

SOCI 623-001: Latent Variable Models

Fall 2015
Tue/Thu 8:35 AM-9:55 AM
Leacock 819

Zoom course site: <https://mcgill.zoom.us/j/97907607818>

Prof. Aniruddha (Bobby) Das

E-mail: Please see communication policy below

Office Hours: Wednesdays 4-5:30 pm.

Zoom site for office hours: <https://mcgill.zoom.us/j/95430192087>

Communication policy

Please use MyCourses for all e-mail communications. E-mails sent to the McGill general e-mail address will not be answered. I will make every attempt to answer e-mail in a timely fashion within 36 hours of receipt. Please see me during office hours for urgent issues.

Software

This course makes heavy use of Stata and Mplus. For both packages, the Faculty of Arts is making licenses available to students for the Fall 2020 semester. Details to be announced in class.

Overview

Latent variable models attempt to explain complex relations between manifest/observed variables by simple relations between these variables and an underlying unobservable or “latent” structure. Topics will include both cross-sectional (Latent Class, factor analysis) and longitudinal (Latent Transition/Hidden Markov, Latent Class Growth Analysis, Growth Mixture Models) versions.

Readings

All assigned readings are hyperlinked in this course outline. If you are on campus, or otherwise connected to the campus VPN, clicking on a link will take you directly to the reading. When off campus, you will be redirected to the library website, where you’d have to log in to access the article in question.

The only exception is the Mplus User Guide, which can be downloaded [here](#).

Evaluation

Two take-home assignments

30*2 = 60%

Final research project

30%

Project presentation

10%

Course requirements

There will be **two assignments, each worth 30%** of your grade. These are intended to test your absorption of the course material, and help you master the tools for the research paper. In addition, there will be a **final project worth 30%**. Details TBA in class. Tentative topics should be discussed with me during office hours in October, or via e-mail. Final topics are to be handed in by the end of October. Working together on these course components is fine, but each student will need to hand in their own assignment. The last day of the course is reserved for in-class **presentations** of final projects (10%). If students do not have cameras or adequate bandwidth for these presentations, accommodations can be made.

At the end of the course, students will be able to properly apply different types of latent variable models and interpret results correctly—as well as *creatively* use these models to examine sociological/demographic topics.

Given the emphasis on active learning, “in-class” Zoom time will be devoted to hands-on data analysis. Students are advised to work with the variables they plan to use for their final project, during lab sessions and in each of their take-home assignments.

Problems with computing: If you want to contact me about a computing problem, include a complete copy of the commands and output. Especially with Mplus, it is often impossible to diagnose error messages without these.

Policy on late submissions

Late submissions of assignments and the term paper will incur a penalty of 20% of the assignment’s grade. Each additional 24-hour delay (including over the week-end) will incur an extra 20%. Since all assignments require the use of a computer, be warned that the probability of a computer crash is inversely related to the number of days until an assignment is due. Please send any late submissions through MyCourses e-mail as soon as possible.

Students’ rights and responsibilities

Attendance and participation in class discussions.

You are responsible for all announcements made in class and on MyCourses, as well as for all course materials distributed during class. You should also check for new announcements or material on MyCourses at least weekly.

Policy Concerning the Rights of Students with Disabilities

If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 398-6009 before you do this.

Remise des travaux en français

“In accord with McGill University’s Charter of Students’ Rights, students in this course have the right to submit in English or in French any written work that is to be graded.” (approved by Senate on 21 January 2009 - see also the section in this document on Assignments and evaluation.)

"Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue)."

Policy for the Accommodation of Religious Holy Days

1. Students will not be penalized if they cannot write examinations or be otherwise evaluated on their religious holy days where such activities conflict with their religious observances.
2. Students who because of religious commitment cannot meet academic obligations, other than final examinations, on certain holy days are **responsible for informing their instructor, with two weeks’ notice of each conflict.**
3. When the requested accommodation concerns a **final examination, students are responsible for advising their faculty office as soon as possible and not later than the deadline for reporting conflicts.** Additional documentation confirming their religious affiliation may be requested.

Statement on academic integrity at McGill

“McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information). (approved by Senate on 29 January 2003)

"L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/)."

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In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in this course is subject to change.

SCHEDULE AND REMOTE DELIVERY FRAMEWORK

Note: Dates highlighted **in red** denote those on which Zoom course sessions will be held during regular class times. These will be workshop-style sessions. The focus will be on hands-on work with Stata and Mplus. Attendance is not mandatory but is strongly recommended. For all other days, recorded lectures will be posted on MyCourses.

Per Faculty of Arts guidelines, students must consent to being recorded if they are attending a lecture or participating in a component of a course that is being recorded. Students will be notified through a 'pop-up' box in Zoom if a lecture or portion of a class is being recorded. If a student is not comfortable being in a class that is recorded, that student may decide not to take part by logging off Zoom.

Students are not required to have their video on during Zoom sessions.

September

Thursday 3

8

10

15

17

22

24

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October

Thursday 1

6

8

13

15

20

22

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29

November

3

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12

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24

26

December

1 Presentations in class (10 minutes per talk)

DETAILED SCHEDULE:

Course overview, expectations What is latent variable modeling?

September 3

Basics

1. Mplus basics, analysis of complex survey data

September 8, 10

1. Mplus user guide, Ch.2
2. Asparouhov, T. (2005). [Sampling weights in latent variable modeling](#). *Structural Equation Modeling*, 12, 411-434.

2. Path analysis

September 15, 17

- Mplus user guide, Ch.3

Continuous latent variables

1. [Exploratory factor analysis in Stata](#)

September 22, 24

2. Exploratory factor analysis in Mplus (with continuous and categorical indicators)

- Mplus user guide, Ch.4
- Muthén, B., Kaplan, (1985). [A comparison of some methodologies for the factor analysis of non-normal Likert variables](#). *British Journal of Mathematical and Statistical Psychology*, 38, 171-189.

3. PCA and polychoric PCA in Stata

Install polychoric in Stata: net search polychoric

[Not ssc install polychoric. Not available there.]

September 29, October 1

- Kolenikov, S. & Angeles, G. (2004). [The use of discrete data in PCA: Theory, simulations, and applications to socioeconomic indices](#). *Working paper WP-04-85, MEASURE/Evaluation project*. Carolina Population Center, University of North Carolina, Chapel Hill. [Click on “Download Document,” right below the title]

4. Confirmatory factor analysis (CFA) + Multiple group analysis

October 6, 8

Stata

Install confa in Stata: net search confa

Click on: confa from <http://web.missouri.edu/~kolenikovs/stata>

- Kolenikov, S. (2009). [Confirmatory factor analysis with confa](#). *Stata Journal*, 9(3): 329–373.

Mplus

Mplus user guide, Ch.5, upto p.73.

Flora, D.B. & Curran P.J. (2004). [An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data](#). *Psychological Methods*, 9, 466-491.

SEM basics

MIMIC & SEM

Exploratory Structural Equation Modeling (ESEM)

October 13, 15

- Mplus user guide, Ch.5, contd.
- Marsh, H. W., Nagengast, B., & Morin, A. J. S. (2012). [Measurement invariance of big-five factors over the life span: ESEM tests of gender, age, plasticity, maturity, and La Dolce Vita effects. *Developmental Psychology*](#). Advance online publication. doi: 10.1037/a0026913.

Cluster analysis in Stata

October 20, 22

Mixture modeling

1. What is mixture modeling?

October 27-November 5

ASSIGNMENT 1 DUE ON NOV 5

- Sterba, S. (2013). [Understanding linkages among mixture models](#). *Multivariate Behavioral Research*, 48:775-815.
- Muthén, B. (2008). [Latent variable hybrids: Overview of old and new models](#). In Hancock, G. R., & Samuelsen, K. M. (Eds.), *Advances in latent variable mixture models*, pp. 1-24. Charlotte, NC: Information Age Publishing, Inc.

2. Cross sectional mixture modeling

Introduction, multiple categorical latent variables

Cross sectional mixture modeling continued

November 10, 12

- Mplus user guide, Ch.7
- Masyn, K. E. (2013). [Latent Class Analysis and Finite Mixture Modeling](#). In P. Nathan and T. Little (Eds.), *The Oxford Handbook of Quantitative Methods* (pp. 551-611). New York, NY: Oxford University Press.
- Marsh, H.W., Lüdtke, O., Trautwein, U., & Morin, A.J.S. (2009). [Classical latent profile analysis of academic self-concept dimensions: Synergy of person- and variable- centered approaches to theoretical models of self-concept](#). *Structural Equation Modeling*, 16:2,191-225.
- Feingold, A., Tiberio, S.S., & Capaldi, D.M. (2013). [New approaches for examining associations with latent categorical variables: Applications to Substance Abuse and Aggression](#). *Psychology of Addictive Behaviors*.

3. Factor-Mixture Models

November 17, 19

4. Longitudinal mixture modeling

LCGA vs. GMM

November 24, 26

- Mplus user guide, Ch.8
- Jung, T. & Wickrama, K.A.S. (2008). [An introduction to latent class growth analysis and growth mixture modeling](#). *Social and Personality Psychology Compass*, 2, 302-317.

- Feldman, B.J., Masyn, K.E. & Conger, R.D. (2009). [New approaches to studying problem behaviors: A comparison of methods for modeling longitudinal, categorical adolescent drinking data.](#) *Developmental Psychology*, 45, 3, 652-676.
- Prince, M. and Maisto, S. (2013). [The clinical course of alcohol use disorders: Using joinpoint analysis to aid in interpretation of growth mixture models.](#) *Drug and Alcohol Dependence*.
- Qureshi, I. & Fang, Y. (2010). [Socialization in open source software projects: A growth mixture modeling approach.](#) *Organizational Research Methods*, 1-31.

Latent Transition/Hidden Markov Models

- Mplus user guide, Ch.8
- Kam, C., Morin, A. J. S., Meyer, J. P., & Topolnytsky, A. (Accepted). [Are commitment profiles stable and predictable? A latent transition analysis.](#) *Journal of Management*.
- Meeus, W., van de Schoot, R., Klimstra, T. & Branje, S. (2011). [Personality types in adolescence: Change and stability and links with adjustment and relationships: A five-wave longitudinal study in early-to-middle and middle-to-late adolescence.](#) *Developmental Psychology*, 47 (4), 1181–1195.
- Witkiewitz, K., Maisto, S. A., & Donovan, D. M. (2010). [A comparison of methods for estimating change in drinking following alcohol treatment.](#) *Alcoholism: Clinical & Experimental Research*.

December 1: Presentations **ASSIGNMENT 2 DUE, FINAL PROJECT DUE**