1 Workshop Description

This workshop offers an intensive 1-week introduction for health researchers to \textit{Qualitative Comparative Analysis (QCA) and Coincidence Analysis (CNA)}—the two most prominent configurational comparative methods (CCMs) of causal discovery. Participants will be guided through the nuts and bolts of configurational comparative data analysis as well as cutting-edge methodological innovations. In replicating published studies from various areas of the health sciences, they will also learn how to make the most of current software for QCA and CNA.

From the philosophical roots of regularity theories of causation, over the procedural protocols of QCA and CNA, to the empirical analysis of causal chain structures, this seminar will go way beyond the material taught in other courses, enabling participants to perform QCA and CNA in a correct and sophisticated manner. It will be shown, for example, why the vast majority of past QCA studies have run the risk of failing to find the underlying causal model, why the so-called “conservative solution” is not conservative at all, what to do when data are beset by model ambiguities, and how to perform sensitivity tests. Last but not least, participants will learn why recent high-profile critiques discouraging the use of QCA lack traction. Individual consultation sessions will be offered in addition to help participants with the methodological aspects of their own research projects.
2 Instructor Details

The two instructors are among the most active researchers and course instructors in the field of configurational comparative data analysis.

**Michael Baumgartner** is a full professor of philosophy at the Department of Philosophy of the University of Bergen, Norway. His research focuses on questions in the philosophy of science and logic, more specifically, on aspects of causation and causal reasoning with QCA and CNA, regularity theories, interventionism, mechanistic explanation, determinism, logical formalization, argument reconstruction and modelling in the social sciences. He has published in journals such as the *British Journal for the Philosophy of Science, Comparative Political Studies, Dialectica, Erkenntnis, Field Methods, Journal of Philosophical Logic, Sociological Methodology, Sociological Methods & Research* and *Synthese*. He has developed the method of CNA and is a co-author of the corresponding cna software package for the R environment. For further biographical details, see his [Homepage](#).

**Alrik Thiem** is Swiss National Science Foundation Professor at the Department of Political Science of the University of Lucerne, Switzerland. The main part of his work addresses questions of methodology in the field of empirical research methods, primarily configurational ones such as CNA and QCA. In addition, he works on meta-scientific questions such as publication bias, and is interested in strategies to improve the teaching of research methods in the social sciences. He has taught nationally and internationally, and has published methodological as well as applied work in journals such as, among others, the *American Journal of Evaluation, Comparative Political Studies, Political Analysis, Sociological Methodology* and *Sociological Methods & Research*. He is also the author of the QCApro software package for the R environment. For further biographical details, see his [Homepage](#) or his [ResearchGate website](#).

3 Detailed Workshop Schedule

Each day is divided into four modules, with each module lasting 90 minutes. A consultation session is offered after the fourth module on days 2 and 4. All recommended and supplementary readings will be made available to registered participants three weeks in advance.
<table>
<thead>
<tr>
<th>Day</th>
<th>Module and Topic(s) Covered</th>
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<tbody>
<tr>
<td><strong>Day 1; Monday, 25 September 2017: Theoretical Foundations</strong></td>
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<tr>
<td>09:00 - 10:30</td>
<td><strong>Module 1.1:</strong> Theorizing about causation and the essentials of Boolean algebra</td>
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<td>10:30 - 10:45</td>
<td>Break</td>
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<tr>
<td>10:45 - 12:15</td>
<td><strong>Module 1.2:</strong> Regularity theories from Hume over Mill to Mackie</td>
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<tr>
<td>12:15 - 13:30</td>
<td>Lunch Break</td>
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<tr>
<td>13:30 - 15:00</td>
<td><strong>Module 1.3:</strong> Discovering regularity theoretic causation</td>
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<tr>
<td>15:00 - 15:15</td>
<td>Break</td>
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<tr>
<td>15:15 - 16:45</td>
<td><strong>Module 1.4:</strong> The basic work flow of QCA and CNA</td>
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<tr>
<td><strong>Recommended readings</strong></td>
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<tr>
<td><strong>Supplementary readings</strong></td>
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<tr>
<td><strong>Day 2; Tuesday, 26 September 2017: Crisp-Set QCA</strong></td>
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<tr>
<td>09:00 - 10:30</td>
<td><strong>Module 2.1:</strong> A short introduction to R</td>
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<td>10:30 - 10:45</td>
<td>Break</td>
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<tr>
<td>10:45 - 12:15</td>
<td><strong>Module 2.2:</strong> A short introduction to R</td>
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<tr>
<td>12:15 - 13:30</td>
<td>Lunch Break</td>
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<tr>
<td>13:30 - 15:00</td>
<td><strong>Module 2.3:</strong> From raw data to the QCA solution</td>
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<td>15:00 - 15:15</td>
<td>Break</td>
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<tr>
<td>15:15 - 16:45</td>
<td><strong>Module 2.4:</strong> Measures of fit in QCA</td>
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<tr>
<td>17:00 - 18:00</td>
<td>Consultation session</td>
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**Recommended readings**


**Supplementary readings**


**Day 3; Wednesday, 27 September 2017: Other variants of QCA**

<table>
<thead>
<tr>
<th>Time</th>
<th>Module 3.1: Complex, intermediate, and parsimonious solutions</th>
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<tbody>
<tr>
<td>09:00 - 10:30</td>
<td>Break</td>
</tr>
<tr>
<td>10:30 - 10:45</td>
<td>Multi-value QCA</td>
</tr>
<tr>
<td>10:45 - 12:15</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>12:15 - 13:00</td>
<td>Fuzzy-set theory and fuzzy-set QCA</td>
</tr>
<tr>
<td>13:00 - 15:00</td>
<td>Break</td>
</tr>
<tr>
<td>15:00 - 15:15</td>
<td>A closer look at model ambiguities</td>
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**Recommended readings**

**Supplementary readings**


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**Day 4: Thursday, 28 September 2017: Coincidence Analysis**

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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>09:00 - 10:30</td>
<td><strong>Module 4.1:</strong> Beyond QCA: causal chains and common cause structures</td>
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<tr>
<td>10:30 - 10:45</td>
<td>Break</td>
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<tr>
<td>10:45 - 12:15</td>
<td><strong>Module 4.2:</strong> The CNA algorithm</td>
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<tr>
<td>12:15 - 13:30</td>
<td>Lunch Break</td>
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<tr>
<td>13:30 - 15:00</td>
<td><strong>Module 4.3:</strong> Differences and commonalities of QCA and CNA</td>
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<tr>
<td>15:00 - 15:15</td>
<td>Break</td>
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<tr>
<td>15:15 - 16:45</td>
<td><strong>Module 4.4:</strong> Working with the cna package for R</td>
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<tr>
<td>17:00 - 18:00</td>
<td>Consultation session</td>
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</table>

**Recommended readings**


Supplementary readings


Day 5; Friday, 29 September 2017: Replications

<table>
<thead>
<tr>
<th>Time</th>
<th>Module</th>
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<tbody>
<tr>
<td>09:00 - 10:30</td>
<td>Module 5.1: Criticisms of QCA</td>
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<tr>
<td>10:30 - 10:45</td>
<td>Break</td>
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<tr>
<td>10:45 - 12:15</td>
<td>Module 5.2: Replication session QCA</td>
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<tr>
<td>12:15 - 13:30</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>13:30 - 15:00</td>
<td>Module 5.3: Replication session QCA/CNA</td>
</tr>
<tr>
<td>15:00 - 15:15</td>
<td>Break</td>
</tr>
<tr>
<td>15:15 - 16:45</td>
<td>Module 5.4: Replication session CNA</td>
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</table>

Recommended readings

Supplementary readings


4 Detailed Seminar Schedule

Day 1: Monday, 25 September 2017

The first module of the seminar introduces the basic objectives and designs of theories of causation, discusses various theory candidates, and presents the elements of Boolean algebra implemented by QCA and CNA. Module 1.2 then displays the details of the regularity theory of causation behind configurational methods and tracks its historical predecessors in the works of David Hume, John Stuart Mill, and John L. Mackie. In module 1.3 we turn to the problem of discovering causation as defined by modern regularity theories. We review Mill's famous method of difference, consider the problems of causal inference under epistemic uncertainty and of data confounding, and pinpoint the background assumptions required by configurational methods. Finally, module 1.4 introduces the basic problem to be solved by QCA and CNA and discusses different algorithms that can be employed to solve this problem.
**Day 2: Tuesday, 26 September 2017**

Day 2 begins with a short introduction to the R environment and its basic functionality in modules 2.1 and 2.2. In module 2.3, participants recap the material from module 1.4 by performing their first crisp-set QCA in an ideal data context from beginning to end with the QCApro package for R. Important differences between the QCApro package and other QCA software like fs/QCA and Tosmana are also highlighted. Module 2.4 then introduces consistency and coverage as the two measures of fit in QCA for evaluating certain data deficiencies that are ubiquitous in applied research.

**Day 3: Wednesday, 27 September 2017**

An often-mentioned issue in QCA research is limited empirical diversity. As a direct result, three solution types have been proposed in the methodological QCA literature, namely complex/conservative, intermediate and parsimonious solutions. Module 3.1 presents the logic of these three solution types, and explains why two of them are unsuitable for empirical research. Since about the early 2000s, QCA has also become a family of different variants that are defined by their underlying set type. Crisp-set QCA has at its root bivalent factors whose levels underlie sets in which cases can only be members or not. Both multi-value and fuzzy-set QCA extend crisp-set QCA in different directions, the former on the dimension of the number of levels a factor can have, and the latter on the dimension of the degree to which cases can be elements in the respective set formed by each level of a bivalent factor. In module 3.2, students learn about multi-value QCA, how it relates to crisp-set QCA, and why it still leads a niche existence in both methodological and applied research. Fuzzy logic and fuzzy-set QCA is the topic of module 3.3. Finally, in module 3.4, a closer look is first taken at the issue of model ambiguities, a problem that has gone unnoticed in the QCA literature until very recently, with serious consequences for applied research. We show why and how this problem occurs, to which extent it affects applied research, and what can be done to alleviate it.

**Day 4: Thursday, 28 September 2017**

Day 4 is dedicated to CNA. In module 4.1, we demonstrate that the restriction of QCA to single outcomes presupposes that there are no causal dependencies among the exogenous factors, which in turn constitutes a considerable restriction on the maximal causal complexity discoverable by QCA. Module 4.2 introduces the algorithmic protocol of CNA, which is designed to overcome the restriction to single-outcome structures, reviews CNA’s theoretical foundation, and introduces complex solution formulas. In module 4.3, we highlight the differ-
ences and commonalities of QCA and CNA: both methods analyze the same type of data and have overlapping search targets, but while QCA is closely associated with Quine-McCluskey optimization, CNA draws on its own custom-built optimization routine, which does not force CNA to make recourse to counterfactual reasoning in cases of limited diversity and does not require an outcome specification as input. Module 4.4 is then devoted to acquiring familiarity with the cna package for R.

**Day 5: Friday, 29 September 2017**

Critiques of QCA are the first topic of day 5. In module 5.1, we confront prominent studies which have argued, for various reasons, that QCA is of no use for empirical data analysis. We demonstrate why these studies lack traction. The rest of day 5 is dedicated to detailed replications of existing studies in the health sciences using QCA and CNA. This will give participants ample opportunity to explore possibilities of exploiting these methods in their own research and to critically evaluate the research design and analyses of other studies.

**5 Prerequisite Knowledge**

The course requires no prior formal knowledge, but it will be intensive for absolute beginners. Users with an intermediate to advanced knowledge of QCA as taught in standard textbooks and methods courses will learn much they did not know before. Participants at all levels of knowledge will benefit from the instructors’ current research, a significant part of which will be broached during the course. Basic knowledge of R, or at least programming more generally, will be helpful but is not essential.

**6 List of Applied QCA Studies in Health Sciences**

This list makes no claim to exhaustiveness. URL hyperlinks will take you directly to the website of the respective article.


2. Backhans, Mona C., Sarah Mosedale, Daniel Bruce, Margaret Whitehead, and Bo Burström. 2016. “What is the impact of flexicurity on the chances of entry into employment for people with low education and activity limitations due to health problems? A comparison of 21
European countries using Qualitative Comparative Analysis (QCA).” *BMC Public Health* 16 (1):1-15. URL.


42. Spangaro, Jo, Sigrid Herring, Jane Koziol-McLain, Alison Rutherford, Mary-Anne Frail, and Anthony B. Zwi. 2016. “‘They aren’t really black fellas but they are easy to talk to’: Factors which influence Australian Aboriginal women’s decision to disclose intimate partner violence during pregnancy.” Midwifery 41:79-88. URL.


patients presenting to a regional referral hospital in Moshi, Tanzania: challenges and the way forward.” International Journal of Injury Control and Safety Promotion 24 (1):69-77. URL.


