SciencesPo
PARIS SCHOOL OF INTERNATIONAL AFFAIRS

STATISTICAL REASONING AND QUANTITATIVE METHODS

Sciences Po Paris
Fall / Spring 2023

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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. Last, 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 REQUIREMENTS

Students are required to be active participants in the course and to complete required readings prior to class. Course sessions start with a theoretical and practical introduction and end with a 'lab' practice session. In order to learn Stata during the semester, students are required to train as much as needed with the software and to find additional help online if required.

Students are assessed on the basis of a **research project**, which they first submit as a draft, and then as a final paper with replication material. Projects focus on a single dataset and research question that students examine in small groups throughout the course. Expectations about coursework will be outlined in the first class and further detailed at several points.

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.* The grading policy for the course is 25 % for first drafts and 75 % for final projects. Active attendance to all course sessions, which are all computer-based, is required. Students are also asked to elect a student representative and to provide regular feedback on the course.

COURSE SUMMARY
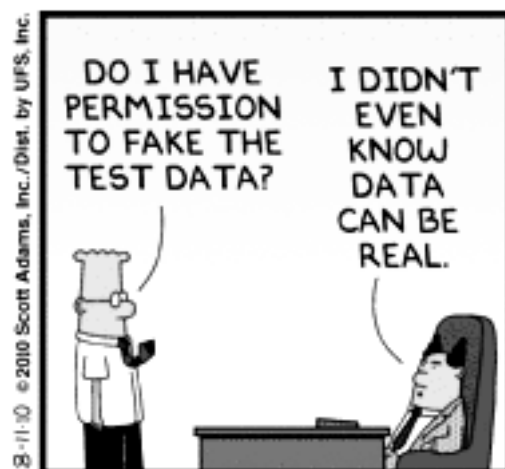
1. Introduction

   Data

2. Datasets

3. Variables

4. Distributions

5. Estimation · *First draft* instructions

   Relationships

6. Associations

7. Correlation

8. Ordinary Least Squares

   Models

9. Linear Regression

10. Logistic Regression

11. Diagnostics

12. Review · *Final paper* instructions

MAIN HANDBOOK

Gerring, J. and Christenson, D. 2017. *Applied Social Science Methodology: An Introductory Guide.* Cambridge University Press.

University of Amsterdam. 2016. *Basic Statistics* and *Inferential Statistics* [video courses]. URL: https://www.youtube.com/channel/UCcjogDXLLQCMtpGvQTNZrOg/playlists

> ***Reading guide***: *Gerring and Christenson is an accessible introduction to (mostly) quantitative social science. You will read 6 of its 22 chapters over the duration of this course, and will possibly watch some additional videos from the University of Amsterdam to complement them.*

STATA HANDBOOKS

Bittmann, F. 2019. *Stata. A Really Short Introduction.* De Gruyter.

Briatte, F. 2012. *This is Stata, a.k.a. The Stata Guide.* Unpublished, and largely outdated.

Mehmetoglu, M. and Jakobsen, T.G. 2017. *Applied Statistics Using Stata: A Guide for the Social Sciences.* Sage.

> ***Reading guide***: *The 'Stata Guide' is a draft (and seriously outdated) handbook that covers most of the course requirements. Where it fails to provide enough information, the two other handbooks, which are simple introductions to Stata for users with no prior knowledge of the software, will come to the rescue. Note that although Bittmann's handbook include instructions to use Stata via point-and-click menus, you will be required to learn and use Stata commands for this course.*

ADDITIONAL READINGS

Baum, C. 2006. *An Introduction to Modern Econometrics Using Stata.* Stata Press.

Long, J.S. and Freese, J. 2014. *Regression Models for Categorical Dependent Variables Using Stata.* 3rd ed. Stata Press.

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

White, L. 2005. "Writes of Passage: Writing an Empirical Journal Article," *Journal of Marriage and Family* 67(4): 791–8.

> ***Reading guide***: *White's article explains the kind of research paper/report that you will have to produce by the end of the course; Baum and Long & Freese are Stata handbooks to read in order to go beyond the scope of this course; and Tufte is a fascinating treaty on 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's article in the additional readings above. Examples of empirical papers using survey or country-level data will be provided in class.

ONLINE TUTORIALS

Additional links to online Stata tutorials are listed at https://f.briatte.org/teaching/quanti.

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).

You will get a weekly email to remind you of what to read, alongside other coursework.

SESSION 1   INTRODUCTION

Readings

o   **Gerring & Christenson**   ch. 4 ('Analyses')
o   **Stata Guide**   s. 1–4

SESSION 2   DATASETS

Readings

o   [**Dataset codebooks**]   *see the course data folder*
o   **Stata Guide**   s. 5–6

SESSION 3   VARIABLES

Readings

o   [**Dataset codebooks**]   *see the course data folder*
o   **Stata Guide**   s. 7–8

SESSION 4   DISTRIBUTIONS

Readings

o   **Gerring & Christenson**   ch. 18 ('Univariate Statistics')
o   **Stata Guide**   s. 9

SESSION 5   ESTIMATION

Readings

o   **Gerring & Christenson**   ch. 19 ('Probability Distributions')
o   *First draft* *instructions (by email)*

SESSION 6   ASSOCIATIONS

Readings

o   **Gerring & Christenson**   ch. 20 ('Statistical Inference')
o   **Stata Guide**   s. 10

SESSION 7   CORRELATION

Readings

- o **Gerring & Christenson**   ch. 21 ('Bivariate Statistics')
- o **Stata Guide**   s. 11 — *section on correlation only*

SESSION 8   ORDINARY LEAST SQUARES

Readings

- o **Gerring & Christenson**   ch. 22 ('Regression')
- o **Stata Guide**   s. 11 — *to be completed*

SESSION 9   LINEAR REGRESSION

Readings

- o **Bittman**   ch. 6 ('Regression Analysis')
- o **Mehmetoglu & Jakobsen**   ch. 4 ('Multiple Regression')

SESSION 10   LOGISTIC REGRESSION

Readings

- o **Bittman**   ch. 8 ('Logistic Regression')
- o **Mehmetoglu & Jakobsen**   ch. 8 ('Logistic Regression')

SESSION 11   DIAGNOSTICS

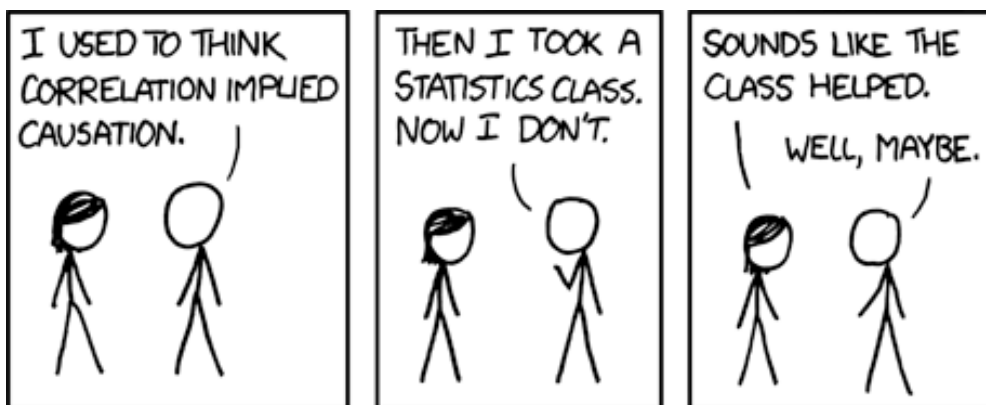*Readings*

- o **Bittman**   ch. 7 ('Regression Diagnostics') and 10 ('Reporting Results')
- o **Mehmetoglu & Jakobsen**   ch. 6 ('Interactions')

SESSION 12   REVIEW

Readings

- o *Final paper* *instructions (by email)*

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