CS&SS 589 A: Multivariate Data Analysis For The Social Sciences

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Syllabus: SOC WL / CSSS 589 – Fall 2016

MULTIVARIATE DATA ANALYSIS FOR THE SOCIAL SCIENCES

Instructor:

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Teaching Assistant:

Sam Wang

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- Time: Tuesday/Thursday 10:30-11:50
- Place: SAV 166
- Optional lab: Thursday 5:30-6:20, SAV 117
- Elena's office hour: Thursday 12:00-1:00, PDL C14C
- Sam's office hour: Wednesday 3:00-4:00pm, PDL C14A
- Web: https://canvas.uw.edu/courses/1064068

·   Questions by e-mail are welcome. They will often be answered quite quickly, but this is not guaranteed. For example, I don't always check e-mail over weekends. Please include course number 589 in the subject line.

Course description

This course will focus on multivariate analysis techniques that explore relationship among several observed characteristics. Examples of research questions include examining structure of work and parenthood styles of dual-earner couples, describing classes of heterogeneous service needs for outpatient substance-use disorder treatment, identifying structurally different typical life course patterns, etc. Statistical methods introduced in the course will include cluster analysis, multidimensional scaling, principal component analysis, factor analysis for metrical and binary variables, and latent class analysis. Time-permitting, we will also read, discuss and critique published articles that make use of multivariate analysis techniques.

Prerequisites

SOC 504-505-506 or equivalent.

Course Text

Analysis of Multivariate Social Science Data (2008) Bartholomew,D.J., Steele,F., Moustaki,I., and Galbraith, J.I.

Other course materials on multivariate analysis:

·　　　***Applied Multivariate Statistical Analysis*** (1998) Johnson, R.I., and Wichern, D.W.

·　　　***Latent Variable Models and Factor Analysis*** (1999) Bartholomew,D.J. and Knott,M.

Course objectives

·　　　To gain statistical background necessary to understand multivariate analysis techniques.

·　　　To gain practical skills necessary to carry out analyses, interpret results, and present findings from a multivariate analysis study.

·　　　To become a critical reader of research papers that employ multivariate analysis techniques.

Computing

Many software packages have capabilities for implementing some or all of the multivariate analyses techniques that we will study in this class (e.g., R, SAS, M-Plus, Latent Gold). Analyses for all of the textbook examples are available **on the web**　**(http://www.bristol.ac.uk/cmm/publications/aimdss-2nd-ed/)** in SPSS (for cluster analysis, multidimensional scaling, principal component analysis and factor analysis for metrical variables) and Lami (for factor analysis with binary variables and latent class analysis). I will provide examples in R.

For homework assignments, I encourage students to use R or Lami software (when available). You are welcome to use another software package, but it will be your responsibility to make sure that your package of choice provides results that are similar to those presented in textbook examples, and, in case of differences, explain any discrepancies in the results. If you are not sure what software to use for the course, please come see me.

The course has no formal lab hour. Optional lab instruction will be provided by the TA.

Software availability: Lami is a free software package that you can use for chapters 8-11; download by clicking **here**　**(http://www.bristol.ac.uk/cmm/publications/aimdss-2nd-ed/lami.zip)** . R is also free; you can download it **here**　**(http://www.r-project.org/)** . Should you decide to work with SPSS, it is available in a number of computer labs on campus, including and the **Center for Social Science Computation and Research**　**(http://julius.csscr.washington.edu/)** , the School of Social Work Computer Lab, as well as the **CSDE terminal servers**　**(http://csde.washington.edu/services/computing)** . In addition, for general questions with computing, consider using services of the **Center for Social Science Computation and Research**　**(http://julius.csscr.washington.edu/)** that provides free computing consulting six days a week during the academic year.

Homework assignments and grades

- Final grades:
  - Three homework assignments (45%),
  - Three in-class quizzes (30%),
  - Project poster or take-home final homework (25%).
- Project poster: Instead of the final homework, there is an option to do a multivariate analysis of a data set of your choice and present it on a poster. The projects option will be cancelled in the event that less than 8 students elect to do this option.
- I encourage you to work on homework assignments with each other in small groups, however, **each student is required to submit their own solution and write-up**.
- Please aim to resolve all technical questions or problems you might have with running software **at least 2 days before** an assignment is due.
- Instructions for asking computing questions: If you are having a problem getting some code to run, follow the question format as in "I did X. I expected Y to happen, but Z happened." In order to help you, one needs to be able to replicate the problem.
- Homework assignments that are not handed in on time will receive **zero** points (except in cases of documented emergency). Everyone receives **one grace day** for the entire quarter to be applied to a late homework.
- Hand in a **hard copy** of your homework at the beginning of a class. Include your code in appendix unless requested otherwise. Follow Canvas instructions for uploading homework files.
- Please type up your homework assignments using a text editor (equations may be written in by hand, if necessary). Unless specifically requested, **never** submit raw computer output pages. Instead, insert **appropriate parts** of the output into your write-up (or cut those parts out and neatly tape them onto your homework paper). Please label all axes, variables, etc., appropriately.
- Students are encouraged to use R markdown language for homework preparation. R markdown allows for easy creation of reproducible reports and presentations using results from R. Instruction on using R markdown will be provided during lab time.
- Hand in a **hard copy** of the homework at the beginning of the class when it is due and **submit the R markdown/code file** via canvas. Homework assignments that are not handed in on time will receive **zero** points (except in cases of documented emergency). Everyone receives **one grace day** for the entire quarter to be applied to a late homework.

Students with Disabilities

If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz, 543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need for this class.