veteran status or any other characteristic protected by applicable law in its employment, educational programs and activities, admissions policies, and scholarship and loan programs as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware also prohibits unlawful harassment including sexual harassment and sexual violence.

For inquiries or complaints related to non-discrimination policies, please contact: Director, Institutional Equity & Title IX Coordinator- Susan L. Groff, Ed.D. groff@udel.edu, 305 Hullihen Hall Newark, DE 19716 (302) 831-8063

For complaints related to Section 504 of the Rehabilitation Act of 1973 and/or the Americans with Disabilities Act, please contact: Director, Office of Disability Support Services, Anne L. Jannarone, M.Ed., Ed.S. - ajannaro@udel.edu Alison Hall, Suite 130, Newark, DE 19716 (302) 831-4643 OR contact the U.S. Department of Education - Office for Civil Rights (wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm)