SciencesPo.

Statistical Reasoning and Quantitative Methods

Paris School of International Affairs

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Room J306

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 affairs. 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 (in that case, Stata) 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. Great importance is also given to cooperation between students and the instructor; your evaluation will reflect the degree of cooperation you showed with the other students.

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

COURSE REQUIREMENTS

Students are invited to be regular participants in the course and to complete required readings prior to class meetings. Course sessions start with a theoretical and practical introduction and end with a lab session. In order to learn Stata during the semester, students are required to train as much as needed with the software, and to help each other with the statistical notions as well as with the use of the software.

The way this class is evaluated tries to mimic the way the academic world works: you will be required to submit a paper, written by group of two (exceptionally three) students. In this process you may seek help, and you may help others, and this will be rewarded. Then papers will be peer-reviewed, that is they will be assessed and checked by other students. Any disagreement between authors and reviewers will be settled by the instructor. And a final review of both the papers and their reviews will be conducted by the instructor.

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 the course documentation first.* All questions will be asked on the dedicated website: www.joelgombin.fr/teaching/quanti/questions, and may be answered by the instructor and/or the other students.

The grading policy for the course is :

- 5 points the cooperation skills. Each answered and accepted question on the dedicated website will give you 1 points.

- 5 points for the peer-reviewing skills. Your reviewed authors will give you a mark, based on how useful they found your review; you may appeal this mark if you find it unfair. The instructor will review this mark anyway.

- 10 points for the authorship skills. This will be based on your final paper, after it has been peer-reviewed and revised. The instructor will assess this final paper.

Attendance to all sessions, which are all computer-based, is crucial to the course. Students are also asked to elect a student representative and to provide regular feedback on the course.

HANDBOOKS

Briatte, F. and Petev, I. 2014. *Stata Guide. A Student Guide to Statistics With Stata.*

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

Urdan, T. 2010. *Statistics in Plain English.* 3rd ed. Routledge.

> **Reading guide**: The 'Stata Guide' is a **draft** handbook by François Briatte and Ivaylo Petev that covers (most of) the course requirements; Feinstein and Thomas is an accessible introduction to quantitative social science; and Urdan further clarifies the statistical notions covered in the other readings. Read responsibly from all sources.

ADDITIONAL READINGS

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

Mitchell, M. 2012. *Interpreting and Visualizing Regression Models Using Stata.* Stata Press.

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

> **Reading guide**: Booth et al. is an introduction to research practice and research writing, and will be particularly helpful to students with limited training in that area; Mitchell's book is an excellent guide to applied regression in Stata; and Tufte is a treaty on visual design and data visualization.

EXAMPLE PAPERS

To complete your coursework, you will need to form a group and write an empirical research paper based on your work throughout the semester. If this is your first research paper based on empirical data, see Lynn White, "Writes of Passage: Writing an Empirical Journal Article," *Journal of Marriage and Family* 67 (2005): 791–8, for essential instructions.

Examples of empirical papers using survey or country-level data will be provided in class. You might want to find more examples on Google Scholar, using the exact name of the dataset that you want to use as keywords. You do not need to understand the full statistical methodology of a research paper to study how it is designed, structured and written.

LINKS

Course website:
http://www.joelgombin.fr/teaching/quanti/

(Old) Course blog, by François Briatte:
http://srqm.tumblr.com/

Twitter feed? Well, that's up to you:

#srqm

StataCorp:
http://stata.com/

StataCorp video tutorials:
https://www.youtube.com/user/statacorp

COURSE OUTLINE

The course is made of three teaching segments: a general section on descriptive statistics and data preparation (sessions 1–5), a focused section on bivariate association tests (sessions 6–8), and a final section on linear and logistic regression models (sections 9–12). Each segment of the course corresponds to a section of the final paper that is due at the end of the semester. Read handbook chapters *before* class and the Stata Guide *after* class.

SESSION 1   INTRODUCTION

Readings

o   Stata Guide   ch. 1
o   Feinstein *&* Thomas   ch. 1
o   Urdan   ch. 1

SESSION 2   DATASETS

Readings

o   Data documentation   *see data folder*
o   Stata tutorials   *see course website*
o   Stata Guide   ch. 2.1-2.2

SESSION 3   VARIABLES

Readings

o   Stata Guide   ch. 2.3
o   Feinstein *&* Thomas   ch. 2.1–2.4
o   Urdan   ch. 2–3

SESSION 4   DISTRIBUTIONS

Readings

o   Stata Guide   ch. 3.1–3.2
o   Feinstein *&* Thomas   ch. 2.5–2.6
o   Urdan   ch. 4–5

SESSION 5   *FIRST DRAFT, Q&A SESSION*

Readings

o   Stata Guide   ch. 3.3

SESSION 6   COMPARISON

Readings

o   Feinstein *&* Thomas   ch. 6–7

- ○ Urdan   ch. 9 and 14
- ○ Stata Guide   ch. 4

SESSION 7   CORRELATION

Readings

- ○ Urdan   ch. 8
- ○ Feinstein *&* Thomas   ch. 3
- ○ Stata Guide   ch. 5.1

SESSION 8   LINEAR REGRESSION

Readings

- ○ Urdan   ch. 13
- ○ Feinstein *&* Thomas   ch. 4, 8, 9
- ○ Stata Guide   ch. 5.2, ch. 6.1

SESSION 9   *PAPER REVIEWING, Q&A SESSION*

Readings

- ○ Stata Guide   ch. 5.3

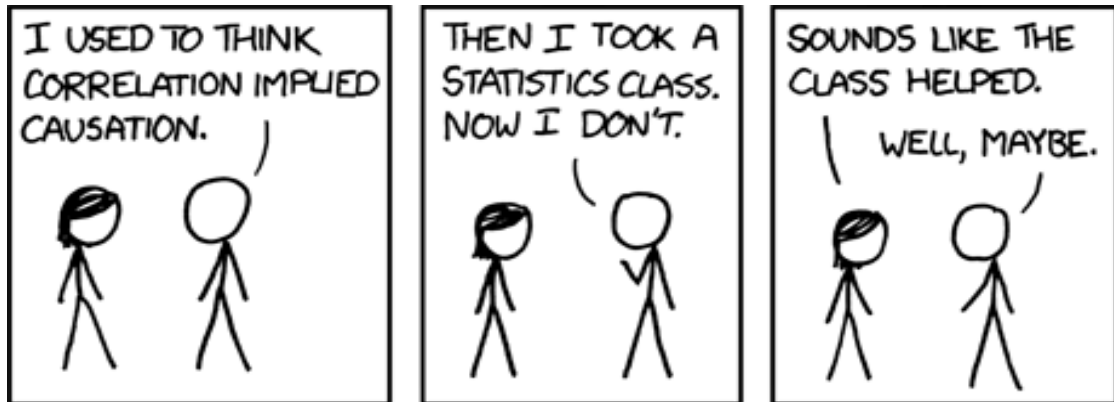## SESSION 10   LOGISTIC REGRESSION

Readings

- ○ Feinstein *&* Thomas   ch. 12.1–12.3 and 13.1–13.3
- ○ Stata Guide   ch. 7

SESSION 11   ADVANCED REGRESSION MATTERS (INTERACTIONS, DIAGNOSTICS)

Readings

- ○ Feinstein *&* Thomas   ch. 10, 11
- ○ Stata Guide   ch. 6.2-6.3

SESSION 12   *FINAL PAPER*