POLSCI 9590A: Intro to Methodology
Fall, 2019

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1   Overview and Course Objectives

This course is meant to get students thinking about how data *are* used to make social, political and economic decisions and how we *could* answer questions we care about with data. The time when political scientists could happily exist in a (quantitative) data-free world has long since passed. We live in a world where many decisions are made using data. This has a number of interesting implications.

1. It is incumbent on those of us who wish to be savvy consumers to understand how data are being used to make decisions, what our "data footprint" is and how to discriminate good from bad uses of data.

2. We have to have some basic understanding of research design and probability to evaluate advances in health, medicine, politics, economics, etc... When looking at media reports of studies, how can we figure out whether the study was done well or poorly? Does the study generalize? What actionable intelligence really exists?

3. As political scientists, we answer questions about policy effectiveness, the efficacy of citizen interactions with government, etc... with data. But, we need to know and understand how.

Throughout the course, you will be asked to engage, and in some cases produce, quantitative work.

One of the interesting aspects of how stats courses (particularly those in the social sciences) have evolved is that they often continue to be perceived as "math classes." One of my goals here is to (mostly) disabuse you of this notion. This is largely not a math class. That is to say, we will be *doing* (in terms of paper and pencil) very little math. We will be *looking at* mathematical notation from time to time. We use mathematical notation because it is precise - with terms and operators defined, we could all look at a statistical function and understand its main components and how they fit together. Similarly, mathematical notation is concise - it allows us to represent some quite abstract and complicated ideas in relatively little space.

Instead of thinking about this as a math class, this is a class that part psychology, part story-telling, part computer programming (don't worry about this part), part visual design and part data analysis (obviously). Statistics in the social sciences are often (as in this course) focused on applications rather than complicated mathematical derivations.

2 Course Text(s)

The required text for the course is:

Hahn, Michael and Jenny Godley (2017) <u>An Introduction to Statistics for Canadian Social Scientists</u>. 3rd *ed.* Oxford University Press.

Other readings will be made available electronically through the course's OWL site.

3 Requirements

The course has a number of requirements, including attendance, reading, quizzes, and written work of different sorts. Here is a breakdown of the different elements:

Participation 10%
> There are quizzes in the short videos. In total, there are about 2 hours of videos to watch. They are designed to make sure that you're understanding the material. I will use your participation in the quizzes as your participation grade.

Homework 60%
> There will be four homework assignments. Grades for those four assignments will count as 60% of your grade (15% each). You can work in groups, but each person needs to turn in his or her own work, in his or her own words.

Final Exam 30%
> The final exam is a non-collaborative, open book and notes assignment designed to get you to produce a small set of results in R and tell me what they mean.

All assignments will be turned in through the your dropbox folder on the course's OWL site. Without exception, all assignments should be submitted as a `.rmd` file (we will talk more about this during the course).

4 Absences, Late Assignments and Makeups

If illness prevents turning in assignments on time, the illness must be documented according to Western's Policy on Accommodation for Illness.
(`http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf`)

5 Academic Offenses

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:
`http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf`.

Course Outline

1. Class 1 (9/9): Introduction

2. Class 2 (9/16): Why Learn About Statistics?/What are data?

   - Readings: Hahn and Godley: Chapters 1 & 2
   - Videos:
     - Chapter 02: 1. Mathematical Operations (06:22)
     - Chapter 02: 2. Data, Observations and Variables (09:08)

3. Class 3 (9/23): Univariate Statistics and Graphs

   - Readings: Hahn and Godley: Chapters 3
   - Videos:
     - Chapter 03: 1. Frequencies (04:32)
     - Chapter 03: 2. Rates, Ratios and Percentiles (05:42)
     - Chapter 03: 3. Visualizing Data (05:21)

4. Class 4 (9/30): Univariate Statistics, Graphs and Probability

   - Readings: Hahn and Godley: Chapters 4 & 5.
   - Videos:
     - Chapter 04: Probabilities (10:36)
     - Chapter 05: Describing Distributions (05:21)

5. Class 5 (10/7): Measures of Central Tendency and Dispersion

   - Readings: Hahn and Godley: Chapters 6 & 7
   - Videos:
     - Chapter 06: 1. Measures of Centre (07:49)
     - Chapter 06: 2. Measures of Spread (03:29)
     - Chapter 07: Probabilities Under the Normal Distribution (09:01)

6. Class 6 (10/14): Sampling and Generalization

   - Readings: Hahn and Godley: Chapters 8 & 9
   - Videos:
     - Chapter 09: 1. Sampling Distributions (04:38)
     - Chapter 09: 2. Confidence Intervals (08:14)

7. Class 7 (10/21): Bivariate Statistics

   - Readings: Hahn and Godley: Chapters 10 & 11
   - Videos:
     - Chapter 10: Hypotheses and Hypothesis Testing (11:40)

8. Class 8 (10/28): Bivariate Statistics for Nominal and Ordinal Data

   - Readings: Hahn and Godley: Chapters 12 & 13
   - Videos:
     - Chapter 12: Contingency Tables (10:03)

9. Class 9 (11/11): Bivariate Statistics for Interval/Ratio Data

   - Readings: Hahn and Godley: Chapters 14
   - Videos:
     - Chapter 14: Pearson Correlation Coefficient (02:48)

10. Class 10 (11/18): OLS Regression I

    - Readings: Hahn and Godley: Chapter 16
    - Videos:
      - Chapter 16: 1. OLS Regression (06:38)
      - Chapter 16: 2. Multiple OLS Regression (09:53)

11. Class 11 (11/25): OLS Regression II

    - Readings: Hahn and Godley: Chapter 18

12. Class 12 (12/2): Wrap up

13. Class 13 (12/9): Final Exam.