

Statistics in Social Research

Sociology 350, Fall 2017
Monday, Wednesday 10:05 - 11:25
McGill University ARTS W-120

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Course Overview

This is an introductory course in descriptive and inferential statistics. The course is designed to help students develop a critical attitude toward statistical argument. It serves as a background for further statistics courses, helping to provide the intuition that can sometimes be lost amid the formulas. It also helps students to acquire the skills required to perform basic statistical analyses on their own, using statistical software frequently employed by social scientists.

Learning Goals

Learning goals for this course are as follows:

- 1) To become acquainted with the basic methodology of introductory descriptive and inferential statistical analyses.
- 2) To gain competency in the critical evaluation of empirical analyses of the social world you are confronted with in civic life.
- 3) To obtain the tools both technical and intellectual to perform statistical analyses and critiques of your own.

Instructional Method

About Math: Please note that this is not a mathematics course. All you need to know are basic arithmetic operations such as addition, subtraction, multiplication, squares and square roots, and be familiar with basic algebra.

This course will be organized as a mix of lectures, in which I review the conceptual tools behind specific sets of statistical analyses, and of applied demonstration/exercise sessions aimed at helping you learn how to perform these analyses using one popular statistical software named Stata. Most classes will include both a lecture and a demonstration/exercise session, though some classes will be either/or. You will find the demonstration/exercise sessions most useful if you can follow me on your computers and be

active participants in the exercises I provide. Therefore, I highly encourage you to have your computers or tablets with you in class. However, please make sure to use these devices only to take notes or to follow demonstration sessions, so as to not distract your colleagues and yourselves with your screens. I will also sometimes use the student response system (SRS) to elicit your participation in class and have you think through concepts. You can use your phones to answer the SRS, but this constitutes the only acceptable use of phones during class. Please be mindful to your colleagues and refrain from browsing on your phones during class and make sure to turn-off any sounds or alarms before class.

For some of our classes, required readings are assigned. These readings will come from two main sources. Occasionally, I will assign journal articles or book chapters that will be posted to MyCourses ahead of class. I will also assign several chapters from an introduction to statistics textbook. At the end of each chapter I assign from this textbook, a series of simple exercises are proposed. I strongly recommend working through as many of these exercises as you can every week. They will help you think through the concepts we learn and make sure you have understood them well. I also ask you to come to class prepared to discuss the readings whenever they are assigned.

Evaluation

Grades will be based on three take-home assignments and three quizzes. The first two assignments will be worth 23% each, and the third one will be worth 30% of your final grade. Each of the three quizzes will be worth 8% of your final grade. This class is split into four main topics: 1) describing the distribution of variables; 2) describing associations between variables; 3) inference for means and proportions; and 4) inference for associations. The Evaluation Schedule Table below shows what topic and class dates each quiz and assignment covers, in addition to showing when these assignments are due and when quizzes will be taken. As a general rule, quizzes will be held one week, and assignments will be due two weeks after we have finished covering the topic they address.

Evaluation Schedule					
Name of assignment	Available on	Due on	%	Topics Covered	Classes Covered
Quiz 1	-	10/2/2017	8	1) describing the distribution of variables	9/11/2017 to 9/25/2017
Assignment 1	9/18/2017	10/11/2017	23	1) describing the distribution of variables	9/11/2017 to 9/25/2017
Quiz 2	-	10/23/2017	8	2) describing associations between variables	9/27/2017 to 10/16/2017
Assignment 2	9/27/2017	11/1/2017	23	2) describing associations between variables	9/27/2017 to 10/18/2017
Quiz 3	-	11/20/2017	8	3) inference for means and proportions	10/23/2017 to 11/8/2017
Assignment 3	11/19/2017	12/15/2017	30	3) inference for means and proportions and 4) inference for associations	10/23/2017 to 12/6/2017

I will hand out assignments in class as specified on the Evaluation Schedule above. Assignments will also be posted on MyCourses the same day they are handed out. In these assignments, you will be asked to perform sets of statistical analyses using Stata. These analyses will be similar to and inspired by the

demonstrations I present in class. You will be expected to turn in both your answers to the assignments' questions and the Stata syntax you have employed to reach them. All three assignments are to be completed in teams of no more than three students, with each team member obtaining the same grade. Late assignments will not be accepted, except in the case of extreme events. Quizzes are relatively short exams (20 to 30 minutes) to be completed in class. These quizzes are meant to verify your comprehension of the concepts presented in class at regular intervals. They are to be completed individually.

Required Course Material

Readings will come from the following sources:

- 1) Rosenthal, James A. 2012. Statistics and Data Interpretation for Social Work, 1st Edition. New-York: Springer. (Henceforth referred to simply as 'Rosenthal'). This book is available as an ebook from the McGill Library. If you do not need a printed book, you can simply use this e-book format. If you prefer a printed book, I have placed a printed copy on reserve at the McLennan Library and ordered a few copies at the James Bookstore.
- 2) I will also occasionally assign journal articles and chapters from other books. I will post these on the course's MyCourses website ahead of class.

The **software** I will use in this class for demonstration/exercise sessions and that I also expect you to utilize to complete assignments is called Stata. This software is installed on many computers at McGill Library: <https://www.mcgill.ca/library/services/computers>. You can also purchase a temporary student license to use Stata on your own computers. If you choose to do so, you will be able to follow and replicate in real time and on your own computers the demos I run in class. However, be sure that all the syntax I produce during these demos will also be posted to MyCourses the day after class. For this class, Stata/IC will work. The price for a temporary Stata/IC license is \$89 for 1-year or \$45 for six months (<https://www.stata.com/order/new/edu/gradplans/student-pricing/>). If you think you might use Stata again in the future for your own research, however, I recommend opting for Stata/SE instead of Stata/IC.

MyCourses

I will use MyCourses to post most resources used in this class. These include this syllabus, the required readings, the databases we will use to perform statistical analyses, the demos I run in class, and lecture overheads. It is the students' responsibility to familiarize themselves, if they have not done so already, with MyCourses. The MyCourses website is located at <https://mycourses2.mcgill.ca/d21/home>.

I will attempt to post the lecture overheads the day before or the morning of each class so you can take notes on them. I do not guarantee this, however, and I remind students that simply looking at the overheads is not a substitute for attending lectures. I will further post revised overheads (with any notes I put on them during class time) after the class.

Contacting Me

Office Hours

You can approach me with questions at any time. My preference is to answer questions in class or in office hours – this format is best for avoiding misunderstandings (which are common via email or when conversations are rushed). My office hours are as listed above. For questions regarding using Stata, our TAs will also have office hours to help you and answer your questions. Also, if at any time you feel that what I am doing is not advancing your learning, please let me know (in a respectful manner) – I want each and every one of you to feel safe and to learn, so please let me know if that is not happening.

Email

Outside of office hours, I may be contacted by email at the address specified above. My turn around time for responding to emails is about 36 hours (except on weekends).

Academic Integrity

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 <http://www.mcgill.ca/integrity> for more information).

Language of Submission

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. This does not apply to courses in which acquiring proficiency in a language is one of the objectives.

Copyright

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Inclusive Learning Environment

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.

Credit for Statistics Courses & Course Overlap: IMPORTANT

McGill credit will be given for **ONLY ONE** of the following introductory statistics courses. PSYC 204, PSYC 305, AEMA 310 BIOL 373 ECON 227D1/ECON 227D2 EPSC 215 GEOG 202 MATH 203 MGCR 271 or this course, SOCI 350. You will not get credit for SOCI 350 if you have taken one of these other courses, and you will not get credit for the others in the future if you successfully complete this class.

Tentative Lecture Schedule

Scheduling of topics for the course listed below and associated readings are subject to change at my discretion. Such changes, should they take place, will be announced in class and through MyCourses. Students are responsible for keeping abreast of any changes made.

Week 1:

9/6/2017: Introduction

Required Readings:

Schirle, Tammy. 2015. "The Gender Wage Gap in the Canadian Provinces, 1997–2014." *Canadian Public Policy* 41 (4): 309–19.

1. Describing the Distribution of Individual Variables

Week 2:

9/11/2017 Data Types, Introduction to the Notion of Distribution, and Graphical and Numerical Representation of Distributions.

Required Readings:

Rosenthal, Chapters 1 and 2.

9/13/2017: *Introduction to Coding and Stata Syntax. Don't miss it if you have never coded!*

Required Readings:

https://en.wikiversity.org/wiki/Introduction_to_Programming

Lessons 1 to 3

Week 3

9/18/2017: Describing what is Typical in a Distribution: Measures and Visual Representation of Central Tendency

Required Readings:

Rosenthal, Chapter 3

9/20/2017: Describing Variation in a Distribution: Measures and Visual Representation of Dispersion

Required Readings:

Rosenthal, Chapter 4

Week 4

9/25/2017: Describing the Shape of the Distribution of Continuous Variables.

Required Readings:
Rosenthal, Chapter 5

2. Describing Associations between Variables

9/27/2017: Describing Association between Categorical Variables

Required Readings
Rosenthal, Chapter 6.

Week 5

10/2/2017: *Quiz 1 Followed by* Describing Association between Categorical and Continuous Variables

10/4/2017: Introduction to Describing Association Between Continuous Variables: Scatterplots and Correlation

Required Readings
Rosenthal, Chapter 8, sections 8.1 to 8.5

Week 6

10/9/2017: NO CLASS (Thanks Giving Break)

10/11/2017: Describing Association between Continuous Variables Continued: Regression

Required Readings
Rosenthal, Chapter 8, sections 8.6 to 8.9 and 8.11

Assignment 1 is Due

Week 7

10/16/2017: Regression Continued

10/18/2017: Practicing Regression Results' Interpretation Using Stata.

3. Inference for Means and Proportions of Individual Variables

Week 8

10/23/2017: **Quiz 2 Followed by** Introduction to Inference: Populations, Samples, and Sampling Distributions

10/25/2017: Sampling Distributions and the Central Limit Theorem.

Required Readings
Rosenthal, Chapter 12

Week 9

10/30/2017: Estimation and Confidence Intervals for Population Means and Proportions

Required Readings
Rosenthal, Chapter 14, section 14.3 and Chapter 13. BE SURE TO READ SECTION 14.3 BEFORE READING CHAPTER 13.

11/1/2017: Introduction to Hypothesis Testing for Population Means and Proportions

Required Readings
Frankfort-Nachmias, Chava, and Anna Leon-Guerrero. 2003. *Social Statistics for a Diverse Society*. 3rd Edition. Thousand Oaks, Calif.: Pine Forge Press, pages 461-472.

Assignment 2 is due

Week 10

11/6/2017: Hypothesis Testing for Population Means and Proportions Continued

11/8/2017: Estimation and Hypothesis Testing using the t Distribution

Required Readings
Frankfort-Nachmias, Chava, and Anna Leon-Guerrero. 2003. *Social Statistics for a Diverse Society*. 3rd Edition. Thousand Oaks, Calif.: Pine Forge Press, pages 472 to 477.

Suggested Readings:
Rosenthal, Chapter 16

4. Inference for Associations between Variables

Week 11

11/13/2017: Mean Differences between two Groups (two samples t-tests)

Required Readings

Frankfort-Nachmias, Chava, and Anna Leon-Guerrero. 2003. *Social Statistics for a Diverse Society*. 3rd Edition. Thousand Oaks, Calif.: Pine Forge Press, pages 477-487.

11/15/2017: Proportion Differences between two Groups

Required Readings

Frankfort-Nachmias, Chava, and Anna Leon-Guerrero. 2003. *Social Statistics for a Diverse Society*. 3rd Edition. Thousand Oaks, Calif.: Pine Forge Press, pages 487-493.

Week 12

11/20/2017: *Quiz 3 Followed by* Association between Categorical Variables (Chi-Square Tests)

Required Readings

Frankfort-Nachmias, Chava, and Anna Leon-Guerrero. 2003. *Social Statistics for a Diverse Society*. 3rd Edition. Thousand Oaks, Calif.: Pine Forge Press, pages 503-523.

11/22/2017: Association between Categorical Variables (Chi-Square Tests) Continued

Week 13

11/27/2017: Association between Categorical Variables (Chi-Square Tests) – Continued

11/29/2017: Association between Categorical and Continuous (Analysis of Variance)

Required Readings:

Rosenthal, Chapter 21

Week 14:

12/4/2017: Association between Categorical and Continuous (Analysis of Variance) – Continued

12/6/2017: Conclusion and Review

12/07/2017: Help Session for Assignment 3

Assignment 3 is due on 12/15/2017