General Information

Pre-requisite
Successful completion of SOCI504 ([https://www.mcgill.ca/sociology/files/sociology/syllabus2015.pdf](https://www.mcgill.ca/sociology/files/sociology/syllabus2015.pdf)) or equivalent (other graduate-level multiple regression courses may fulfill this prerequisite with instructor’s approval.) The course also requires skills that would be covered in a basic college algebra course.

Course number and title, number of credits
SOCI 620. Fixed and random effects, 3 credits

Meeting times and location
Lectures: Tue and Thu 10:00-11:25, Peterson Hall 310;

Instructor
Amélie Quesnel-Vallée, Canada Research Chair in Policies and Health Inequalities, Professor in the Department of Sociology and the Department of Epidemiology, Biostatistics and Occupational Health. Phone: 398-2758
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Office hours: Please make an appointment with me at [www.needtomeet.com/ameliev](http://www.needtomeet.com/ameliev).

Communication policy
I will make every attempt to answer emails in a timely fashion within 36 hours of receipt.

"As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009."

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

Course content
This course introduces extensions to basic regression. Using Stata, it covers various topics in the use of regression-based techniques for analyzing social science data, in particular models where the dependent variable cannot be assumed to be normally distributed, and fixed and random effect regression techniques with an emphasis on longitudinal panel and hierarchical data. Issues of causal inference and selection bias will be discussed as well.

The emphasis of the course will – to the extent possible – be on data analytic issues rather than on statistical theory. Statistical theory will be introduced to the extent necessary to ensure adequate understanding of the particular estimation technique.
**Learning outcomes**

This course will enable participants to:
1) understand the strengths and limitations of various statistical applications;
2) make sound decisions about which methods best fit the question and data;
3) understand and read critically quantitative social science research published in contemporary journals
4) conduct publishable research using these methods.

**Required reading and software**

Readings will be available electronically or in MyCourses, and assigned the week prior to class. Please refer to the evergreen weekly outline spreadsheet for more details about topics covered every week and associated readings.

Exercises are interwoven with lectures, so you need to **bring a laptop to class** (we will not be having class in a computer lab). In addition, we will use** Stata **in this class, so you should have access to it on the laptop that you bring to class. If you do not have a laptop and/or do not have access to Stata, please let me know we will discuss your options in the first class. I have a couple of laptops to lend and older versions of Stata that can be installed for the duration of the course.

**Recommended reading**

I highly recommend this approachable, practical textbook on statistics. I will bring copies to class so you can look it over.


**Topics covered**

This list provides a broad overview of the general content of the course. Additional topics will be covered by the students’ methods presentations. Please refer to the evergreen weekly outline spreadsheet for more details about topics covered every week and associated readings.

**Issues of causal inference.**

Review of models for binary outcomes.
Estimating Logit models
Identification issues
Interpretation of coefficients
Hypothesis Testing, Goodness of Fit and Prediction

Data management of multilevel data using Stata.
Reshape function to move from wide to long files (and vice-versa)
Creation of time varying variables
Use of egen to create summary variables of time-varying effects
Introduction to macros and loops.

Regression models for multilevel data
Fixed Effects Models
Random Effects Models
Hausman specification tests as applied to the specific task of testing the random effects assumption.
Mixed Effects Model
**Key dates**
Please refer to the evergreen weekly outline spreadsheet for more details about deliverables.
- January 9: First course
- January 30: Annotated bibliography is due;
- February 15: Class is canceled
- March 5-9: Reading week, no class
- March 15: Class is cancelled – time to work on your final assessment!
- Two weeks prior to your presentation: Meet with me to go over your draft material
- March 20 – April 5: Methods (Option 2) presentations (depending on the class size, we may only meet every other class during that period)
- April 10 & 12: Research projects (Option 1) presentations
- April 12: Last class. Debrief (what did we learn, what worked, what didn’t?) and celebration!

**Evaluation**

There are three components to the evaluation: Participation, weekly assignments and a final assessment with two options.

1. **Participation (5%).**
   You will learn the most by actively engaging with the material. That means coming prepared, having read the material, done the assignment and asking and answering questions. There are no dumb questions in this class. If you have a question, chances are, someone else does as well, and you will do them a favor by asking it. We are all here to learn (yes, even me, see point 3 below!), and I hope to make this seminar an environment where you will feel safe asking questions.

2. **Assignments (60%).**
   The purpose of these assignments is to help you understand statistical concepts and mechanics through learning by doing. The assignments consist of a computer-based analysis, your interpretation of the results, Stata syntax and Stata output.

   Each assignment is worth 10 points, graded according to a grading rubric, and together they account for 60 percent of your course grade. The assignments are due in class, in hard copy, the day of the due date. Please make sure to print well ahead of class (because Uprint printers always seems to run out of paper at the least auspicious moment!).

   **Late assignments will be penalized 1 point per 24 hours they are late** (see grading rubric), unless you have written beforehand with a valid excuse for the delay and a specific plan for when it will be submitted. You may discuss among yourselves and consult reference books, but may not submit the same material or minute variations of the same work (i.e. you must select different variables).

**Assignment topics, content and due dates**

1. Recoding variables, dummy variables, summary statistics. Due Jan. 23
2. OLS and Logit analysis with X and Y in same survey year. Due Feb 6.
4. Panel data management and preparation. Due Feb. 20
5. Fixed and random effects (with Hausman specification test). Due March 13.
6. Mixed effects model. Due Mar. 20
Assignment grading rubric
10 pts – no errors or, at most, very minor mistakes in math or in wording; great job
9 pts – no errors but did not fully address what one of the questions was asking; or a single error in terms of interpretation or model/test execution; a good job overall
8 pts – two major errors in execution or interpretation, or incomplete answers; shows a good level of effort but inadequate attention to or knowledge of some details
7 pts – more than two major errors in execution or interpretation; suggests inadequate effort or serious confusion about the methods featured in the assignment
0 pts – if you copy another student’s syntax or report, you will receive no credit
(1 pt deduction for late assignments per day they are late without prior authorization.)

3. Final assessment (35%)
There are two options for the final assessment. You may pick either, but I would recommend that those with fewer layers of knowledge in stats go for Option 1, and those with more background go with Option 2. The methods presentations (Option 2) will occur during the last three weeks of the semester from March 20 to April 5, while the paper presentations (Option 1) will occur on April 10 and 12. I will attempt to maximize your preferences for a presentation date, but in the case of ties, I will do a random draw.

Mandatory meeting with prof two weeks prior to your presentation: You will meet with me to go over your draft material (Option 1: presentation and paper draft; Option 2: exercise, presentation and your cheat sheet). I will provide constructive feedback to help improve your deliverables to ensure an optimal experience for both presenters (you!) and students (also you, but not at the same time!).

Annotated bibliography (10%).
Both options require the submission of an annotated bibliography in class, on January 30. The annotated bibliography (10%) consists of: a short introductory paragraph presenting your research question (option 1) or method (option 2), and 10 references, each accompanied by a short paragraph justifying the contribution of these references for your topic. Use a wide variety of references (chapters, papers, websites). For instance, you may reference websites presenting datasets that you are thinking of using for your paper or your method’s exercises, youtube tutorials on a particular method, etc. These references will provide you with a basis for the next steps of the assignment.

Option 1. Research paper using the methods taught in class (20%)
For this assessment, you will pick a topic of your choice, a dataset and a method taught in the course of the semester, and you will conduct the analyses and write a paper (6,000-8,000 words, including abstract, tables and references) to be handed in and presented to class (in a 15-minute presentation).
You will meet with me two weeks prior to your presentation to go over your draft presentation and paper.

Option 2. Methods presentation (25%).
You will develop a session of course content, providing a brief overview of another method not already covered in class. The content should be geared towards the practical application of the method, not on in-depth statistical theory. With my assistance, you will pick an article featuring a method that you wish to present, develop a brief lecture (30 minutes) as well as a Stata exercise to be performed in class, and provide the class with a one-page “cheat sheet” summarizing the main takeaway points of your presentation, focusing particularly on the conditions under which these methods are indicated (or
not). You must meet with me two weeks prior to your presentation with drafts of all three deliverables. You will be evaluated on these three components (presentation, exercise, one-pager).

The goal of this assessment is twofold:
1. You will explore a new method with an eye to application, and gain confidence in your statistical acumen by presenting it to peers and
2. In so doing, you will increase each other’s exposure to a broader range of methods in which you can then delve deeper if the need arises.

Examples of methods that could be of interest (non-exhaustive list, these are just the ones that I am more generally familiar with): Imputation techniques for missing values; bootstrapping; sample selection models (Heckman selection); propensity score models; marginal structural models; segmented regression; interrupted time series; difference-in-differences models; instrumental variables; regression discontinuity.

**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 given out in class. You should also check for new announcements, changes to the course outline or material on MyCourses at least weekly.

Remise des travaux en français

"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 maitrise d’une langue)." (approved by Senate on 21 January 2009)

Review of a mark

You have the right to ask for a regrading if you feel that your work was not accurately graded. However, in order to request a regrade, you must write a one page paper indicating the reasons why your work should be regraded and hand it in to the professor within a week of receiving the grade.

In addition, during the regrading process, the work is analyzed much more critically. The first time around, we tend to give students the benefit of the doubt. Please also note that will regrade the whole material (not just an individual question), and that we have the right to lower your grade in this process.

You may prefer to meet with us and talk about how you may have improved your work and your learning.

Policy for the Accommodation of Religious Holy Days

“1 Students are not to 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.”” (Approved by Senate - November 20, 1996 - Minute 92)
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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Guidelines for the use of mobile computing and communications

Allowed as long as not disruptive

Mobile computing and communications devices are permitted in class insofar as their use does not disrupt the teaching and learning process.