

Quantitative Methods with Survey Data

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Class Room: Bergheimer Str. 58, Room 02.034

Office Hours: via Calendly (see below)

Class Hours: Tuesdays, 14:15-15:45

Description

This seminar offers a hands-on introduction to quantitative techniques for analyzing survey data, with a focus on using R and RStudio. Participants will engage in practical exercises and data analysis to build skills in applying quantitative methods to the study of individual-level attitudes and behavior. Topics include data management, descriptive visualization, modeling techniques, and survey experiments.

The seminar is divided into five parts. The first part introduces the language of quantitative research, including how to formulate research questions, measure concepts, and collect data in survey research. The second part focuses on data management and descriptive statistics, providing a foundation for handling and summarizing data. The third part covers bivariate and multivariate data analysis and visualization, equipping participants to interpret and present their results. The fourth part introduces survey experiments, presenting key designs and discussing data analysis techniques. The fifth part is dedicated to in-class presentations.

Learning Objectives

By the end of the course, students will have designed, conducted, presented, and received feedback on their own empirical analysis. In doing so, they will achieve several key learning outcomes:

1. Understand and apply quantitative research designs using survey data.
2. Estimate and interpret OLS regression models in R.
3. Critically evaluate published quantitative studies.
4. Work effectively with R and RStudio.
5. Present and discuss quantitative research findings effectively.

Course Requirements

This seminar is designed for BA students and assumes no prior experience with statistics or R, though previous exposure to quantitative methods will be helpful.

Weekly attendance is mandatory. If you cannot attend, please email me before the respective session. In addition, active participation includes reading the assigned texts, engaging with in-class discussions, asking questions, contributing to debates, and providing constructive peer feedback.

Reading the texts is imperative for the success of the seminar; without having read the readings, the seminar will be very difficult to follow, and over time, the material will become overwhelming.

| 2 credit points | 2 + 6 credit points |
|--|--|
| <ul style="list-style-type: none"> • Active participation in class • Reading the literature • Doing (group) exercises • In-class presentation (see below) | <ul style="list-style-type: none"> • Active participation in class • Reading the literature • Doing (group) exercises • In-class presentation (see below) • Term paper: 5,000 words |

Office Hours

Office hours are by appointment. Please use Calendly via this link to register for office hours: <https://calendly.com/endre-borbath/office-hour>.

We can meet on site in room 03.033 (Bergheimer Str. 58, 69115 Heidelberg) or online via the following Zoom link: <https://eu02web.zoom-x.de/my/eborbath>. If the appointment is scheduled as a face-to-face meeting on campus but you would prefer to meet online, please send me an email or indicate this preference through the Calendly interface.

Online Learning

I provide the course literature in advance via Moodle (<https://moodle.uni-heidelberg.de/>) and also use the platform for general course information. Please contact me with any questions regarding the course literature, technical problems with Moodle, or other organizational issues.

Presentations

Every student receiving credit points for the seminar must present in class. For this, each student is required to **formulate a research question and individually conduct empirical analysis** using the techniques we learned in class. In addition, **each student is required to discuss the presentation of one of their peers**.

The presentation should be **no longer than 10 minutes**. **You are required to email me your slides a week before the presentation, by Monday noon.** This allows the discussants to have a week to prepare their feedback. The presentations will also be uploaded to Moodle and made available to all students in the class.

A successful presentation has 4-5 slides, with the following structure:

1. What is the research question? What is the main thesis/theoretical expectation? What data is being used? How are the main concepts operationalized? (1-2 slides)
2. What are the key results? Include figures rather than tables (e.g., a coefficient plot instead of a regression table). (1-2 slides)

3. What are the main conclusions that we can draw from the analysis? How does that relate to the research question and theoretical expectation? What were some of the challenges in conducting the empirical analysis? (1 slide)

Following this structure helps ensure the presentation is concise and covers all essential elements. However, it needs to be adapted to each presentation. Focus on the most relevant aspects, but ensure that your presentation provides a comprehensive overview that showcases the empirical analysis you have conducted.

As a discussant, you are required to critically evaluate the strengths and weaknesses of the analysis, suggest ideas for refinement and further development, and ask at least one question. The question would ideally relate to the empirical analysis presented. **Discussants do not need slides, and are expected to talk for 2-3 minutes.**

Term Paper

A term paper should be 5,000 words (BA), including references and footnotes. The deadline for this paper is the end of the winter term, **31st March 2026**. The paper is the final ‘product’ of the seminar, allowing you to showcase what you have learned throughout the semester. **You are strongly encouraged to write the term paper on the same topic on which you have presented.**

The term paper should present a clear research question and answer it based on original empirical analysis. This is the critical requirement for assessment. A successful term paper follows a clear structure, where the research question is introduced, the analysis is positioned in the relevant debates, theoretical expectations are formulated, the data source, the key measures, and the method are discussed, the results are presented, and conclusions are drawn with a view towards the research question and expectations. The empirical analysis should include a descriptive account of the phenomenon being studied (dependent variable), as well as a correlational analysis where (some of) its predictors are explored. It is not required to identify causal relationships in the term paper. The topic of the term paper should relate to the field of political behaviour.

Formatting

Please format the term paper according to the following guidelines:

- **Title page:** include the paper title, course name, semester, your name, student ID, department/institution, and email address.
- **Font & spacing:** use a 12-point serif font (e.g., Times, Palatino) with 1.5-line spacing; footnotes in 10-point font, single spacing.
- **Margins & layout:** all margins should be at least 2.5 cm.
- **Page numbers:** number all pages (except the title page) consecutively, placed at the bottom center or bottom right.
- **Structure:** include a table of contents with section and subsection titles and page numbers. Use meaningful headings (avoid merely Section 1, 2, 3). You do not need to number the sections or subsections.
- **Abstract:** all papers must include an abstract of no more than 250 words. See my recommendation on writing a suitable abstract below.

- **Sections:** the paper should consist of an *Introduction*, *Main Body*, and *Conclusion*. Use subsections as needed, but avoid over-fragmentation. Format headings as follows: level 1 14-point bold; level 2 12-point bold; level 3 12-point italic. Do not use more than three levels.
- **Figures and tables:** all figures and tables must have a number, a title, and a note. Each should be self-explanatory. If you use color, ensure that it remains distinguishable when printed in black and white.
- **Citations & footnotes:** mark all non-original arguments or borrowed ideas with citations, ideally using the Chicago citation style. I recommend using a reference manager such as Zotero (see below).
- **Bibliography / References:** at the end, list all sources cited in alphabetical order. Do not include works not cited in the text.
- **Appendices:** appendices (if needed) do not count toward the main text length; label them clearly (Appendix A, Appendix B, etc.).
- **Declaration of originality:** include a short statement (on the title page or at the end) confirming that you have written the paper independently and used only the stated sources.

Academic Writing and Reading

On writing research papers:

Minkoff, Scott L. 2012. "A Guide to Developing and Writing Research Papers in Political Science," https://kevinlyles.digital.uic.edu/wp-content/uploads/2021/08/minkoff_researchpaper_guide_v4.pdf.

On writing a good abstract:

Gilardi, Fabrizio. 2021. "Good Abstracts: A Template," <https://www.fabriziogilardi.org/resources/papers/good-abstracts.pdf>.

Templates for writing:

Graff, Gerald, and Cathy Birkenstein. 2018. *They Say, I Say: The Moves That Matter in Academic Writing*. Fourth edition. New York: W. W. Norton. ISBN: 0-393-63167-2. <https://tinyurl.com/bdec4eeex>.

General tips for writing

Catherine de Vries' Substack: Respect the Marble (<https://catherineunicedevries.substack.com>)

On reading efficiently:

Pacheco-Vega, Raul. 2020. "Reading Strategies," <http://www.raulpacheco.org/resources/reading-strategies>.

Note: Raul Pacheco-Vega's blog is a valuable resource for academic writing in general!

Software Recommendation:

I use Google Scholar and Zotero (both freely available) for literature search. For note-taking, I use Obsidian (also freely available). I recommend that you learn how to use these software tools (or their alternatives), as the investment pays off later during your studies. YouTube has many tutorial videos, and I am also happy to help if you have questions.

Academic Integrity and Mental Health

Plagiarism

Students must comply with the university policy on academic integrity found at <https://www.ub.uni-heidelberg.de/en/service/detecting-plagiarism>. In addition, please also familiarize yourself with the Study Guide https://www.uni-heidelberg.de/politikwissenschaften/bachelor_recht.html. Not knowing the rules is no excuse for plagiarism!

Use of AI

If you use AI (ChatGPT, Claude, etc.) to write your term paper, you are required to be transparent about it. More specifically, list the prompts and answers in a separate appendix at the end of the term paper. This appendix does not count towards the word count.

You do not need to list the use of AI for grammar corrections (e.g., DeepL Write, Grammarly, etc.). You are also allowed to use AI for coding, data analysis, and programming, but remember to critically evaluate AI-generated content and use it as a supportive tool rather than as a primary author.

Please remember always to respect the rules of academic integrity and honesty! Plagiarism will be handled according to university policy.

Mental Health

Many students feel overwhelmed by the tasks and responsibilities during their studies, especially if they are new to Germany and Heidelberg. This is normal! If you feel that you are not able to cope alone, please consider approaching the psychosocial counselling service offered free of charge by the student services at <https://www.uni-heidelberg.de/en/study/advisory-services/psychosocial-counselling-for-students-pcs>. If you are having difficulties, e.g., with the term paper, please do not hesitate to approach me.

Schedule and Readings

Block I: Introduction

Session 1, 14.10.2025 - Introducing the seminar

- Get to know each other
- Introduce the syllabus
- Clarify expectations

Session 2, 21.10.2025 - Research questions and theory building

- How to specify answerable research questions in quantitative research?
- How to build theories and formulate testable expectations?

Required:

Kellstedt, Paul M., and Guy D. Whitten. 2018a. "The Art of Theory Building." In *The Fundamentals of Political Science Research*, 25–55. Cambridge: Cambridge University Press.

———. 2018b. "Evaluating Causal Relationships." In *The Fundamentals of Political Science Research*, 56–76. Cambridge: Cambridge University Press.

Session 3, 28.10.2025 - Research design and measurement

- What is the difference between observational and experimental research designs?
- What are validity and reliability, and how can we assess them in the measurement of theoretical concepts?

Required:

- Kellstedt, Paul M., and Guy D. Whitten. 2018a. "Research Design." In *The Fundamentals of Political Science Research*, 77–103. Cambridge: Cambridge University Press.
- . 2018b. "Measuring Concepts of Interest." In *The Fundamentals of Political Science Research*, 104–124. Cambridge: Cambridge University Press.

Block II: Data management and descriptive statistics**Session 4, 04.11.2025 - Data sources and distributions**

- What are the main alternative data sources for studying individual-level attitudes, party competition, and protest dynamics?
- How do I import datasets into R using R-Studio?
- What types of variables exist?
- How can we characterize distributions?
- Integrating GitHub Copilot & ChatGPT in data analysis

Required:

- Kellstedt, Paul M., and Guy D. Whitten. 2018a. "Getting to Know Your Data." In *The Fundamentals of Political Science Research*, 125–142. Cambridge: Cambridge University Press.
- . 2018b. "Probability and Statistical Inference." In *The Fundamentals of Political Science Research*, 143–160. Cambridge: Cambridge University Press.
- Wickham, Hadley, Mine Çetinkaya-Rundel, and Garrett Grolemund. 2023a. "Introduction." In *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. Beijing Boston Farnham Sebastopol Tokyo: O'Reilly Media. ISBN: 978-1-4920-9740-2. <https://r4ds.hadley.nz/intro>.
- . 2023b. "Chapter 7: Data Import." In *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. Beijing Boston Farnham Sebastopol Tokyo: O'Reilly Media. ISBN: 978-1-4920-9740-2. <https://r4ds.hadley.nz/data-import>.
- Review the list of datasets available at <https://github.com/erikgahner/PolData>

Session 5, 11.11.2025 - Data transformation

- How do I filter rows, select columns, and mutate values?
- What is the long and wide data format, and how do I move between them?

Required:

Wickham, Hadley, Mine Çetinkaya-Rundel, and Garrett Grolemund. 2023a. “Chapter 3: Data Transformation.” In *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. Beijing Boston Farnham Sebastopol Tokyo: O'Reilly Media. ISBN: 978-1-4920-9740-2. <https://r4ds.hadley.nz/data-transform>.

———. 2023b. “Chapter 5: Data tidying.” In *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. Beijing Boston Farnham Sebastopol Tokyo: O'Reilly Media. ISBN: 978-1-4920-9740-2. <https://r4ds.hadley.nz/data-tidy>.

Session 6, 18.11.2025 - Data visualization

- How do I plot the distribution of various types of variables?
- How do I visualize the relationship between two (or more) variables?

Required:

Wickham, Hadley, Mine Çetinkaya-Rundel, and Garrett Grolemund. 2023. “Chapter 1: Data Visualization.” In *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. Beijing Boston Farnham Sebastopol Tokyo: O'Reilly Media. ISBN: 978-1-4920-9740-2. <https://r4ds.hadley.nz/data-visualize>.

Tufte, Edward R. 2001. “Graphical Excellence.” In *The Visual Display of Quantitative Information*, 13–52. Cheshire, Connecticut: Graphics Pr. ISBN: 978-1-930824-13-3.

Block III: Data modelling and hypothesis testing

Session 7, 25.11.2025 - Bivariate hypothesis testing

- What are t-tests, p-values, and r-values?
- How to conduct a bivariate regression?

Required:

Kellstedt, Paul M., and Guy D. Whitten. 2018a. “Bivariate Hypothesis Testing.” In *The Fundamentals of Political Science Research*, 161–187. Cambridge: Cambridge University Press.

———. 2018b. “Two-Variable Regression Models.” In *The Fundamentals of Political Science Research*, 188–214. Cambridge: Cambridge University Press.

Session 8, 02.12.2025 - Multivariate OLS regression

- How can we extend the bivariate framework to a multivariate setting?
- How do we estimate a multivariate OLS model using R and present the results?

Required:

Kellstedt, Paul M., and Guy D. Whitten. 2018. “Multiple Regression: the Basics.” In *The Fundamentals of Political Science Research*, 215–245. Cambridge: Cambridge University Press.

Block IV: Advanced topics

Session 9, 09.12.2025 - Interactions in multivariate OLS regression

- How do we specify a multivariate OLS model with interactions?
- How do we plot the results of interactions?

Required:

Kellstedt, Paul M., and Guy D. Whitten. 2018. "Multiple Regression Model Specification." In *The Fundamentals of Political Science Research*, 246–272. Cambridge: Cambridge University Press.

Session 10, 16.12.2025 - Survey experiments

- What are the most common survey experiment designs?
- How do we analyze survey experiments?

Required:

Sniderman, Paul M. 2011. "The Logic and Design of the Survey Experiment: An Autobiography of a Methodological Innovation." In *Cambridge Handbook of Experimental Political Science*, edited by James N. Druckman, Donald P. Greene, James H. Kuklinski, and Arthur Lupia, 102–114. Cambridge: Cambridge University Press. ISBN: 978-0-511-92145-2. <https://doi.org/10.1017/CBO9780511921452.008>.

Hainmueller, Jens, Daniel J. Hopkins, and Teppei Yamamoto. 2014. "Causal Inference in Conjoint Analysis: Understanding Multidimensional Choices via Stated Preference Experiments." *Political Analysis* 22 (1): 1–30. <https://doi.org/10.1093/pan/mpt024>.

Block V: In-class presentations

Session 11, 06.01.2026 - NO SESSION

- Epiphany holiday

Session 12, 13.01.2026 - In-class presentations

- Student presentations

Session 13, 20.01.2026 - In-class presentations

- Student presentations

Session 14, 27.01.2026 - In-class presentations

- Student presentations

Session 15, 03.02.2026 - In-class presentations & feedback session

- Student presentations
- Feedback session on the content and organization of the seminar, with an open discussion on what you liked, disliked, or learned from the seminar.