PSY 6600: Structrual Equation Modeling

Cort W. Rudolph, Ph.D.

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E-mail: cort.rudolph@health.slu.edu
Office Hours: Tu,Th 10:45 a.m. - 12:45 p.m.
Office: 2827 Morrissey Hall

Web: github.com/PSY6600
Class Hours: Tu,Th 12:45 p.m. - 2:00 p.m.
Class Room: 2714 Morrissey Hall

Required Texts

[1] R.B. Kline. *Principles and practice of structural equation modeling, 4th Ed.* New York, NY: Guilford Publications, 2016.

Required Software (Open Source)

[1] R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. Vienna, Austria, 2018. http://www.r-project.org.

[2] RStudio Team. *RStudio: Integrated Development Environment for R*. RStudio, Inc. Boston, MA, 2018. http://www.rstudio.com/.

Dropbox

This course will use the file sharing software `Dropbox`. A free account can be set up by visiting www.dropbox.com. I also strongly suggest you download the desktop client for `Dropbox`, which will enable you to easily work with shared files from your personal computer.

Course Description

This course will provide an overview of structural equation modeling (SEM).

More specifically, the course will:

1. Provide foundational knowledge of SEM and related techniques commonly used in behavioral science research.
2. Promote the understanding and critical evaluation of SEM through the use of computer applications, interpretation of outputs, and discussion of published research.
3. Provide students with opportunities to explore the application of SEM within their area of research interest.

Course Format

The course format will include lectures, group discussions, and active learning. Lectures will cover technical details on analytic approaches, assumptions and appropriateness of tests, and interpretation of results. Group discussions will focus on application and interpretation of specific statistical tests. Active learning exercises will involve programming using R, interpretation of output, and presentation of results.

Course Goals:

In addition to the general learning objectives outlined above, this course will address the following goals:

1. Scholarship and Knowledge: The knowledge gained in the course will allow students to better appreciate and critically evaluate the use of SEM in their own work and the work of others.
2. Intellectual Inquiry and Communication: Students will have opportunities to engage in conversations about the strengths, weaknesses, and applications of various statistical approaches through class discussions.
3. Community Building: Students will work in teams on common in-class projects. By working in student teams, students will appreciate multiple perspectives on research design and approaches to data analysis.
4. Leadership and Service: Students will demonstrate leadership through in-class discussions and group activities. Indirect appreciation for service will be demonstrated through a community-focused group project.
5. Ethics & Values: Students have opportunities to reflect on the intersection between their personal values and professional codes of conduct through discussion and coursework.

Course Requirements:

Attendance & Participation:

Attendance is required and expected.

Midterm and Final Presentations

There will be a midterm and a final presentation, both of which will be comprised of short talks that you will give to the class:

- The midterm presentation will require you to find and critique a published paper that uses SEM. The critique should include attempts to replicate the models presented in the paper.
- The final evaluation will require you to provide a short teaching demonstration of an SEM-related technique in `R` that we have not covered in class. The demonstration should provide example data and an accompanying markdown file.

More details about these evaluations will be made available as the semster unfolds.

SEM Project

Final Grading Breakdown

The following percentage weights and ranges will be used for the calculation of final grades:

- Attendance & Participation 33%
- Midterm Presentation 33%
- Final Presentation 33%

Grade	Percentage
A	93-100%
A-	90-92.9%
B+	87-89.9%
B	83-86.9%
B-	80-82.9%
C+	77-79.9%
C	73-76.9%
C-	70-72.9%
D	60-69.9%
F	0-59.9%

Syllabus Revisions

Other readings or activities may be assigned or substituted throughout the semester. Scheduling may be rearranged to accommodate guest lecturers or other events that may occur. Any changes made will be done as far in advance as possible to allow students the time necessary to prepare for class. The instructor reserves the right to make changes and/or additions to course policies as deemed appropriate.

University Policies

Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX coordinator, Anna R. Kratky (DuBourg Hall, Room 36; akratky@slu.edu; 314-977-3886) and share the basic facts of your experience with her. The Title IX coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK. To view SLU's sexual misconduct policy and for resources, please visit the following web addresses: www.slu.edu/here4you and https://www.slu.edu/general-counsel.

Disability Services

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course.

Please contact Disability Services, located within the Student Success Center, at Disability_services@slu.edu or 314.977.3484 to schedule an appointment. Confidentiality will be observed in all inquiries. Once approved, information about the student's eligibility for academic accommodations will be shared with course instructors via email from Disability Services and viewed within Banner via the instructor's course roster.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact to Disability Services.

Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy was adopted in Spring 2015, and can be accessed at: https://www.slu.edu/provost/policies/academic-and-course/policy_academic-integrity_6-26-2015.pdf.

Additionally, each SLU College, School, and Center has adopted its own academic integrity policies, available on their respective websites. All SLU students are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions, and appeals. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the Dean/Director of the College, School or Center in which your program is housed.

Student Success Center

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. The Student Success Center assists students with academic-related services and is located in the Busch Student Center (Suite, 331). Students can visit https://www.slu.edu/life-at-slu/student-success-center/ to learn more about tutoring services, university writing services, disability services, and academic coaching.

University Writing Services

Students are encouraged to take advantage of University Writing Services in the Student Success Center; getting feedback benefits writers at all skill levels. Trained writing consultants can help

with writing projects, multimedia projects, and oral presentations. University Writing Services offers one-on-one consultations that address everything from brainstorming and developing ideas to crafting strong sentences and documenting sources. For more information, visit https://www.slu.edu/life-at-slu/student-success-center/ or call the Student Success Center at 314-977-3484.

Basic Needs Security

Students in personal or academic distress and/or who may be specifically experiencing challenges such as securing food or difficulty navigating campus resources, and who believe this may affect their performance in the course, are encouraged to contact the Dean of Students Office (deanofstudents@slu.edu or 314-977-9378) for support. Furthermore, please notify the instructor if you are comfortable in doing so, as this will enable them to assist you with finding the resources you may need.

Class Schedule

Note: Class schedule for planning purposes only; subject to change.

Week 01, 08/26 - 08/30 Introduction to SEM

- Course Introduction; Parameters; Model matrices; Latent variables
- Kline ch. 1

Week 02, 09/02 - 09/06 Review of GLM

- **No class Thursday, NAS Meeting**
- Introduction to `lavaan`, Review of GLM
- Kline chs. 2 & 3

Week 03, 09/09 - 09/13 Path analysis I

- Tracing rules
- Kline chs. 6 & 7

Week 04, 09/16 - 09/20 Path analysis II

- Mediation; Endogeneity
- Kline chs. 6 & 7

Week 05, 09/23 - 09/27 Measurement models I

- CFA; Model identification, Scaling latent variables, Model fit
- Kline chs. 9, 11, & 12

Week 06, 09/30 - 10/04 Measurement models II

- **No class Thursday, NAS Meeting**
- Higher order models; Bifactor models
- Kline ch. 13

Week 07, 10/07 - 10/11 Measurement models III

- Mean Structures; Multigroup analysis; Measurement invariance
- Kline ch. 16

Week 08, 10/14 - 10/18 Midterm

- **Midterm presentation week**

Week 09, 10/21 - 10/25

- **No class, Fall break**

Week 10, 10/28 - 11/01 Structural models I

- Cross-sectional models; Time lagged models
- Kline chs. 10 & 14

Week 11, 11/04 - 11/08

- **No class, Aging and Work Meeting 2019**

Week 12, 11/11 - 11/15 Structural models II

- Models for growth and change
- Kline ch. 15

Week 13, 11/18 - 11/22 Power analysis

- Monte Carlo power simulations
- Readings TBA

Week 14, 11/25 - 11/29 Missing data

- **No class Thursday, Thanksgiving break**
- Estimating models with missing data
- Readings TBA

Week 15, 12/02 - 12/06 Final Presentations (*n.b.* May carry over to following week)

- **Final presentation week**