

**Summer Term 2023****Research Design and Research Logic****Instructor:** Leonce Röth

Time: Friday 14.04 | 10:00-11:30 (Initial Session)

Block I: Saturday 10.06 | 10-16.00

Block II: Saturday 08.07 | 10-16.00

Place Block I + II: Building 211, S105

Place First Session: 14.04.2023, Building 211, Room 3.40 (3<sup>rd</sup> floor)**Office hours:** [leonce.roeth@uni-koeln.de](mailto:leonce.roeth@uni-koeln.de)

On-demand by appointment.

**Registration**

Registration for the exam in KLIPS2.

**Course description**

Usually, whenever there is a big fire, there are also fire workers. Should we close all fire stations to prevent future outbreaks? There is also evidence that people who are infected with Covid-19 and get hospitalized have a higher probability of dying than infected people who are not hospitalized. Should we stop hospitalizing infected people? For both questions, the answer should be “no” because the suggested answers “get the causality wrong”, yet for different reasons.

In this course, you will learn how to systemize your causal thinking and reasoning and learn about different research designs for answering causal research questions. In the first part, we will discuss what it means to infer causation.

In part two, you will make the first steps to systemize your causal and theoretical thinking using directed acyclic graphs (DAGs) as a modern, informal tool of causal mapping. Simple DAGs can demonstrate why the closing of fire stations and non-hospitalization of infected people wouldn't help much in preventing fires and deaths caused by Covid-19. More generally, DAGs can give one an idea about what causal research questions can be answered in principle and how. In the third part, we will discuss different research designs (a map or plan for answering a research question). We will structure and compare the designs across common dimensions – few cases vs many cases; experimental vs observational; qualitative vs quantitative – and carve out their unique strengths and weaknesses for answering research questions. At the end of the course, you will be familiar with (1) the basic elements of causality-oriented empirical research; (2) different understandings of causation; (3) how to theorize causal models, use DAGs to visualize them and understand what they imply for your analysis; (4) a variety of research designs and the research questions one can (and cannot) answer with them. Finally, we concluded based on meta-studies how much we can trust the findings of different designs and how to increase the credibility of social science research.

## Part I: Foundations

### 14.04.2023: Varieties of research, designs, research goals, and questions

Halperin, Sandra and Oliver Heath (2012): Political Research: Methods and Practical Skills. Oxford, New York: Oxford University Press: Chapter 2. (*A requirement to read!*)

- The chapter gives an overview of different ways of doing political research. We zoom in on research aiming at making causal inferences for the rest of the course, but it is important to know there is more to political research.

King, Gary, Robert O. Keohane and Sidney Verba (1994): Designing Social Inquiry: Scientific Inference in Qualitative Research. Princeton: Princeton University Press: Chapter 1. (*A requirement to read!*)

- Summarizes some elements of good research design.

Halperin, Sandra and Oliver Heath (2012): Political Research: Methods and Practical Skills. Oxford, New York: Oxford University Press: Chapter 4. (*A requirement to read!*)

- A general overview of research questions and the main research goals that inform questions.

Toshkov, Dimiter (2016): Research Design in Political Science. Palgrave: 23-44.

- A slightly different taxonomy of research goals

Day, Christopher and Kendra L. Koivu (2018): Finding the Question: A Puzzle-Based Approach to the Logic of Discovery. Journal of Political Science Education 15 (3): 377-386.

- Focuses on puzzles as one specific way of formulating questions that is probably the most popular one in political science. We will see whether puzzles deserve this popularity or not.

## Block I

### 10.06.2023: Causation, causal inference, and causal mediation

#### Causation and causal inference

Rohlfing, Ingo and Christina Isabel Zuber (2021): Check Your Truth Conditions! Clarifying the Relationship between Theories of Causation and Social Science Methods for Causal Inference. *Sociological Methods & Research* 50 (4): 1623-1659. *(A requirement to read!)*

- This paper gives an overview of different perspectives on causation and causal inferences that have been developed over the decades (or even centuries, when we go back to Hume in the 18th century)

Huntington-Klein, Nick (2021): *The Effect: An Introduction to Research Design and Causality*. Boca Raton: Chapman and Hall/CRC: chapter 5 (<https://theeffectbook.net/chIdentification.html>).

- The book has not been published yet, but the author has put all chapters online. Hence, I include the URLs here. This chapter introduces the idea of 'identification' using Directed Acyclical Graphs (DAGs) that is central for the following discussions.

Huntington-Klein, Nick (2021): *The Effect: An Introduction to Research Design and Causality*. Boca Raton: Chapman and Hall/CRC: chapters 6 (<https://theeffectbook.net/chCausalDiagrams.html>), 7 (<https://theeffectbook.net/ch-DrawingCausalDiagrams.html>). *(A requirement to read!)*

- A relatively intuitive way to visualize causal models, aka directed acyclic graphs (DAGs).

Huntington-Klein, Nick (2021): *The Effect: An Introduction to Research Design and Causality*. Boca Raton: Chapman and Hall/CRC: chapter 8. (<https://theeffectbook.net/chCausalPaths.html>)

- Once we have covered the basics of causal models, we discuss how one can use them to think about whether and how one can learn something about the causal effect of a variable. The backdoor criterion is one of the strategies to identify whether a variable is causal.
- **Empirical example:** Mutz, Diana C. (2016): Harry Potter and the Deathly Donald. *PS: Political Science & Politics* 49 (4): 722-729.
- We use this text, which does not include a causal diagram, to construct one ourselves to see how sound the quantitative analysis is (one does not need to anything about regression for this).

#### Inferring Causal Mediation

Röth, Leonce (2023): Pathway analysis, causal mediation and the identification of causal mechanisms. In Negri, F. and Damonte, A. (Eds.). *Causality in Policy Studies*. Springer.

- **Empirical example:** *(these papers/blogs will be individually assigned as a reading)*

Miguel, E., & Kremer, M. (2004). Worms: identifying impacts on education and health in the presence of treatment externalities. *Econometrica*, 72(1), 159-217.

Humphreys, Macartan (2015). What Has Been Learned from the Deworming Replications: A Nonpartisan View. <http://www.columbia.edu/~mh2245/w/worms.html>

Ozier, O. (2021). Replication Redux: The Reproducibility Crisis and the Case of Deworming. *The World Bank Research Observer*, 36(1), 101-130.

The first is an influential study that triggered a causal identification debate and the second is a blog that covered this debate until a certain point in 2015. The last is a recent replication paper of the first.

## Inferring Causal Processes

Bennett, Andrew and Jeffrey Checkel (2014): *Process Tracing: From Methodological Roots to Best Practices*. Andrew Bennett and Checkel, Jeffrey (ed.): *Process Tracing in the Social Sciences: From Metaphor to Analytic Tool*. Cambridge: Cambridge University Press: 1-37.

- The text gives good overviews of what process tracing and mechanisms are and what they are good for.

The following three texts are representatives of the three key perspectives on inference in process tracing.

Fairfield, T., & Charman, A. E. (2017). Precise Bayesian analysis for process tracing: Guidelines, opportunities, and caveats. *Political Analysis*, 25(3), 363-380.

- This is a recent appraisal of the Bayesian perspective.

Runhardt, R. W. (2022). Concrete Counterfactual Tests for Process Tracing: Defending an Interventionist Potential Outcomes Framework. *Sociological Methods & Research*.

- This is a recent appraisal of the counterfactual perspective.

Beach, D., & Pedersen, R. B. (2019). *Process-tracing methods: Foundations and guidelines*. The University of Michigan Press. (Chapter 5).

- This is an influential Book advocating the physical process view as an inferential perspective.

Fairfield, T., & Charman, A. (2015). Formal Bayesian process tracing: guidelines, opportunities, and caveats.

- This is a paper showing how formalized Bayesian process tracing might look like – including an example of a tax reform in Chile.

## Examples:

Juliet Kaarbo, Kai Oppermann, Ryan K Beasley, What if? Counterfactual Trump and the western response to the war in Ukraine, *International Affairs*, Volume 99, Issue 2, March 2023, Pages 605–624.

- A recent example of a process that involves counterfactuals.

Smeets, S., & Beach, D. (2020). Political and instrumental leadership in major EU reforms. The role and influence of the EU institutions in setting up the Fiscal Compact. *Journal of European Public Policy*, 27(1), 63-81.

- A recent example aiming for seamless productive continuity

## Block II - Research designs for causal inference

### Basics of (quantitative) designs

Keele, Luke (2015): *The Statistics of Causal Inference: A View from Political Methodology*. *Political Analysis* 23 (3): 313-335.

- Introduces the distinction between design-based inference and model-based inference and different ways to make both types of inferences.

Angrist, Joshua D. and Jörn-Steffen Pischke (2009): *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton: Princeton University Press: Chapter 2.

- This chapter is focused on quantitative research and designs. This is useful, but we will broaden the perspective and apply the general idea behind their approach to quantitative and qualitative methods.

### Natural experiments

Dunning, Thad (2008): *Natural Experiments in the Social Sciences: A Design-Based Approach*. Cambridge: Cambridge University Press: Chapter 2. (*A requirement to read!*)

- **Empirical illustration:** (*these papers will be individually assigned as a reading*)

Silva, Bruno Castanho and Sven-Oliver Proksch (2020): Fake It 'Til You Make It: A Natural Experiment to Identify European Politicians' Benefit from Twitter Bots. *American Political Science Review*: 1-7.

Erikson, R. S., & Stoker, L. (2011). Caught in the draft: The effects of Vietnam draft lottery status on political attitudes. *American Political Science Review*, 105(2), 221-237.

### Regression-discontinuity designs and instrumental variables

Dunning, Thad (2008): *Natural Experiments in the Social Sciences: A Design-Based Approach*. Cambridge: Cambridge University Press: Chapter 3.

Smith, Leah M., Linda E. Lévesque, Jay S. Kaufman and Erin C. Strumpf (2017): Strategies for evaluating the assumptions of the regression discontinuity design: A case study using a human papillomavirus vaccination program. *International Journal of Epidemiology* 46 (3): 939-949.

- **Empirical illustration:** (*these papers will be individually assigned as a reading*)

Eggers, A. C., & Hainmueller, J. (2009). MPs for sale? Returns to office in postwar British politics. *American Political Science Review*, 103(4), 513-533.

Angrist, J. D., Battistin, E., & Vuri, D. (2017). In a small moment: Class size and moral hazard in the Italian Mezzogiorno. *American Economic Journal: Applied Economics*, 9(4), 216-249.

### Comparative case studies

Lijphart, Arend (1971): *Comparative Politics and the Comparative Method*. *American Political Science Review* 65 (3): 682-693.

- A classic, foundational text on case comparisons that popularized the term “the comparative method”.

Rohlfing, Ingo (2012): *Case Studies and Causal Inference: An Integrative Framework*. Basingstoke: Palgrave Macmillan: Chapter 4. (*A requirement to read!*)

- A text on comparative case studies that synthesizes work on case comparisons. The difference between correlational and set-relational research can be ignored because it is not relevant anymore (you will have seen why when we got to this part of the course).

**Empirical illustration:** Eckert, Sandra (2010): *Between Commitment and Control: Varieties of Delegation in the European Postal Sector*. *Journal of European Public Policy* 17 (8): 1231 - 1252.

### Process tracing

Bennett, Andrew and Jeffrey Checkel (2014): *Process Tracing: From Methodological Roots to Best Practices*. Andrew Bennett and Checkel, Jeffrey (ed.): *Process Tracing in the Social Sciences: From Metaphor to Analytic Tool*. Cambridge: Cambridge University Press: 1-37.

- Both texts together give good overviews of what process tracing and mechanisms are and what they are good for.

**Empirical illustration:** Bonjour, Saskia (2011): *The Power and Morals of Policy Makers: Reassessing the Control Gap Debate*. *International Migration Review* 45 (1): 89-122.

Moravcsik, A. (2013). *The choice for Europe: Social purpose and state power from Messina to Maastricht*. Routledge. (chapter 3: *Grain and Grandeur: Consolidating the Common Market, 1958-1969*).

Lieshout, R. H., Segers, M. L., & Vleuten, A. M. V. D. (2004). *de Gaulle, Moravcsik, and the choice for Europe: soft sources, weak evidence*. *Journal of Cold War Studies*, 6(4), 89-139.

### The credibility of research designs in the social science

Arel-Bundock, V., Briggs, R. C., Doucouliagos, H., Mendoza Aviña, M., & Stanley, T. D. (2022). *Quantitative political science research is greatly underpowered (No. 6)*. I4R Discussion Paper Series.

Brodeur, A., Cook, N., & Heyes, A. (2020). Methods matter P-hacking and publication bias in causal analysis in economics. *American Economic Review*, 110(11), 3634-3660. (***A requirement to read!***)

Lal, A., Lockhart, M. W., Xu, Y., & Zu, Z. (2021). How much should we trust instrumental variable estimates in political science? Practical advice based on over 60 replicated studies. *Practical Advice based on Over, 60 replicated studies*

Stommes, D., Aronow, P. M., & Sävje, F. (2021). On the reliability of published findings using the regression discontinuity design in political science. *arXiv preprint arXiv:2109.14526*.

Lieshout, R. H., Segers, M. L., & Vleuten, A. M. V. D. (2004). de Gaulle, Moravcsik, and the choice for Europe: soft sources, weak evidence. *Journal of Cold War Studies*, 6(4), 89-139.

### Exam and grading

- The exam in this course is the portfolio exam. Participants have to submit multiple assignments.
- The final grade depends on all assignments. The final grade is determined based on the sum of the points across all assignments and is graded using a 100-point scale (see below).
- Failing a single assignment does not have consequences. Only passing in the end matters.
- The assignments will be graded and returned to the participants with comments.
- Submissions have to be made on ILIAS.

#### Total number of points and final grade

Points	Grade
100-95	1
94,5-90	1,3
89,5-85	1,7
84,5-80	2
79,5-75	2,3
74,5-70	2,7
69,5-65	3
64,5-60	3,3
59,5-55	3,7
54,5-50	4
0-49	5

You have to perform three assignments in this course. More details will be shared later during the term. The details about the assignments will be in Ilias. The assignments are set up to apply to the student's research agenda, those might include term papers, a final thesis, or Ph.D. designs.

Task	Deadline	Points
Write a short essay with a research question and its justification	20.05.2023 (incl.)	15
Based on the research question, formulate hypotheses on a causal	20.06.2023 (incl.)	35

relationship of your choice, draw and discuss a causal model (DAG)		
Discuss a research design based on your prior submissions.	01.09.2023 (incl.)	50