# STATISTICAL REASONING AND QUANTITATIVE METHODS

MSc in International Affairs
MSc Governing the Large Metropolis

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This course is about the **core notions** of quantitative research for the social sciences, based on three fundamental blocks of knowledge: essential statistical concepts, survey data, and various forms of regression analysis.

By design, this course will approach quantitative analysis through methods and examples taken from various branches of the social sciences, with some specific applications to international relations. We will focus on **research design**, as to make sure that we ask valid questions, based on sound hypotheses as well as reliable data, and draw correct inferences. Throughout the course, we will introduce and explain some essential **statistical operations** that can be used to that end. Finally, we will introduce **statistical software** and work through the procedures to produce statistical tests and visualizations of quantitative data.

The emphasis of the course is set on conceptual understanding and statistical reasoning, and each session will apply statistical procedures to real data. Handbook chapters will be used to cover the statistical side of the course, while class sessions will focus on practical experience.

No previous knowledge in any of these topics is required for taking the course, but some computer and Internet skills as well as a genuine interest in understanding why and how we use quantitative information to understand society will prove useful.

## COURSE ASSIGNMENTS

Students are expected to be regular and active participants in the course, and to complete required readings and exercises prior to class meetings. Course sessions start with a theoretical and practical introduction, after which students will train themselves to perform routine quantitative operations using Stata. The course sessions use a wide range of examples and exercises based on real data, and the course will regularly explore a selection of teaching dataset to familiarize students with survey data analysis.

Students will be assessed on the basis of two **draft papers** and one **final paper**, for which they should provide replication material. The assignments and paper will all revolve around a single dataset and research question that students will gradually outline and apply throughout the semester. Expectations about coursework will be outlined at the first meeting and further detailed at several points of the course.

Feel free to ask for additional guidance on what to read and how to structure your papers, yet *do not wait for the last minute to do so, and read extensively from the course documentation.* The grading policy for the course is 25 points for each report and 50 points for the final paper. Attendance to all sessions, which are all computer-based, is crucial to the course. Finally, students are asked to provide as much feedback on the course as they can.

## COURSE SUMMARY

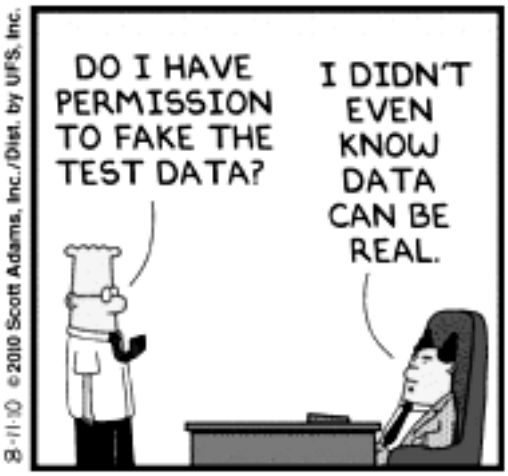
1. Introduction
2. Datasets
3. Variables
4. Distributions

**Association**

5. Estimation
6. Crosstabulations
7. Comparisons
8. Correlation

**Regression**

9. Prediction
10. Models
11. Diagnostics
12. Review



## HANDBOOKS

Agresti, A. and Finlay, M. 1997. *Statistical Methods for the Social Sciences*. 3rd ed. Prentice-Hall.

Briatte, F. and Petev, I. 2012. *Stata Guide*. Online at http://f.briatte.org/teaching/quanti/.

Feinstein, C. H. and Thomas, M. 2002. *Making History Count*. Cambridge University Press.

> ***Reading guide**: Agresti and Finlay go into the detailed mathematics of the statistical procedures used in class, provide further guidance on probability, and cover essential knowledge about surveys. Their handbook is a long and sometimes challenging read: **you should read selectively from it**. Indications on the notions to concentrate on during your reading will be delivered by email and during class. The second handbook is a course guide that will be updated during the semester. The third and last handbook by Feinstein and Thomas is the one used for weekly readings throughout the course.*

## ADDITIONAL READINGS

Acock, A. 2008. *A Gentle Introduction to Stata*. 2nd ed. StataCorp.

Booth, W. *et al.* 2003. *The Craft of Research*. 2nd ed. University of Chicago Press.

Mitchell, M. 2004. *A Visual Guide to Stata Graphics*. StataCorp.

Tufte, E. 2001. *The Visual Display of Quantitative Information.* Graphics Press.

> ***Reading guide**: Acock is a very good handbook for Stata users who prefer to have a written support to learn about software procedures; Booth* et al. *is an introduction to research practice and research writing, and will be particularly helpful to students who have limited training in that area; Mitchell is a guide to setting graph options in Stata; and Tufte is a beautiful treaty on visual design and data visualization.*

## WEBSITES

*Course*

Companion web page with data, code and links:
http://f.briatte.org/teaching/quanti/

Download link for the *Stata Guide* in its most current version:
http://f.briatte.org/teaching/quanti/guide.pdf

*Tutorials*

University of California Los Angeles: Stat Computing
http://www.ats.ucla.edu/stat/

Princeton University: Stata Guide
http://www.princeton.edu/wwac/academic-review/stata/

## SESSION 1 INTRODUCTION

*Readings*

- **Feinstein & Thomas** ch. 1
- **Stata Guide** s. 1–4

## SESSION 2 DATASETS

*Readings*

- **Stata Guide** s. 5–6
- **Stata tutorials** *cf. course website*

## SESSION 3 VARIABLES

*Readings*

- **Stata Guide** s. 7–8
- **Stata tutorials** *cf. course website*

## SESSION 4 DISTRIBUTIONS

*Readings*

- **Feinstein & Thomas** ch. 2
- **Stata Guide** s. 9

## SESSION 5 ESTIMATION

*Readings*

- **Feinstein & Thomas** ch. 5
- **Stata Guide** s. 13–14 ASSIGNMENT **Draft #1 due next week!**

## SESSION 6 CROSSTABULATION

*Readings*

- **Feinstein & Thomas** ch. 7
- **Stata Guide** s. 10 *cf. Chi-squared test*

## SESSION 7 COMPARISON

*Readings*

- **Feinstein & Thomas** ch. 6
- **Stata Guide** s. 10 *cf.* t-*test*

## SESSION 8 CORRELATION

*Readings*

- **Feinstein & Thomas** ch. 3
- **Stata Guide** s. 11 *cf. Pearson's* r

## SESSION 9 REGRESSION / 1: PREDICTION

*Readings*

- **Feinstein & Thomas** ch. 4
- **Stata Guide** s. 13–15 ASSIGNMENT **Draft #2 due next week!**

## SESSION 10 REGRESSION / 2: MODELLING

*Readings*

- **Feinstein & Thomas** ch. 8–10
- **Stata Guide** s. 11 *cf. multiple linear regression*

## SESSION 11 REGRESSION / 3: DIAGNOSTICS

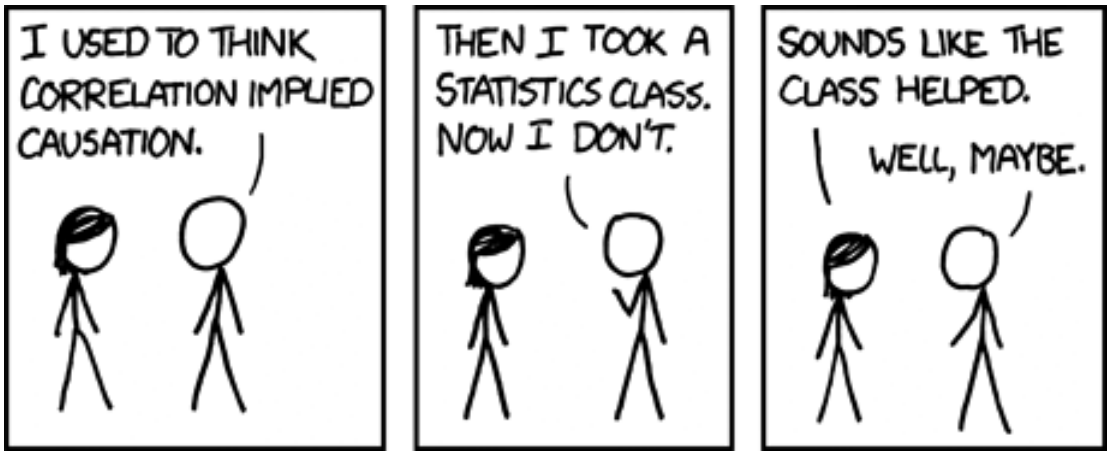
*Readings*

- **Feinstein & Thomas** ch. 8–10
- **Stata Guide** s. 11 *in full*

## SESSION 12 REVIEW

*Readings*

- **Feinstein & Thomas** ch. 12–13
- **Stata Guide** s. 16 FINAL PAPER **Final paper due soon!**

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