RUSH

INTRODUCTION TO CAUSAL DATA ANALYSIS & MODELING WITH COINCIDENCE ANALYSIS
MAY 20 – 23, 2024
RUSH UNIVERSITY MEDICAL CENTER
JOAN AND PAUL RUBSCHLAGER AMBULATORY BUILDING
1520 W HARRISON ST, 4TH FLOOR
CHICAGO, IL 60607

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. In smaller practice groups, the instructors will demonstrate how to make the most of current software for CNA and offer advice on practical issues, such as getting funded and published with 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. This will also be an opportunity to get to know researchers working with and on CNA from all over the world.

RUSH University Medical Center/RUSH, the host for this groundbreaking workshop, is strongly committed to addressing health inequities that affect Chicago's community, particularly in those neighborhoods surrounding our academic medical center. For this workshop, we will draw from Chicago neighborhood health data to craft practice sessions using real data drawn from health care and community practice to apply a health equity lens to configurational data analysis with CNA. RUSH faculty experienced in health equity and CNA will help to guide these practical sessions.

On the two days following the workshop (May 24-25), there will be a conference on CNA at the same venue in Chicago. Participants of the training workshop will be invited to attend that conference. (More information on that conference is available 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.

RUSH

AGENDA
DAY # 1 – MONDAY, MAY 20, 2024 – OVERVIEW AND BACKGROUND ON COINCIDENCE ANALYSIS

7:30a – 8:45a	Breakfast
9:00a – 9:45a	Welcome & Orientation
9:45a – 10:45a	Module 1.1: **Theoretical Background of CNA (Part 1): Methodological Landscape/Essentials of Boolean Algebra**
10:45a – 11:00a	Break
11:00a – 11:10a	Greetings from Robert Higgins, MD, MSHA, President, Rush University
11:10a – 11:55a	Module 1.2: **Theoretical Background of CNA (Part 2): Theories of Causation**
12:00p – 1:00p	Lunch
1:00p – 1:45p	Module 1.3: **Methodological Background (Part 1): The General Principles of Configurational Causal Discovery**
1:45p – 2:45p	Module 1.4: **Methodological Background (Part 2): Top-down vs. Bottom-up Search/the CNA algorithm**
2:45p – 3:00p	Break
3:00p – 3:45p	**Breakout #1:** Introductions (Qualitative, Health Equity, Implementation Science/Health Services Research, Social Science)
4:00p – 5:00p	**Bonus Session: Introduction to R for those new to R**
5:15p – 7:00p	**Rooftop Reception**

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. (introduction to 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 to QCA)

DAY **#2 – T**UESDAY**, M**AY **21, 2024 – P**REPARING **D**ATA FOR **C**OINCIDENCE **A**NALYSIS

7:30a – 8:45a	Breakfast
9:00a –10:15a	Module 2.1 **Data Types, Fuzzy Operations, Measures of Fit**
10:15a – 10:30a	Break
10:30a – 12:00p	Module 2.2: **Calibration** (with exercises)
12:00p – 1:00p	Lunch
1:00p – 2:30p	Module 2.3: **Factor Selection** (with exercises)
2:30p – 2:45p	Break
2:45p – 4:15p	Module 2.4: **Running a CNA**
4:30p – 5:15p	**Breakout #2:** (Qualitative, Health Equity, Implementation Science/Health Services Research, Social Science) **OR Consultation Session:** The instructors are available for individual consultation.
6:00p – 8:00p	**Dinner** – *Carnivale, 702 West Fulton Market Street, 702 W Fulton St, Chicago, IL 60661 (Samba Room)*

ESSENTIAL READINGS
- Baumgartner, Michael, and Mathias Ambühl. 2023. "cna: An R package for configurational causal inference and modeling." R package vignette: The Comprehensive R Archive Network. Package version 3.5.0.
  - 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 Dus̡a. 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)

RUSH

7:30a – 8:45a	Breakfast
9:00a – 10:30a	Module 3.1: **Model Ambiguities** (with exercises)
10:30a – 10:45a	Break
10:45a – 12:15p	Module 3.2-3.3: **Overfitting + Robustness** (with exercises)
12:15p – 1:15p	Lunch Break
1:15p – 2:45p	Module 3.4: **Replication of an Empirical Study**
2:45p – 3:00p	Break
3:00p – 4:30p	**Breakout #3:** (Qualitative, Health Equity, Implementation Science/Health Services Research, Social Science) **OR Consultation Session:** The instructors are available for individual consultation.

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)

RUSH

DAY #4 – THURSDAY, MAY 23, 2024 – APPLYING COINCIDENCE ANALYSIS TO ACADEMIC RESEARCH & TEACHING

7:30a – 8:45a	Breakfast
9:00a – 10:30a	Module 4.1: **CNA and Related Methods: QCA & Logic Regression**
10:30a – 10:45a	Break
10:45a – 11:45a	Module 4.2: **Solution Visualizations in CNA**
12:00p – 1:00p	Lunch Break
1:00p – 2:00p	Module 4.3: **Next Steps: Getting Funded and Published with CNA**
2:00p – 2:30p	**Reflections/Feedback + Closing**

<u>ESSENTIAL READINGS</u>
- 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)

<u>SUPPLEMENTARY READINGS</u>
- 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)