

# Introduction to Qualitative Comparative Analysis (QCA) using R

## Instructor

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## About the instructor

[Eva Thomann](#) is a full professor of Public Administration at the University of Konstanz who specializes in policy implementation research and case-oriented and set-theoretic research design and methods. Publications include “[Qualitative Comparative Analysis \(QCA\) Using R: A Beginner’s Guide](#)” (2021, Cambridge University Press, with Carsten Q. Schneider and Ioana-Elena Oana), “[Customized implementation of European Union food safety policy: United in diversity?](#)” (Palgrave, 2019; IPPA best book award), “[Designing Research with Qualitative Comparative Analysis \(QCA\): Approaches, Challenges, Tools](#)” (2020, Sociological Methods & Research, with Martino Maggetti), and “[Causation, inferences, and solution types in configurational comparative methods](#)” (2021, Quality & Quantity, with Tim Haesebrouck). Eva Thomann is an active member of the international research community who teaches at international method and summer schools.

## Target audience and course requirements

This PhD level course is open to all researchers aiming at bringing their research to the next level. It is particularly designed for those who are looking for a method that allows them to compare cases while modelling aspects of causal complexity, on the one hand, and integrate case knowledge, on the other hand. You should have basic knowledge of comparative empirical research. No prior knowledge of the R software is required, although it might be an advantage. Each participant needs a laptop/ computer to work with—either their own or provided by university. You need to have installed, **prior to the start of the course**, the newest versions of the following freely available software on your computer:

- **R** (freely available at <http://cran.rstudio.com/> )
- **RStudio** (freely available at <http://www.rstudio.com/products/rstudio/download/> )

Install R before RStudio. Once installed, you don’t have to open R; it suffices to open RStudio.

## Learning goals

- ✓ Understanding of the logic and technical working of QCA
- ✓ Basic familiarity with the application of QCA in R
- ✓ Familiarity with core QCA readings
- ✓ Ability to integrate a basic QCA in own research project

## Course description

This course introduces students to the nuts and bolts of Qualitative Comparative Analysis (QCA), an innovative set-theoretic technique that allows for comparisons of small, intermediate or large numbers of cases in order to identify necessary and/or sufficient conditions for an

outcome. It is an attractive method for scholars who seek to model causally complex patterns and integrate in-depth case knowledge at all stages of the analysis. We will introduce you to performing QCA with the freely available R software using the user-friendly RStudio environment. We will primarily discuss QCA as a case-oriented approach to small- and intermediate N comparisons. The intensive two-day course has a practical focus and combines theoretical blocks with many hands-on labs entailing exercises and quizzes. We will use real-life data to replicate a published study and discuss examples from the participants' own research projects in class. The course covers the following topics:

- QCA: Origin, variants, uses and approaches
- Set theory and causal complexity
- Defining, structuring, measuring and calibrating concepts as sets
- Analyses of necessity and sufficiency
- Truth tables, limited diversity and counterfactual reasoning
- Conservative, intermediate and parsimonious solution types

The course materials (Readings, slides, R scripts and datasets) will be made available to participants via dropbox. The textbook used in this course is:

Oana, I. E., Schneider, C. Q. & Thomann, E. (2021). *Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide*. Cambridge University Press.

You should have basic knowledge of comparative empirical research. No prior knowledge of the R software is required, although it might be an advantage.

Participants should bring their own laptops and have the free statistical softwares R and RStudio (desktop version) installed prior to the start of the course.

Participants should reserve an additional 5-6h for preparatory readings (to be read ahead of the course).

### Schedule and key readings

	Topic(s)	Details
Session 1 (120') 18.4.13-15h	What is QCA?	<ul style="list-style-type: none"> <li>• QCA: Origin, variants, uses and approaches</li> <li>• Set theory and causal complexity</li> <li>• Logical operations and concept structures</li> </ul> <p>Oana, I. E., Schneider, C.Q. &amp; Thomann, E. (2021). <i>Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide</i>. Cambridge University Press. Chapter 1 (QCA in a nutshell)</p> <p>Hinterleitner, M., Sager, F. &amp; Thomann, E. (2016). The Politics of External Approval: Explaining the IMF's Evaluation of Austerity Programs. <i>European Journal of Political Research</i> 55(3): 549–567.</p>
Session 2 (120')	Technical underpinnings	<ul style="list-style-type: none"> <li>• Set calibration</li> <li>• Set relations</li> <li>• Parameters of fit</li> </ul>

18.4. 15:30- 17:30		<p>Oana, I. E., Schneider, C.Q. &amp; Thomann, E. (2021). <i>Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide</i>. Cambridge University Press. Chapter 2 (Calibrating and combining sets)</p> <p>Schneider, C. Q. &amp; Wagemann, C. (2012). <i>Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis</i>. New York: Cambridge University Press, pp. 117-150 (parameters of fit)</p>
Session 3 18.4. (60') 17.45- 18.45h	<b>Lab</b>	<ul style="list-style-type: none"> <li>• Q&amp;A</li> <li>• Students to independently solve formative assignments (quizzes etc)</li> <li>• Simultaneous office hour</li> </ul>
Session 4 (90') 19.4. 9- 10.30h	<b>R software lab</b>	<ul style="list-style-type: none"> <li>• Basic introduction to R</li> <li>• R syntax, packages, operations</li> <li>• Opening and editing datasets</li> </ul>
Session 5 (120') 19.4. 11- 13h	<b>Let's do QCA!</b>	<ul style="list-style-type: none"> <li>• Truth table analysis and logical minimization</li> <li>• Analyses of necessity and sufficiency</li> <li>• Conservative, intermediate and parsimonious solution types</li> </ul> <p>Oana, I. E., Schneider, C. Q. &amp; Thomann, E. (2021). <i>Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide</i>. Cambridge University Press. Chapters 3 (necessity) and 4.1-4.3 (sufficiency).</p> <p>Oana, I. E., Schneider, C. Q. &amp; Thomann, E. (2021). <i>Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide</i>. Cambridge University Press. Chapters 4.4-4.5 (limited diversity)</p>
Session 6 (120') 19.4. 14.30- 16.30h	<b>R software lab</b>	<ul style="list-style-type: none"> <li>• Running a QCA with a prepared script</li> </ul>
Session 7 (60') 19.4. 17- 18h	<b>Lab</b>	<ul style="list-style-type: none"> <li>• Q&amp;A</li> <li>• Students to independently solve formative assignments (quizzes etc)</li> <li>• Simultaneous office hour</li> </ul>
Session 8 (120') 20.4. 9-11h	<b>After the analysis</b>	<ul style="list-style-type: none"> <li>• Interpreting and presenting results</li> <li>• Follow-up case studies</li> </ul> <p>Oana, I. E., Schneider, C.Q. &amp; Thomann, E. (2021). <i>Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide</i>. Cambridge University Press.</p>

		<p>Chapter 7 (Summary and outlook).</p> <p>Schneider, C. Q. &amp; Rohlfing, I. (2013). Combining QCA and process tracing in set-theoretic multi-method research. <i>Sociological Methods &amp; Research</i> 42(4): 559-597.</p>
<p>Session 9 (45') 20.4. 11.15-12h</p>	<p><b>exam</b></p>	<ul style="list-style-type: none"> <li>• Final exam (online quiz)</li> </ul>

## Additional readings

The main **textbook** used for the course is:

Oana, I.E., Schneider, C.Q. and E. Thomann. (2021). *Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide*. Cambridge University Press.

For a more **in-depth theoretical reading**, it is recommended to buy:

Schneider, C.Q. and C. Wagemann (2012). *Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis*. New York: Cambridge University Press.

In the course, we will replicate the following study as the main **empirical example** which all participants must read before the course starts:

Hinterleitner, M., Sager, F. und E. Thomann (2016). The Politics of External Approval: Explaining the IMF's Evaluation of Austerity Programs. *European Journal of Political Research* 55(3): 549–567.

The following is a good example of a book **applying** set-theoretic, case-oriented methodology:

Thomann, E. (2019). *Customized implementation of European Union food safety policy: United in diversity?* Cham: Palgrave Macmillan, International Series on Public Policy.

All participants are expected to read all **key readings** listed in the table. Below I list **additional, optional readings** that you may find of interest. On the online platform, there is also a list of high-quality empirical example studies using QCA.

	Readings
Session 1	<p>Ragin, C. C. (2008). Measurement versus calibration: a set-theoretic approach. In Box-Steffensmeier, J. M., Brady, H.E. and D. Collier. <i>The Oxford Handbook of Political Methodology</i>. Oxford Handbooks Online: 174-198.</p> <p>Berg-Schlosser, D., De Meur, G., Rihoux, B. &amp; Ragin, C. C. (2009). Qualitative Comparative Analysis (QCA) as an Approach. In Rihoux, B. and C.C. Ragin. <i>Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques</i>. Los Angeles, London, New Delhi and Singapore: Sage Publications, 1-18.</p> <p>De Block, D., &amp; Vis, B. (2019). Addressing the challenges related to transforming qualitative into quantitative data in qualitative comparative analysis. <i>Journal of Mixed Methods Research</i> 13(4): 503-535.</p> <p>Duşa, A. (2018). <i>QCA with R. A Comprehensive Resource</i>. New York: Springer International Publishing, chapter 2.</p>

	<p>Haesebrouck, T. (2016). The added value of multi-value qualitative comparative analysis. In <i>Forum: Qualitative Social Research</i>, 17(1): 12.</p> <p>Legewie, N. (2017). Anchored calibration: From qualitative data to fuzzy sets. <i>Forum Qualitative Sozialforschung/Forum: Qualitative Social Research</i> 18(3): 24.</p> <p>Mello, P. A. (2021). Qualitative Comparative Analysis: Research Design and Application. Washington: Georgetown University Press. Chapter 2.</p> <p>Schneider, C. Q. &amp; Wagemann, C. (2012). <i>Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis</i>. New York: Cambridge University Press, pp. 23-41 (calibration), 253-274 ( variants of QCA).</p> <p>Thiem, A., Baumgartner, M. &amp; Bol, D. (2016). Still Lost in Translation! A Correction of Three Misunderstandings between Configurational Comparativists and Regressional Analysts. <i>Comparative Political Studies</i> 49(6): 742–774.</p>
Session 2	<p><b>Key readings</b></p> <p>Schneider, C. Q. &amp; Wagemann, C. (2012). <i>Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis</i>. New York: Cambridge University Press, pp. 42-90 (Boolean logic and set relations).</p> <p>Gerrits, L. M. &amp; Verweij, S. (2013). Critical Realism as a Meta-Framework for Understanding the Relationships between Complexity and Qualitative Comparative Analysis. <i>Journal of Critical Realism</i> 12(2): 166-82.</p> <p>Goertz, G., &amp; Mahoney, J. (2005). Two-level theories and fuzzy-set analysis. <i>Sociological Methods &amp; Research</i> 33(4): 497-538.</p> <p>Mahoney, J., &amp; Acosta, L. (2021). A regularity theory of causality for the social sciences. <i>Quality &amp; Quantity</i> 1-23.</p> <p>Ragin, C. C. (2006). Set Relations in Social Research: Evaluating Their Consistency and Coverage. <i>Political Analysis</i> 14(3): 291-310.</p> <p>Rohlfing, I. (2020). The choice between crisp and fuzzy sets in Qualitative Comparative Analysis and the ambiguous consequences for finding consistent set relations. <i>Field Methods</i> 32(1), 75-88.</p>
Session 5	<p>Goertz, G., &amp; Starr, H. (Eds.). (2002). <i>Necessary conditions: Theory, methodology, and applications</i>. Rowman &amp; Littlefield, pp.1-24, 47-94.</p> <p>Ragin, C. C. (2009). Qualitative Comparative Analysis Using Fuzzy Sets (fsQCA). In Rihoux, B. and C.C. Ragin. <i>Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques</i>. Los Angeles, London, New Delhi and Singapore: Sage Publications, 87-121.</p>

Rihoux, B. & De Meur, G. (2009). Crisp-Set Qualitative Comparative Analysis (csQCA). In Rihoux, B. and C.C. Ragin. *Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques*. Los Angeles, London, New Delhi and Singapore: Sage Publications, 33-68.

Schneider, C.Q. & Wagemann, C. (2012). *Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis*. New York: Cambridge University Press, pp. 221-232 (potential pitfalls necessity), 91-116 (truth tables), 178-194 (truth table algorithm).

Ragin, C.C. (2008). Easy Versus Difficult Counterfactuals. *Redesigning Social Inquiry: Set Relations in Social Research*. Chicago: University of Chicago Press, chapter 9.

Schneider, C.Q. & Wagemann, C. (2012). *Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis*. New York: Cambridge University Press, pp. 232-250 (skewed data).

Baumgartner, M. (2015). Parsimony and Causality. *Quality & Quantity* 49: 839-856.

Emmenegger, P. (2011). How good are your counterfactuals? Assessing quantitative macro-comparative welfare state research with qualitative criteria. *Journal of European Social Policy* 21(4): 365-380.

Radaelli, C. M. & Wagemann, C. (2019). What did I leave out? Omitted variables in regression and qualitative comparative analysis. *European Political Science* 18(2): 275-290.

Ragin, C.C. (1987/2014). *The comparative method: Moving beyond qualitative and quantitative strategies*. Univ of California Press, pp.85-124.

Schneider, C. Q. (2018). Realists and Idealists in QCA. *Political Analysis* 26(2): 246-254.

Schneider, C. Q. (2019). Two-step QCA revisited: the necessity of context conditions. *Quality & Quantity* 53(3): 1109-1126.

Schneider, C. Q. & Wagemann, C. (2013). Doing Justice to Logical Remainders in QCA: Moving Beyond the Standard Analysis. *Political Research Quarterly* 66(1): 211-220.

Schneider, C. Q. & Wagemann, C. (2012). *Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis*. New York: Cambridge University Press, pp. 151-177 (limited diversity and Standard Analysis).

Thomann, E. & Maggetti, M. (2020). Designing Research with Qualitative Comparative Analysis (QCA): Approaches, Challenges, and Tools. *Sociological Methods & Research* 49(2): 356-386.

Session 8	<p>Ragin, C.C. (1987/2014). <i>The comparative method: Moving beyond qualitative and quantitative strategies</i>. Univ of California Press, pp. 164-172.</p> <p>Álamos-Concha, P., Pattyn, V., Rihoux, B. et al. (2021). Conservative solutions for progress: on solution types when combining QCA with in-depth Process-Tracing. <i>Qual Quant</i>. DOI:10.1007/s11135-021-01191-x</p> <p>Baumgartner, M. &amp; Thiem, A. (2017). Model ambiguities in configurational comparative research. <i>Sociological Methods &amp; Research</i> 46(4): 954-987.</p> <p>Fischer, M., &amp; Maggetti, M. (2017). Qualitative comparative analysis and the study of policy processes. <i>Journal of Comparative Policy Analysis: Research and Practice</i> 19(4): 345-361.</p> <p>Gerrits, L., &amp; Pagliarin, S. (2020). Social and causal complexity in qualitative comparative analysis (QCA): strategies to account for emergence. <i>International Journal of Social Research Methodology</i> 1-14.</p> <p>Haesebrouck, T. (2022). Relevant, Irrelevant, or Ambiguous? Toward a New Interpretation of QCA's Solution Types. <i>Sociological Methods &amp; Research</i> DOI: 00491241211036153.</p> <p>Oana, I. E., &amp; Schneider, C. Q. (2021). A Robustness Test Protocol for Applied QCA: Theory and R Software Application. <i>Sociological Methods &amp; Research</i> DOI: 00491241211036158.</p> <p>Oana, I. E., Schneider, C. Q. &amp; Thomann, E. (2021). <i>Qualitative Comparative Analysis (QCA) Using R: A Beginner's Guide</i>. Cambridge University Press. Chapter 5 (rounding up a solid QCA).</p> <p>Pattyn, V., Molenveld, A., &amp; Befani, B. (2019). Qualitative comparative analysis as an evaluation tool: Lessons from an application in development cooperation. <i>American Journal of Evaluation</i>, 40(1): 55-74.</p> <p>Rihoux, B. &amp; Lobe, B. (2009). The case for qualitative comparative analysis (QCA): Adding leverage for thick cross-case comparison. <i>The Sage Handbook of Case-Based Methods</i>, pp. 222-242.</p> <p>Rubinson, C. (2019). Presenting qualitative comparative analysis: Notation, tabular layout, and visualization. <i>Methodological Innovations</i> 12(2): 2059799119862110.</p> <p>Schneider, C. Q. &amp; Wagemann, C. (2012). <i>Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis</i>. New York: Cambridge University Press, pp. 220-249 (Potential pitfalls in the analysis of necessity and sufficiency and suggestions for avoiding them).</p> <p>Thomann, E., Ege, J., &amp; E. Paustyan. (2022). Approaches to Qualitative Comparative Analysis and good practices: a systematic review. <i>Swiss Political Science Review</i>, DOI: 10.1111/spsr.12503.</p>
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