Peder Sather Center for Advanced Study

5^{th} **International Conference**

Current Issues in Coincidence Analysis

12 – 13 June, 2026

hosted by the School of Social Welfare, UC Berkeley, and the Peder Sather Center
venue: Residence Inn by Marriott Berkeley, San Pablo room (3rd floor)

Description

This is the fifth international conference dedicated exclusively to the configurational comparative method of Coincidence Analysis (CNA), which has seen a significant uptick in applications in recent years, particularly in public health. The conference provides a platform for exchange between CNA methodologists and applied researchers. The newest methodological advancements will be presented alongside exemplary applications and new developments on training opportunities.

Program

Friday, 12 June 2025	
09:15 - 09:30	**Welcome**
09:30 - 10:30	**Jessica Dodge, Vera Yakovchenko, Shari Rogal, Matthew Chinman, Laura Ellen Ashcraft:** Updated Difference Making Implementation Strategies for Significant Implementation: Coincidence Analysis on a Global Systematic Review of Implementation Studies
10:30 - 10:50	Break
10:50 - 11:50	**Deborah Cragun:** CNA Navigator – Using GPT to Assist CNA Research and Literature Critique
11:50 - 13:00	Lunch
13:00 - 14:00	**DeAnne Turner:** Examining PrEP Integration in Health Facilities in Kenya: An Application of Coincidence Analysis
14:00 - 14:10	Break
14:10 - 15:10	**Edward Miech:** The "Multi-Crisp" Approach: Joining the Nuance of Multi-Value CNA with the Reduced Dimensionality of Crisp-Set CNA
15:10 - 15:30	Break
15:30 - 16:30	**Apoorva Nambiar, Jonathan Simões Freitas, Arya Rachel Thomas, Devaki Nambiar:** When Does Community-System Engagement Occur? A Configurational Causal Analysis of Frontline Health Worker Contact Among Women in India Using NFHS-5
19:30	Workshop Dinner at Restaurant XYZ

Saturday, 13 June 2026

09:30 - 10:30	**Katharina Sterr, Deborah Cragun, Edward Miech, Simon Blaschke:** Pathways to Successful School Health Promotion Implementation: A Coincidence Analysis
10:30 - 10:50	Break
10:50 - 11:50	**Jonathan Simões Freitas:** Rethinking CNA's Algorithmic Architecture in Light of Recent Developments in Model Evaluation
11:50 - 13:00	Lunch
13:00 - 14:00	**Anna Quon:** Mammography Screening Among Women with Autism Spectrum Disorder and Intellectual Disabilities: A Coincidence Analysis
14:00 - 14:10	Break
14:10 - 15:10	**Michael Baumgartner, Edward Miech:** Addition by Subtraction: Pruning High-Dimensional CCMs Datasets with Tree-Ensemble Methods
15:10 - 15:25	**Closing**

If you are interested in attending, please, register here:

https://skjemaker.app.uib.no/view.php?id=20976768

Abstracts

Updated Difference Making Implementation Strategies for Significant Implementation: Coincidence Analysis on a Global Systematic Review of Implementation Studies

Jessica Dodge (Center for Healthcare Evaluation Research and Promotion, Pittsburgh VA, USA), **Vera Yakovchenko** (VA Bedford Healthcare System, Bedford, Massachusetts, USA), **Shari Rogal** (University of Pittsburgh / VA Pittsburgh Healthcare System, USA), **Matthew Chinman** (RAND Corporation / VA Pittsburgh Healthcare System, USA), **Laura Ellen Ashcraft** (University of Pennsylvania, USA)

Implementation science studies how best to promote uptake of evidence-based practices, yet "bundles" of implementation strategies make it difficult to identify which specific approaches drive success. Building on a global systematic review of 129 implementation studies, this study applies Coincidence Analysis (CNA) to determine which strategies or combinations of strategies lead to significant outcomes across the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, Maintenance). From 70 initial strategies, 25 were retained based on frequency and difference-making criteria. CNA revealed four distinct pathways to any successful RE-AIM outcome: identifying and preparing champions, assessing and redesigning workflows, conducting cyclical small tests of change, or combining audit and feedback with educational meetings. These pathways achieved 85% consistency and 65% coverage. Sub-analyses for individual RE-AIM dimensions showed both overlapping and distinct configurations, demonstrating that no single strategy guarantees implementation success and highlighting CNA's utility for disentangling complex strategy bundles in implementation research.

When Does Community-System Engagement Occur? A Configurational Causal Analysis of Frontline Health Worker Contact Among Women in India Using NFHS-5

Apoorva Nambiar (University of Strasbourg, France), **Jonathan Simões Freitas** (University of Minas Gerais, Brazil), **Arya Rachel Thomas** (The George Institute for Global Health, India), **Devaki Nambiar** (The George Institute for Global Health, India)

Frontline health workers are the critical interface between communities and health systems in low- and middle-income countries, yet the factors driving women's engagement with them remain poorly understood. This study applies Coincidence Analysis (CNA) to NFHS-5 data (2019–21) to identify configurational pathways to contact with frontline workers among Indian women. Analysis of 36,627 cases revealed a dominant national-level pathway: women with secondary education, weekly media exposure, and rural residence consistently coincided with frontline worker contact, representing an informational-institutional pathway with strong fit. A rural subsample analysis identified equifinal pathways including early reproductive stage, education compensating for economic disadvantage, and education interacting with social targeting among marginalized groups. The findings illustrate conjunctural causation and equifinality in community health engagement, underscoring that engagement arises from clusters of interacting social and institutional conditions rather than single predictors.

Pathways to Successful School Health Promotion Implementation: A Coincidence Analysis

Katharina Sterr (Technical University of Munich, Germany), **Deborah Cragun** (University of South Florida, USA), **Edward Miech** (Indiana University School of Medicine / Roudebush VA Medical Center,

Indianapolis, Indiana, USA), **Simon Blaschke** (Technical University of Munich, Germany)

School health promotion is central to improving population health, yet implementation success varies substantially across schools. This study applies CNA to data from 113 German primary schools participating in a nationwide health promotion program (2023–2025) to identify causal configurations leading to successful implementation of health-promoting activities. Eleven contextual and process-related factors were analyzed, including organizational health literacy (OHL), staffing levels, and implementation of Plan–Do–Study–Act cycles. The final model identified two alternative pathways to success: high organizational health literacy, or the combination of sufficient staffing with structured PDSA cycle implementation. This study provides one of the first CNA applications in school health promotion and illustrates a transparent analytic workflow for examining causal complexity in organizational implementation settings.

Mammography Screening Among Women with Autism Spectrum Disorder and Intellectual Disabilities: A Paired Configurational and Correlational Approach

Anna Quon (RUSH University, USA)

Women with autism spectrum disorder (ASD) and/or intellectual disabilities (ID) may face disparities in breast cancer screening, yet U.S.-based evidence is limited. This retrospective cohort study examined electronic health records of 722 women aged 40+ with ASD and/or ID across three Midwestern healthcare facilities. While only 33.2% had ever received screening mammography and 5% met guideline-concordant screening, CNA revealed unexpected configurational patterns. The presence of screening was best explained by two pathways: lacking health insurance, or being non-White with a chronic pain diagnosis. Conversely, the absence of screening was explained by being insured and White, or being insured without chronic pain. Logistic regression showed that race, insurance status, chronic pain diagnosis, residential financial hardship, and screening for social drivers of health were significantly associated with screening. CNA and logistic regression results were largely congruent. The study findings highlight the complementary nature of configurational and correlational approaches.

Examining PrEP Integration in Health Facilities in Kenya: An Application of Coincidence Analysis

DeAnne Turner (University of South Florida, USA)

Despite Kenya's early approval of HIV pre-exposure prophylaxis (PrEP), many health facilities have yet to integrate it into routine primary care. This mixed-methods study investigated which implementation strategies contribute to PrEP integration across 38 facilities in geographically diverse Kenyan counties. Data were collected through aggregate facility assessments, staff surveys, and semi-structured interviews, then analyzed using crisp-set CNA. After factor selection and robustness testing with FRScore, the final model identified two key strategies: distributing education materials to clients and providing reminders to clinicians. Together, these explained 70.8% of cases with both consistency and coverage at 0.708. The findings highlight the importance of simultaneously addressing both client and clinician sides of the care process.

Addition by Subtraction: Pruning High-Dimensional CCM Datasets with Tree-Ensemble Methods

Michael Baumgartner (University of Bergen, Norway), **Edward Miech** (Indiana University School of Medicine / Roudebush VA Medical Center, Indianapolis, Indiana, USA)

Configurational comparative methods such as Coincidence Analysis (CNA) face a serious challenge when datasets contain hundreds of candidate factors, only a handful of which are causally relevant. Standard factor screening assumes that relevant variables make individual marginal contributions, but configurational causation is conjunctural: a factor can be causally indispensable yet show zero pairwise correlation with the outcome. This study tests whether tree-ensemble methods—Random Forest and XGBoost—can nonetheless serve as effective pruning tools for high-dimensional CNA workflows. We report a large-scale batch experiment varying candidate-factor dimensionality (101 and 201), sample size (700–2100), and noise (10–20%), with 200 independent trials per condition. Results show that XGBoost Gain and Random Forest Importance perform remarkably well overall, capturing most true factors even in high-dimensional, noisy settings. However, full recovery is not guaranteed. The conclusion is that tree ensembles are a valuable preprocessing aid for reducing configurational search space, but not a substitute for configurational causal search itself.

CNA Navigator – Using GPT to Assist CNA Research and Literature Critique

Deborah Cragun (University of South Florida, USA)

This presentation will introduce CNA Navigator, a customized large language model (LLM)-based research assistant designed specifically for methodological support in Coincidence Analysis (CNA). The project was motivated by persistent conceptual confusion between CNA and Qualitative Comparative Analysis (QCA) in general-purpose AI systems and the desire to have AI help create simpler (but accurate) plain language descriptions or analogies for some of the jargon used in CNA.

Unlike generic AI systems that frequently conflate configurational comparative methods under broad "set-theoretic" reasoning, CNA Navigator was intentionally developed to preserve the methodological distinctiveness of CNA. The system was trained through an iterative process involving custom instruction and uploading of all fundamental methodological literature on CNA from which the AI can pull. Preliminary testing during the iterative creation process focused on methodological fidelity across a range of CNA-relevant tasks. These include: (1) conceptual explanation of CNA principles, (2) differentiation between CNA and QCA, (3) interpretation of CNA solution formulas, (4) guidance on dataset construction and calibration, and (5) model comparison. While adding to and modifying the instructions, additional emphasis was placed on enforcing methodological safeguards, such as distinguishing ambiguity from equifinality, avoiding QCA-style necessity logic, and preventing fabricated CNA outputs unless disclaimers are included.

Additional testing suggests that the system performs strongly on many core CNA tasks. However, additional issues continue to be identified. For example, when asking to produce a plain language description of exhaustiveness, the system initially took several broader ideas (e.g., omitted conditions and model completeness) and compressed them into a generalized notion of exhaustive rather than using the technical CNA model-evaluation metric of exhaustiveness. Although the system successfully revised its interpretation after user challenge, the exchange revealed a potential tendency toward conceptual drift from CNA's specialized technical vocabulary. This type of failure is especially important because CNA employs highly specific methodological terminology whose meanings do not always align with broader definitions of the words.

Recently, to ensure that only the most updated content is utilized, the May 2026 documentation for of the CNA software ecosystem (cna v4.0.3; frscore v0.5.2) was recently added and old versions removed from the GPT's specialized knowledge base. Additional work is ongoing to further stress test the GPT and evaluate its ability to develop and annotate R code specific to CNA. During the conference the GPT will be shown and audience members can provide ideas for stress testing it.

Rethinking CNA's Algorithmic Architecture in Light of Recent Developments in Model Evaluation

Jonathan Simões Freitas (University of Minas Gerais, Brazil)

Recent developments in model evaluation have created new opportunities for CNA, but also exposed methodological tensions. New measures of sufficiency and necessity have been proposed for causal configurational modeling, including contrapositive and adjusted measures. While such developments may improve model assessment, they also raise questions concerning epistemic interpretation, metric selection, monotonicity properties, model search and pruning, and computational cost. Moreover, because different evaluation measures may lead CNA to construct different configurational models, model evaluation criteria cannot be treated as merely ex post reporting tools. Current approaches based on repeated CNA reanalyses across multiple sufficiency and necessity thresholds also present limitations. Information from previous analyses is not reused in subsequent runs, generating computational rework, while results may become sensitive to the chosen granularity of threshold variation. In light of these considerations, I present a still tentative proposal to rethink CNA's algorithmic architecture while preserving its basic structure. The proposal privileges: (1) a single analysis capable of scanning the entire space of admissible sufficiency and necessity values; (2) decomposition of the different evaluative functions currently integrated into more elaborate metrics and their use at different moments of the algorithmic pipeline; (3) exploitation of possibilities for structural pruning and heuristic prioritization in model search; and (4) a corresponding new approach to final model ranking. The goal is to promote discussion about possible contributions, limitations, and future adaptations of this initial outline.

The "Multi-Crisp" Approach: Joining the Nuance of Multi-Value CNA with the Reduced Dimensionality of Crisp-Set CNA

Edward Miech (Indiana University School of Medicine / Roudebush VA Medical Center, Indianapolis, Indiana, USA)

This talk will provide an overview of a "multi-crisp" approach in CNA, featuring examples from several recently-published articles. With this approach, researchers begin with multi-value data but end up with crisp-set data. During the exploratory data analysis phase, researchers analyze multi-value data using a double-pronged strategy (msc routine + going back to the cases) to identify not only candidate difference-making factors but also the levels that matter within those factors. Researchers next develop an analytic dataset for modeling where the candidate factors have been converted into binary metafactors by dichotomizing multi-value factors around identified key thresholds. Crisp-set CNA is applied during the modeling phase to develop preliminary and final models. The "multi-crisp" approach seeks to draw upon the best of both worlds, joining the nuance and granularity of multi-value CNA with the reduced dimensionality of crisp-set CNA.