Quantitative methods in social research

Week 1 (Introductory course)

Duration: 12 hours

Format: In person and online

Instructor: (Burak Sonmez)

Course description:

This course is designed to introduce applied researchers to and help them become familiar with quantitative methodologies in empirical social research. The introductory methods course begins with key quantitative concepts, such as measures of central tendency, dispersion, distributions, hypothesis testing, test statistics, confidence intervals, and so on. The following topics cover the fundamentals of linear regression models, dimensionality reduction, interaction effects, primarily focusing on model specifications and assumptions. The methods covered will be demonstrated using R and a variety of example datasets. By the end of the course, students should be able to understand introductory quantitative methods, apply them to their research questions and evaluate their use in published research. Students should also be able to acquire a working knowledge of performing such statistical analyses using R.

Learning schedule:

Day 1	09:00 – 10:45	Introduction to Quantitative Methodology: correlation and causation; research design and formulation; levels of measurement; measures of central tendency; sampling and distributions; and dispersion.
	10:45 – 11:15	Break
	11:15 – 13:00	Hypothesis Testing and T-test for Difference in Means: comparing means across two groups; t-tests for independent samples; and t-tests for dependent samples.

Day 2	09:00 – 10:45	Correlation and Bivariate Linear Regression Models: the idea of correlation; the Pearson correlation; scatterplots and lines of best fit; linear regression with one explanatory variable; regression equations; residuals; and accuracy of prediction.
	10:45 – 11:15	Break
	11:15 – 13:00	Multiple Linear Regression Models: linear regression with multiple explanatory variables; control variables; collinearity and multicollinearity; categorical and dummy variables in regression; comparing coefficients; and model specification and assumptions.
Day 3	09:00 – 10:45	Understanding interaction effects and marginal effects
	10:45 – 11:15	Break
	11:15 – 13:00	Dimensionality reduction (Principal Component Analysis vs Exploratory Factor Analysis)

Prerequisites: This course has no specific prerequisites. Nonetheless, students are strongly encouraged to attend Introduction to R course beforehand if they are not familiar with the basics of R programming language.

Software: R and RStudio

Readings:

There is no specific textbook in this course. Rather, there is a suggested list of various textbooks that will help advance your knowledge on the topics covered in this course.

- Gelman, A., Hill, J., & Vehtari, A. (2020). Regression and Other Stories. Cambridge University Press.
- Gelman, A., & Hill, J. (2006). Data Analysis Using Regression and Multilevel/Hierarchical Models. Cambridge university press.
- Imai, K., & Williams, N. W. (2022). Quantitative Social Science: An Introduction in Tidyverse. Princeton University Press.

Instructor short bio: Burak Sonmez is a Lecturer in Quantitative Social Science in UCL Social Research Institute at University College London. His broad research interests centre around social norms, trust, collective action, beliefs, other-regarding preferences, and social stratification. His studies primarily use experimental methods and computational tools. Prior to joining UCL, he was an LSE Fellow in Quantitative Social Research Methods in the Department of Sociology at London School of Economics and Political Science. He received his Ph.D. In Sociology from University of Essex. He holds a Master's degree in Longitudinal Social Research from the same institution and a Bachelor's degree in Economics from Bilkent University.