

Introduction to Causal Data Analysis and Modeling with Coincidence Analysis

May 19 – 22, 2025

The National Research Centre for the Working Environment (NFA), Copenhagen

main instructor:

Michael Baumgartner, University of Bergen, Norway

additional presentations by:

Deborah Cragun, University of South Florida, USA

Jonathan Freitas, University of Minas Gerais, Brazil

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Workshop Description

This workshop offers an intensive 4-day introduction to causal modeling with Coincidence Analysis (CNA), a novel configurational comparative method of data analysis geared towards causal complexity, which has seen a considerable uptick in applications in recent years (click [here](#) for references). **No prior knowledge of CNA is required.**

In plenary lectures, the main developer of CNA, Michael Baumgartner, and a team of experienced CNA methodologists and practitioners will guide participants through the nuts and bolts of configurational data analysis and cutting-edge methodological innovations, as well as offer advice on practical issues such as getting funded and published with CNA. In smaller practice groups, the understanding of the material will be deepened through exercises and the instructors will demonstrate how to make the most of current software for CNA.

From Boolean algebra and the philosophical roots of regularity theories of causation, over the basic ideas behind CNA's search algorithm, and measures of fit to multi-outcome structures, model ambiguities, and robustness analyses this introduction will enable participants to conduct CNA analyses themselves and review those of other researchers in a sophisticated manner.

In addition, this will be an opportunity to get to know researchers working with and on CNA from all over the world—in beautiful [Copenhagen](#).

On the two days after the workshop (i.e. May 23-24), there will be a **conference on CNA** at the same venue (NFA, Copenhagen). Participants of the training workshop will be invited to attend that conference as well. More information about the conference can be found [here](#). Moreover, the instructors will remain available for consultation after the event to help participants with the methodological and practical aspects of their research projects.

Pre-Workshop R Installation

This year, we are offering two preparatory Zoom meetings before the actual workshop. They will take place at two different times to accommodate participants from different continents. The purpose of these meetings is to ensure that everyone has a working R environment on the computer they will bring to Copenhagen.

<i>European Zoom Meeting to set up R</i>	
<i>Tuesday, 6 May 2025</i>	
Central European Time	13:00 - 14:30 (1PM - 1.30PM)
	Zoom link
<i>US Zoom Meeting to set up R</i>	
<i>Tuesday, 13 May 2025</i>	
Eastern Time (US)	1PM - 2.30PM (13:00 - 14:30)
	Zoom link

Workshop Schedule

<i>Day</i>	<i>Module and Topics Covered</i>
<i>Day 1; Monday, 19 May 2025</i>	
09:00 - 09:15	Welcome
09:15 - 10:30	Module 1.1: Methodological Landscape and the Essentials of Boolean Algebra
10:30 - 10:50	Break
10:50 - 12:00	Module 1.2: The Theory of Causation Behind CNA
12:00 - 13:15	Lunch Break
13:15 - 14:15	Module 1.3: The Principles of Configurational Causal Discovery
14:15 - 14:30	Break
14:30 - 15:45	Module 1.4: Top-down vs. Bottom-up Search / the CNA Algorithm
15:45 - 16:15	Break

16:15 - 17:45 **Bonus Session:** Introduction to R for those new to R

19:00 Workshop Dinner at **Pintxos**, Nansensgade 63

Essential readings

- Baumgartner, Michael. 2020. "Causation." In: *The SAGE Handbook of Political Science*, ed. by D. Berg-Schlosser, B. Badie, and L. Morlino, London: SAGE, pp. 305-321. (brief overview of theories of causation)
- Baumgartner, Michael, and Mathias Ambühl. 2020. "Causal modeling with multi-value and fuzzy-set Coincidence Analysis." *Political Science Research and Methods* 8 (3):526-42. (introduction of the CNA algorithm)
- Mackie, John L. 1965. "Causes and conditions." *American Philosophical Quarterly* 2 (4):245-64. (central piece on the INUS theory of causation)

Supplementary readings

- Barringer, Sondra N., Scott R. Eliason, and Erin Leahey. 2013. "A history of causal analysis in the social sciences." In *Handbook of Causal Analysis for Social Research*, ed. S. L. Morgan. Dordrecht: Springer, pp. 9-26. (historical background)
- Baumgartner, Michael and Christoph Falk. 2019. "Boolean difference-making: A modern regularity theory of causation." *The British Journal for the Philosophy of Science*. doi: 10.1093/bjps/axz047. (technical introduction to the theory of causation behind CNA)
- Mill, John Stuart [edited by J. M. Robson]. 2006, 1973, [1843]. *A system of logic, ratiocinative and inductive*. Toronto: University of Toronto Press, pp. 388-406, 434-453. (central piece about methods of causal inference)
- Ragin, Charles C. 1987. *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*. Berkeley: University of California Press. (first and still very readable introduction of QCA)

Day 2; Tuesday, 20 May 2025

09:00 - 10:30	Module 2.1 Data Types, Fuzzy Operations, Measures of Fit
10:30 - 10:45	Break
10:45 - 12:45	Module 2.2: Calibration + Exercises (ca. 45min)
12:45 - 13:45	Lunch Break
13:45 - 15:00	Module 2.3: Factor Selection
15:00 - 15:15	Break
15:15 - 16:45	Module 2.4: Running a CNA
16:45 - 17:00	Break
17:00 - 18:00	Parallel Session: Possible Bonus Session: Solution Visualization (conditional on interest) Consultation Session: The instructors are available for individual consultation

Essential readings

- Baumgartner, Michael, and Mathias Ambühl. 2025. “**cna**: An R package for configurational causal inference and modeling.” R package vignette: The Comprehensive R Archive Network. Package version 4.0.0. <https://cran.r-project.org/web/packages/cna/vignettes/cna.pdf>. (introduction to the CNA R package)
- Oana, Ioana-Elena, Carsten Schneider, and Eva Thomann. 2021. *Qualitative Comparative Analysis using R: A Beginner's Guide*. Cambridge: Cambridge University Press, Chapter 2 (chapter on calibration).

Supplementary readings

- Ragin, Charles C. 2006. “Set relations in social research: Evaluating their consistency and coverage.” *Political Analysis* 14 (3):291-310. (introduction of consistency and coverage as measures of fit)
- Swiatczak, Martyna. 2021. “Towards a neo-configurational theory of intrinsic motivation.” *Motivation and Emotion*. doi: 10.1007/s11031-021-09906-1 (calibration in practice)
- Thiem, Alrik, and Adrian Duşa. 2013. *Qualitative Comparative Analysis with R: A User's Guide*. New York: Springer, pp. 51-62 (chapter on calibration of fuzzy sets).
- Yakovchenko, Vera, Edward Miech, et al., and Shari Rogal. 2020. “Strategy configurations directly linked to higher Hepatitis C virus treatment starts. An applied use of configurational comparative methods, *Medical Care* 58(5), pp. e31-e38, doi: 10.1097/MLR.0000000000001319. (factor selection in practice)

Day 3; Wednesday, 21 May 2025

09:00 - 11:00	Module 3.1: Model Ambiguities + Exercises (ca. 45min)
11:00 - 11:15	Break
11:15 - 12:15	Module 3.2: Overfitting
12:15 - 13:15	Lunch Break
13:15 - 15:15	Module 3.3: Robustness + Exercises (ca. 45min)
15:15 - 15:30	Break
15:30 - 16:30	Module 3.4: Replication of an Empirical Study (group work)

17:00 - 19:00	Field Trip: Harbour ferry and scenic walk up CopenHill
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Essential readings

- Baumgartner, Michael, and Alrik Thiem. 2017. “Model ambiguities in configurational comparative research.” *Sociological Methods & Research* 46 (4):954-87. (discussion of the problem of model ambiguities)
- Parkkinen, Veli-Pekka, and Michael Baumgartner. 2021. “Robustness and model selection in configurational causal modeling.” *Sociological Methods & Research*. doi: 10.1177/0049124120986200. (introduction to robustness analysis with CNA)

Supplementary readings

- Arel-Bundock, Vincent. 2019. "The double bind of Qualitative Comparative Analysis." *Sociological Methods & Research*. doi: 10.1177/0049124119882460. (discussion of the problem of overfitting)
- Haesebrouck, Tim. 2019. "Who follows whom? A Coincidence Analysis of military action, public opinion and threats." *Journal of Peace Research* 56(6): 753-766. (exemplary CNA application)
- Haesebrouck, Tim. 2023. "The Populist Radical Right and Military Intervention: A Coincidence Analysis of Military Deployment Votes." *International Interactions*, doi: 10.1080/03050629.2023.2184815. (exemplary frscore application)

Day 4; Thursday, 22 May 2025

09:00 - 10:30	Module 4.1: Replication of an Empirical Study (group work)
10:30 - 10:45	Break
10:45 - 12:15	Module 4.2: CNA and Related Methods: QCA & Logic Regression
12:15 - 13:30	Lunch Break
13:30 - 15:00	Module 4.3: Enhancing the Experience of Learning CNA
15:00 - 15:15	Break
15:15 - 16:45	Module 4.4: Getting Funded and Published with CNA
16:45 - 17:00	Closing

Essential readings

- Baumgartner, Michael and Christoph Falk. 2021. "Configurational causal modeling and Logic Regression." *Multivariate Behavioral Research*. doi: 10.1080/00273171.2021.1971510. (comparison of CNA and Logic Regression)
- Swiatczak, Martyna 2021. "Different algorithms, different models." *Quality & Quantity*. doi: 10.1007/s11135-021-01193-9. (comparison of CNA and QCA)

Supplementary readings

- Ragin, Charles C. 2008. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press, pp. 147-175. (introduction to fuzzy-set QCA)
- Rihoux, Benoît, and Gisèle De Meur. 2009. "Crisp-set Qualitative Comparative Analysis (csQCA)." In *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*, ed. B. Rihoux and C. C. Ragin. London: SAGE, pp. 33-68. (introduction to crisp-set QCA)
- Ruczinski, Ingo, Charles Kooperberg, and M. LeBlanc. 2003. "Logic regression." *Journal of Computational and Graphical Statistics*, 12(3), 475-511. doi: 10.1198/1061860032238. (introduction of Logic Regression)
- Swiatczak, Martyna. 2021. "Towards a neo-configurational theory of intrinsic motivation." *Motivation and Emotion*. doi: 10.1007/s11031-021-09906-1 (example study for replication)
- Thiem, Alrik. 2016. "Conducting configurational comparative research with Qualitative Comparative Analysis: A hands-on tutorial for applied evaluation scholars and practitioners." *American Journal of Evaluation* 38 (3):420-33. (concise introduction to QCA)