Introduction to Causal Data Analysis and Modeling with Coincidence Analysis

May 15 – 18, 2023

Prague University of Economics and Business, Czech Republic

main instructor:
Michael Baumgartner, University of Bergen, Norway

additional presentations by:
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Workshop Description

This workshop offers an intensive 4-day introduction to causal modeling with Coincidence Analysis (CNA), a relatively new 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 one of the most beautiful cities in Europe: Prague.

On the two days after the workshop (i.e. May 19-20), there will be a **conference on CNA** at Prague University of Economics and Business. Participants of the training workshop will be invited to attend that conference as well. Moreover, the instructors will remain available for consultation after the event to help participants with the methodological and practical aspects of their research projects.

Participation, Registration, Tuition

Registration is now open here:

https://form.app.uib.no/CNA2023

As the financial side of the course is organized through the University of Bergen, course fees are in NOK. The early-bird fee for registrations no later than February 10, 2023, is NOK 4800 (ca. €460/$485), the standard fee for later registrations is NOK 5200 (ca. €500/$525).

The fee includes tuition as well as lunches, coffee break catering, and one workshop dinner. We can offer a small amount of tuition scholarships to people without sufficient institutional funding (grad students, post-docs, etc.) and for participants from the Prague University of Economics and Business (VŠE). If you are interested in a scholarship, write to michael.baumgartner@uib.no for more information.

After successful completion of the course, we can provide participation certificates to those interested, stating, among other things, that the course is worth 5 ECTS points (e.g. to PhD students).

Space is limited. There will be a waiting list, once all enrolment slots are reserved. For questions, please, write to michael.baumgartner@uib.no.

Workshop Schedule

Day	*Module and Topics Covered*
Day 1; Monday, 15 May 2023	
09:00 - 09:15	**Welcome**
09:15 - 10:30	**Module 1.1:** Methodological Landscape and the Essentials of Boolean Algebra
10:30 - 10:45	Break
10:45 - 12:15	**Module 1.2:** Theories of Causation
12:15 - 13:30	Lunch Break
13:30 - 15:00	**Module 1.3:** The General Principles of Configurational Causal Discovery
15:00 - 15:15	Break
15:15 - 16:45	**Module 1.4:** Top-down vs. Bottom-up Search / the CNA algorithm
17:00 - 18:00	**Optional Session** Introduction to R for those new to R
19:00	Workshop Dinner

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, 16 May 2023

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
12:45 - 13:45	Lunch Break
13:45 - 15:00	**Module 2.3:** Factor Selection + Exercises
15:00 - 15:15	Break
15:15 - 16:45	**Module 2.4:** Running a CNA
16:45 - 17:00	Break
17:00 - 18:00	**Consultation Session:** The instructors are available for individual consultation (use sign up sheets)

Essential readings

- Baumgartner, Michael, and Mathias Ambühl. 2021. "**cna:** An R package for configurational causal inference and modeling." R package vignette: The Comprehensive R Archive Network. Package version 3.3. 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, 17 May 2023

09:00 - 11:00	**Module 3.1:** Model Ambiguities + Exercises
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
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:** TBD

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)
- Dy, Sidney, Ryan Acton, et al., and Sarah Hudson. 2020. "Association of implementation and social network factors with patient safety culture in medical homes. A Coincidence Analysis." *Journal of Patient Safety*. doi: 10.1097/PTS.0000000000000752. (exemplary CNA application)
- 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)

Day 4; Thursday, 18 May 2023

09:00 - 10:30	**Module 4.1:** Replication of an Empirical Study (group work)
10:30 - 10:45	Break
10:45 - 12:15	Parallel Session: **Module 4.2:** Benchmarking **Consultation Session:** Individual consultation (use sign up sheets)
12:15 - 13:30	Lunch Break
13:30 - 15:00	**Module 4.3:** CNA and Related Methods: QCA & Logic Regression
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)