Research Design and Methods in Quantitative Research*

Masterseminar Fall 2024

Room 3.B48 Thursdays 14:15-18:00†

1 Course description

Social science is increasingly adopting quantitative research tools, such as experimental, statistical and machine learning methods. Students without a strong mathematical background often struggle to keep up with these developments. Motivated by these facts, this seminar introduces students to quantitative social research with an intuition-based approach. The goal is twofold: first, to provide students with the basic toolset to elaborate the research designs that better fit their needs, and second, to enable them to gain a deeper understanding of specific methods autonomously by making quantitative research accessible. To meet these goals, the seminar will first delineate the fundamental elements of scientific inquiry in the social sciences. With a clear understanding of these elements, the students will be guided through the essential social science approaches for the analysis of quantitative data. Finally, the seminar will also train students to deal with applied quantitative research by providing basic statistical skills, such as producing descriptive statistics, reading regression tables, interpreting statistical tests, and converting hypotheses into an appropriate regression model. Students will learn to

*This version of the syllabus: 10 Dec 2024
†Every two Thursdays.

identify their research goals and elaborate a theory-driven research design. Students are encouraged to think critically to detect and understand the strengths and limitations of specific quantitative analyses.

2 Seminar requirements

This introductory seminar does not require prior knowledge of programming or statistics, though high-school level of mathematical concepts (like the mean of a variable or the idea of a function) will be assumed. The seminar is suitable for students with a qualitative background who want to start learning about quantitative research, as well as for those with some experience in quantitative methods who seek a deeper understanding.

3 Course organization

The course is organized as a bi-weekly seminar that will run during the Fall term of 2024. There will be two sessions every two Thursdays from 14:15 to 18:00. Each session will start with a student presentation of (one of) the supplementary readings. Then, we will delve into the session topic by discussing doubts about the basic readings and expanding on them. To help the discussion, students will be asked to answer a number of questions about the readings that must be uploaded to OLAT before each session. Finally, during the second half of the course, students will have to complete three take-home exercises to apply statistical analyses to real-world data.

4 Learning outcomes

By the end of this course, students will be able to:

1. [**Knowledge**] understand the logic of quantitative social science, differentiate the main targets of scientific inference and identify appropriate methods to serve these goals.

2. [**Competence — reading research**] understand and critically assess quantitative research articles.
3. [**Competence — research design**] identify an appropriate and feasible research design for a given research problem, including an indication of the appropriate statistical tests (when applicable).
4. **(competence - communication)** communicate complex concepts effectively to a broad audience.
5. [**Competence — statistical analysis**] perform simple descriptive and inferential statistical analyses.

5 Textbooks

Each session will be accompanied by a set of basic and supplementary readings. Basic readings typically include an introductory text that covers the fundamental concepts related to the session topic. Supplementary readings usually consist of scientific articles that apply the session's topic or delve deeper into specific areas of interest. Students are encouraged to thoroughly study the basic readings and engage with the supplementary texts, focusing on understanding the main arguments or points presented. Master's students are particularly expected to tackle the supplementary readings.

All texts will be available in the OLAT folder. The basic readings are often based on the following textbooks:

- AJ: Angrist, J. D. (2014). Mastering' metrics: The path from cause to effect. Princeton University Press.
- BCH: Blair, G., Coppock, A., & Humphreys, M. (2023). Research design in the social sciences: declaration, diagnosis, and redesign. Princeton University Press.
- BF: Bueno de Mesquita, E. and Fowler A. (2021). Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis. Princeton University Press.

- GG: Gerber, A. S., & Green, D. P. (2012). Field experiments: Design, analysis, and interpretation. (No Title).
- KKV: King, G., Keohane, R.O., and S. Verba (1994). Designing Social Inquiry. Princeton: Princeton University Press.
- KW: Kellstedt, P. M., and Whitten, G.D. (2013). The Fundamentals of Political Science Research. Third Edition. Cambridge: Cambridge University Press.

Additionally, here are some references that students may find useful to improve their critical reading skills:

- How to read a scientific article
- How to critique a scientific article

Finally, the instructor will provide a selection of supplementary readings that will also be available in OLAT. For the specific readings, see the section *Course schedule* below.

6 Teaching policy

This course is designed as a seminar rather than a traditional lecture. Students are expected to prepare by completing both the basic and supplementary readings in advance. While the lecturer will facilitate the discussion, each session will follow a bottom-up approach, where students are encouraged to raise questions and engage in debates after the presentation. Therefore, active participation from everyone is essential to the success of the class.

7 Integration and interaction policy

Discrimination due to race, gender, ethnicity, or sexual orientation is strictly forbidden in this course. Students are encouraged to use inclusive language and to respect the sexual and gender identification of others. During each session, the lecturer will actively

promote equal participation within the class. More generally, interventions must be carried out respectfully, integrating and engaging with different views and perspectives. Discouraging language or other bullying strategies are strictly forbidden, too.

8 Artificial intelligence (AI) policy

The use of ChatGPT and other generative AI tools for preparing class materials is allowed. However, these tools should augment, not replace, human effort (e.g., students should not copy and paste content directly from these tools). The primary concern is not grades but the quality of class discussions, which are central to evaluation. Relying on AI to substitute for human work will hinder meaningful discussion and, ultimately, not only the grade but the learning outcomes.

To help enforcing this policy, students are required to declare the use of AI and specify its scope in an appendix when submitting presentation slides, take-home exercises, and answers to reading questions.

9 Evaluation

Mandatory requirements (4 credits)

To receive the credits, students are expected to fulfill the following criteria:

1. Attend all the sessions

Attendance is mandatory. Students can miss a maximum of two sessions. Missing more sessions without a justified certificate of absence implies failing the course.

2. Study the mandatory readings before each session

Studying = reading + critical thinking.

Students can find the texts in the materials folder in OLAT.

3. Participate actively

Active engagement involves intervening during the discussion with questions, comments and ideas, reflecting on the content of the readings. Students are always encouraged to raise original arguments and debates.

4. Answer the reading questions of each session

The lecturer will upload a series of questions before each session about the content of the basic reading(s). Students are expected to answer to these questions briefly (one paragraph per question is enough) before each class. Completing these questions is mandatory to pass the course, however, the answers to the questions will not be graded. The idea is to encourage critical thinking when preparing the readings and prepare material to discuss during class.

The **submission rules** are:

- Students must upload their responses to the *Students responses/Readings questions* folder within the specific session folder (e.g., *02_session*) in OLAT.
- The deadline for submitting the responses is the day before the corresponding session, that is, the **previous Wednesday at noon (12:00)**.
- The file must be in Word. The title must always follow the structure *reading_questions_sessionXX_YOURSURNAME* (e.g., *reading_questions_session03_CANALEJO*).

5. Present the supplementary reading of (at least) one of the sessions

Presentations will be conducted individually or in groups of two and will last a maximum of 20 minutes. They will focus on the supplementary reading of the day, which includes a research design related to the topic. Rather than merely summarizing the chosen supplementary reading, the presenter(s) should critically evaluate its research design: Is it fully adequate, or does it have problematic aspects? After identifying the study's main flaws or limitations, the presenter(s) should propose a feasible research design to address these issues and improve or extend the inferential strategy. The schedule of the presentations will be determined during the introductory session. For further guidance, please refer to the "How to Make a Good Presentation" section of this syllabus.

The presentation slides must be uploaded to the *Students responses/Presentation slides* folder in OLAT at least one day before the session, that is, the **previous Wednesday, at noon (12:00)**. The slides can be in PowerPoint or PDF, but the name of the file must always follow the structure *presentation_slides_sessionXX_YOURSURNAME(S)* (e.g., *presentation_slides_session02_CANALEJO*).

6. Complete three take-home exercises

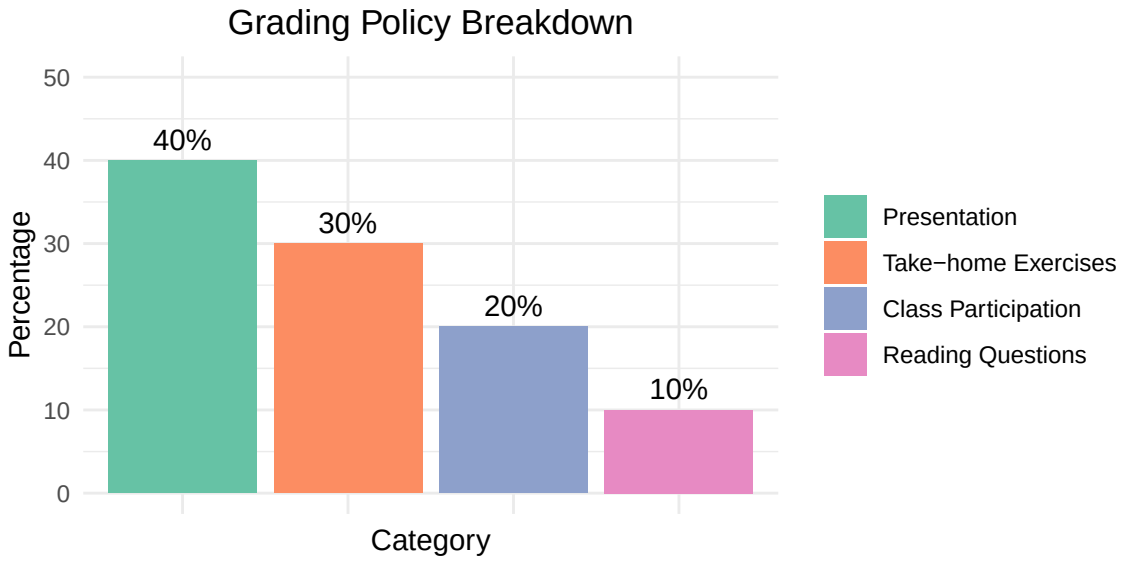
The exercises will take place in the second half of the course. They will build gradually upon each other and involve finding a dataset, developing a research question and hypotheses that can be tested with the data, and conducting basic statistical analyses using R. These exercises may be adapted based on the class needs. For students with prior knowledge of statistics and programming, additional non-mandatory exercises will be assigned.

The responses to the exercises must be uploaded to the *Students responses/Take-home exercises* folder within the specific take-home exercises subfolder (e.g. *Take-home exercise I*). The name of the file must always follow the structure *take-home_exercise_X_YOURSURNAME(S)* (e.g., *take-home_exercise_i_CANALEJO*).

Grading policy

- 10% of the grade is determined by submitting the answers to the reading questions.
- 20% of the grade is determined by the quality and quantity of the participation in class.
- 30% of the grade is determined by the the take-home exercises.
- 40% of the grade is determined by the presentation.

The grade will not only take differences between students into account but also within students' differences over time (i.e., their personal progress).



Masterseminar paper (6 credits)

Students can choose to write a master seminar paper to obtain six extra credits. The seminar paper must have between 7000 and 9000 words. The topic should be agreed upon between the instructor and the student. To this end, students are asked to write a paper outline of 1-2 pages consisting of the following elements:

- Introduction of the topic
- Research question
- Academic and societal relevance
- Theory and hypotheses
- Approach and structure of the paper (including a tentative empirical design)

The deadline for the submission of the paper outline is **December 1st 2024**.

The deadline for the submission of the seminar paper is **April 1st 2024**.

Please refer to the Guidelines on How to Do Research of the Department of Political Science for more details.

10 Office hours

The lecturer has not fixed office hours. Instead, students can send an e-mail at alvaro.canalejo@unilu.ch to schedule a meeting within a one-week time period, either in person or virtually via Zoom.

11 Tutor

A student tutor is available for this seminar. The tutor can help to solve quick doubts and should be contacted to request help with the preparation of the materials whenever the lecturer advises it. Non-mandatory tutorial classes will be available weekly on **Tuesday from 16:00 to 17:30** (at *Hörsaal HS 2*), starting on **the 5th of November**. During these classes, students can prepare their take-home exercises, requesting support from the tutor to complete the assignments. More information about the tutorial classes will be discussed in class.

The contact details of the tutor are:

- Name: **Sara Ndiaye**
- E-mail address: **sara.ndiaye@stud.unilu.ch**

12 How to make a good presentation

- **Summarize the Core Ideas:** Briefly summarize the theoretical argument and key takeaways of the chosen supplementary text in 1-2 slides, taking no more than 3 minutes.
- **Analyze the Research Design:** Describe the research design used in the text, covering aspects like the research question, main hypotheses, method (e.g., comparative, statistical, or experimental), type of data (e.g., cross-sectional or panel data), unit of analysis (individual or aggregate), and key findings. The most critical part is to identify a problematic or unsatisfactory aspect of the design that may limit its application to different contexts or time periods. This could involve flawed conceptualizations, operationalizations, limited external or internal validity, or relevance of the issue. This analysis should be presented in 3-4 slides (5-6 minutes), emphasizing clear and effective communication. Techniques like diagrams, step-by-step reasoning, compact definitions, hypothetical scenarios, examples, and visual aids can help in conveying the ideas effectively.
- **Propose a Solution:** Suggest an original and feasible research design to address the identified problem. The proposed solution should align with the type of issue identified, such as offering a better conceptualization, a more suitable indicator, or a research design that is applicable in broader settings or accounts for omitted variables. The goal is to convince the class of the advantages of this new approach. This section, being the most crucial part of the presentation, should take about 7-9 minutes.
- **Evaluation Criteria:** The presentation will be evaluated based on clarity and communication effectiveness, understanding of key concepts, critical assessment of the research design, ability to engage in class discussion, quality of reasoning, and feasibility of the proposed research design.

- **Avoiding Common Pitfalls:** Poor presentations often suffer from overcrowded slides, superficial content, and poor time management. To avoid these issues, start preparing the presentation at least a week in advance, choose the supplementary text early, sketch the presentation content beforehand, rehearse to ensure it fits within the 20-minute limit, and refine the slides by removing redundant content. Practicing in front of a friend and seeking feedback can also help improve the presentation.

13 Course schedule

Session 1. Introduction (19.09.24 / 14:15–16:00)

Basic readings:

- Schwartz, M. A. (2008). The importance of stupidity in scientific research. Journal of Cell Science, 121(11), 1771-1771.

Session 2. The logic of scientific research (19.09.24 / 16:15–18:00)

Basic readings:

- KKV: pp. 3-33, Chapter 1. The Science in Social Science
- BCH: Chapter 1. What is a research design? & Chapter 2. Research design principles

Supplementary readings:

Presentation by the lecturer.

- Canalejo-Molero, Á., & Le Corre Juratic, M. (2024). Blinded by Out-group Hatred. Why does Radical Party Entry Reduce its Voters' Satisfaction with Democracy?. https://doi.org/10.31219/osf.io/7bfka

Session 3. Theory and research design (03.10.24 / 14:15–16:00)

"All models are wrong, but some are useful" (George E. P. Box)

Basic readings:

- KW: pp. 1-52, Chapter 1. The Scientific Study of Politics & Chapter 2. The Art of Theory Building

Supplementary readings:

Choose one of the two readings.

- Cremaschi, S., & Masullo, J. (2023). The political legacies of wartime resistance: How local communities in Italy keep anti-fascist sentiments alive. Comparative Political Studies, 00104140241252094.
- Dipoppa, G. (2021). How criminal organizations expand to strong states: Migrant exploitation and political brokerage in Northern Italy.

Session 4. Data and measurement (03.10.24 / 16:15–18:00)

Basic readings:

- KW: pp. 104-141, Chapter 5. Measuring Concepts of Interest & Chapter 6. Getting to Know Your Data

Supplementary readings:

The two readings must be prepared together

- Little, A. T., & Meng, A. (2023). Measuring democratic backsliding. PS: Political Science & Politics, 1-13.
- Knutsen, C. H., Marquardt, K. L., Seim, B., Coppedge, M., Edgell, A. B., Medzihorsky, J., ... & Lindberg, S. I. (2024). Conceptual and measurement issues in assessing democratic backsliding. PS: Political Science & Politics, 57(2), 162-177.

Session 5. Descriptive inference (17.10.24 / 14:15–16:00)

Basic readings:

- KKV: pp. 34-74, Chapter 2. Descriptive Inference
- Gerring, J. (2012). Mere Description. British Journal of Political Science, Vol. 42(4): 721-746.

Supplementary readings:

Choose one of the two readings.

- Anderson, C. J., Bol, D., & Ananda, A. (2021). Humanity's attitudes about democracy and political leaders: Patterns and trends. Public Opinion Quarterly, 85(4), 957-986.
- Garzia, D., Ferreira da Silva, F., & Maye, S. (2023). Affective polarization in comparative and longitudinal perspective. Public Opinion Quarterly, 87(1), 219-231.

Session 6. Causal inference (17.10.24 / 14:15–16:00)

Basic readings:

- BF: pp. 11-52, Chapter 2. Correlation: What Is It and What Is It Good For? & Chapter 3. Causation: What Is It and What Is It Good For?
- KV: pp. 75-114, Chapter 3. Causality and Causal Inference

Supplementary readings:

- Hosseinmardi, H., Ghasemian, A., Rivera-Lanas, M., Horta Ribeiro, M., West, R., & Watts, D. J. (2024). Causally estimating the effect of YouTube's recommender system using counterfactual bots. Proceedings of the National Academy of Sciences, 121(8), e2313377121.

Session 7. Predictive inference (31.10.24 / 16:15–18:00)

Publication of ***take-home exercise I*** *in OLAT. The* ***deadline*** *for delivery is in two weeks:* ***14.11.24*** .

Basic readings:

- Grimmer, J., Roberts, M. E., & Stewart, B. M. (2021). Machine learning for social science: An agnostic approach. Annual Review of Political Science, 24(1), 395-419.
- Grimmer, J., Knox, D., & Westwood, S. (2024). Assessing the Reliability of Probabilistic US Presidential Election Forecasts May Take Decades. Working Paper.

Supplementary readings:

- López-Iturriaga, F. J., & Sanz, I. P. (2018). Predicting public corruption with neural networks: An analysis of spanish provinces. Social indicators research, 140(3), 975-998.

Session 8. Experimental studies (31.10.24 / 16:15–18:00)

Basic readings:

- AJ: pp. 1-33. Chapter 1. Randomized trials
- GG: pp. 1-17. Chapter 1. Introduction

Supplementary readings:

Choose one of the two readings.

- Elder, E. M., Enos, R. D., & Mendelberg, T. (2024). The long-term effects of neighborhood disadvantage on voting behavior: The "moving to opportunity" experiment. American Political Science Review, 118(2), 988-1004.

- Voelkel, J. G., Chu, J., Stagnaro, M. N., Mernyk, J. S., Redekopp, C., Pink, S. L., ... & Willer, R. (2023). Interventions reducing affective polarization do not necessarily improve anti-democratic attitudes. Nature human behaviour, 7(1), 55-64.

Additional readings:

- Richardson, D. C., Devlin, J., Hogan, J. S., & Thompson, C. (2023). Small penises and fast cars: Evidence for a psychological link.

Session 9. Large-N observational studies (14.11.24 / 14:15–16:00)

Publication of ***take-home exercise II*** *in OLAT. The* ***deadline*** *for delivery is in two weeks:* ***28.11.24*** *.*

Basic readings:

- KW: pp. 92-99. Chapter 4. Research Design, Section 4.3. Observational Studies (in two flavors)
- AJ: pp. 47-81. Chapter 2. Regression

Supplementary readings:

Choose one of the three readings.

- Turnbull-Dugarte, S. J. (2024). Far from the (Conservative) tree? Sexuality and intergenerational partisan preferences. Journal of European Public Policy, 1-29.
- Wimmer, A., & Feinstein, Y. (2010). The Rise of the Nation-State across the World, 1816 to 2001. American Sociological Review, 75(5), 764-790.
- Ziblatt, D., Hilbig, H., & Bischof, D. (2024). Wealth of tongues: Why peripheral regions vote for the radical right in germany. American Political Science Review, 118(3), 1480-1496.

Session 10. Small-N observational studies (14.11.24 / 16:15–18:00)

Basic readings:

- KW: pp. 77-78. Chapter 4. Research Design, Section 4.1. Comparisons as Key to Establishing Causal Relationships
- Mahoney, J. (2000). Strategies of causal inference in small-N analysis. Sociological methods & research, 28(4), 387-424.
- Collier, D. (2011). Understanding process tracing. PS: political science & politics, 44(4), 823-830.

Supplementary readings:

- Skocpol, T. (1976). France, Russia, China: A structural analysis of social revolutions. Comparative Studies in Society and History, 18(2), 175-210.

Additional readings:

- Hopkin, J. (2010). The comparative method. Theory and methods in political science, 3, 285-307.

Session 11. Statistical testing (28.11.24 / 14:15–16:00)

Publication of ***take-home exercise III*** *in OLAT. The* ***deadline*** *for delivery is in two weeks:* ***12.12.24*** *.*

Basic readings:

- KW: pp. 143-184. Chapter 7. Probability and Statistical Inference & Chapter 8. Bivariate Hypothesis Testing
- BF: pp. 94-111. Chapter 6. Samples, Uncertainty, and Statistical Inference

Supplementary readings:

A different reading may be agreed with the lecturer upon request.

- Dasgupta, A., & Ramirez, E. (2020). Explaining Rural Conservatism: Political Consequences of Technological Change in the Great Plains. American Political Science Review, 1-23.

Session 12. Introduction to regression I (28.11.24 / 16:15–18:00)

Basic readings:

- KW: pp. 188-213. Chapter 9. Two-Variable Regression Models

Supplementary readings:

A different reading may be agreed with the lecturer upon request.

- Polavieja, J. G. (2015). Capturing culture: A new method to estimate exogenous cultural effects using migrant populations. American Sociological Review, 80(1), 166-191.

Session 13. Introduction to regression II (12.12.24 / 14:15–16:00)

Basic readings:

- KW: pp. 215-271. Chapter 10. Multiple Regression: the Basics & Chapter 11. Multiple Regression Model Specification

Supplementary readings:

A different reading may be agreed with the lecturer upon request.

- Pulejo, M., & Querubín, P. (2023). Plata y plomo: How higher wages expose politicians to criminal violence (No. w31586). National Bureau of Economic Research.

Session 14. Conclusion (12.12.24 / 16:15–18:00)

Basic readings:

- HuntingtonKlein, N., Arenas, A., Beam, E., Bertoni, M., Bloem, J. R., Burli, P., ... & Stopnitzky, Y. (2021). The influence of hidden researcher decisions in applied microeconomics. Economic Inquiry, 59(3), 944-960.

Additional readings:

- Cinelli, C., Forney, A., & Pearl, J. (2024). A crash course in good and bad controls. Sociological Methods & Research, 53(3), 1071-1104.