Qualitative Comparative Analysis (QCA) and Set-Theoretic / Configurational Comparative Methods (STMs/CCMs): an introduction and practical illustration

25 November 2016, ITG Antwerp

Prof. Benoît Rihoux, UCLouvain

http://www.compasss.org

Keywords

- Toolbox [& craft(wo)manship]
- Multiple cross-case analysis
- Within-case [causal?] complexity
- [mostly] Outcome-driven
- Formal [mathematical] treatment
- Simplifications [‘simple complexity’?]

1. What is QCA (not)?

QCA as a «middle ground» between qualitative and quantitative approaches

Charles Ragin's (1987) critique:

- The assumption of isolated ['net'] effects of single variables makes little sense in social reality.
  Social phenomena always occur together with other social phenomena. The ceteribus paribus principle is not helpful to understand the world.
- It is of little use to gain an in-depth understanding of single cases if we cannot draw lessons for other cases [idiosyncratic bias]
- [systematically] identifying regularities (> single case) is a central task of empirical social research.
- → we need a method that combines the strengths of both approaches: identify regularities while remaining sensitive to cases and context.

Source: e.g. Marx, Rihoux & Ragin (2013)

Breadth vs. depth and the comparative method

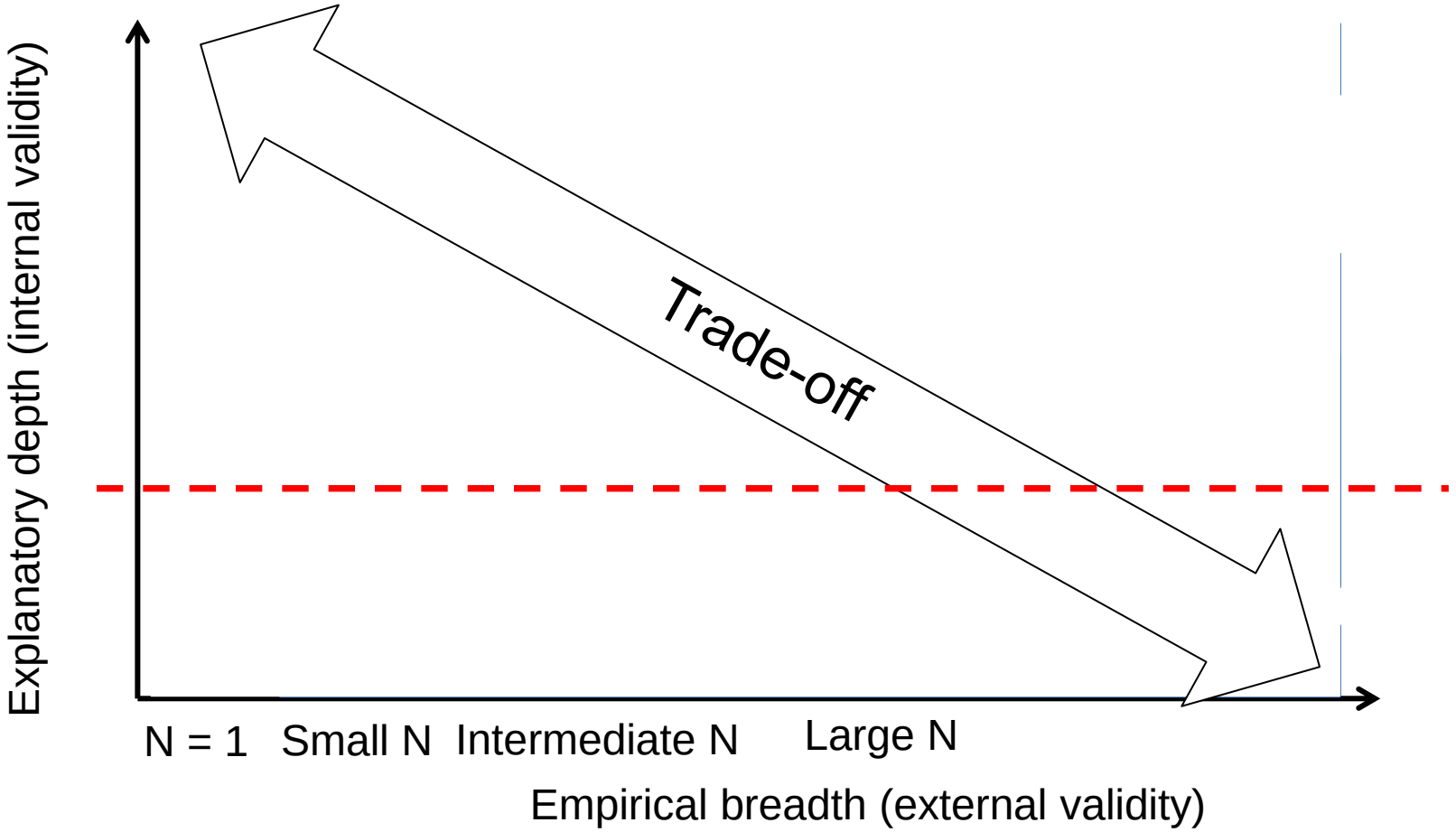
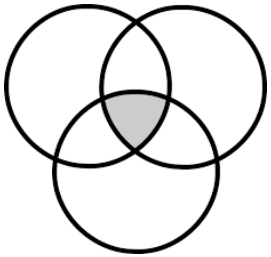


Illustration by Thomann & Rihoux, based on Aarebrot and Bakka 2003.

What is QCA?



- A set-theoretic, case-sensitive, configurational **method** [= *approach* & family of *techniques*] which:
  - Conceives each case as a unique **configuration** that «counts»
  - Combines case studies with a **formalized** analysis of data-set observations
  - Assumes causal **complexity**
  - Identification of **necessary** (←) and / or **sufficient** (→) conditions for an outcome
  - Describes social reality as memberships of cases in, and relationships between, **sets**

Schneider and Wagemann 2012: 1-19.

QCA as a family of techniques vs. QCA as a case-oriented approach

- QCA as a family of techniques: The «analytic moment»
  - Based on the **truth table** and **logical minimization**
  - Offers formalized and **replicable** tools to work with variables and data-set observations
  - **Case-sensitive** (no “averaging out” of outliers)
- QCA as an approach: back-and forth between ideas and evidence
  - Processes before & after the analysis of the data: (re-)collection of data, (re-)definition of the case selection criteria, (re-) specification of concepts
  - Continuous dialogue between theory and cases
  - Often requires intimate **case knowledge**

→ *Case-orientedness of QCA approach crucial for making results robust and plausible (‘casing’, case selection, calibration, measurement error, causal mechanisms).*

→ *Iterative: combines deductive and inductive / explorative elements; not suited for standard hypothesis testing.*

Schneider and Wagemann 2012: 11, 296; Rihoux and

Elements of causal complexity

- **Conjunctural causation**
  - The causal role of a single factor (condition) may unfold only in combination with other conditions (configurations, conjunctions, paths)

- **Equifinality [→ multiple conjunctural causation]**
  - Many roads lead to Rome: One outcome can have several, mutually non-exclusive explanations (single conditions or combinations of)

- ! **Asymmetric** (v/s symmetric) causation
  1. The occurence of the outcome can have a different explanation than its non-occurence. The two are treated as separate phenomena.
  2. Multifinality:
     a) The same condition can produce a different outcome, depending on the context in which it occurs.
     b) Similarly, the causal role of the occurence of a condition does not inform us about the causal role of its non-occurence.

Schneider and Wagemann 2012: 78ff.; Rihoux & Ragin 2009 Chap 1

2. Why use QCA (or not)?

When do we use QCA?

- Nature of the research question:
  - Necessary and sufficient conditions rather than gradual, probabilistic net effects
  - ! «Causes of effects» type of question
  - We expect complex causal patterns
  - Want to identify regularities while doing justice to the cases' particularities

- Empirical arguments:
  - Researcher has intimate (at least some) case knowledge
  - Possible to reduce number of conditions (C ≤ ca. 8, recommended: 4-6 – depends on N & diversity of cases (Marx & Dusa 2011))
  - **Medium to large N (≥ ca. 10).** Rule of thumb: N ≥ Cx3, even better: $N \geq 2^C$

«The empirical argument must be subordinated to the theoretical argument. Even if researchers are confronted with a medium-N dataset, the use of QCA (…) would be appropriate (…) only if researchers are interested in set relations rather than correlations.»

Schneider and Wagemann 2012: 12, 276; Emmenegger et al. 2013; Marx & Dusa 2011

Uses and variants of QCA

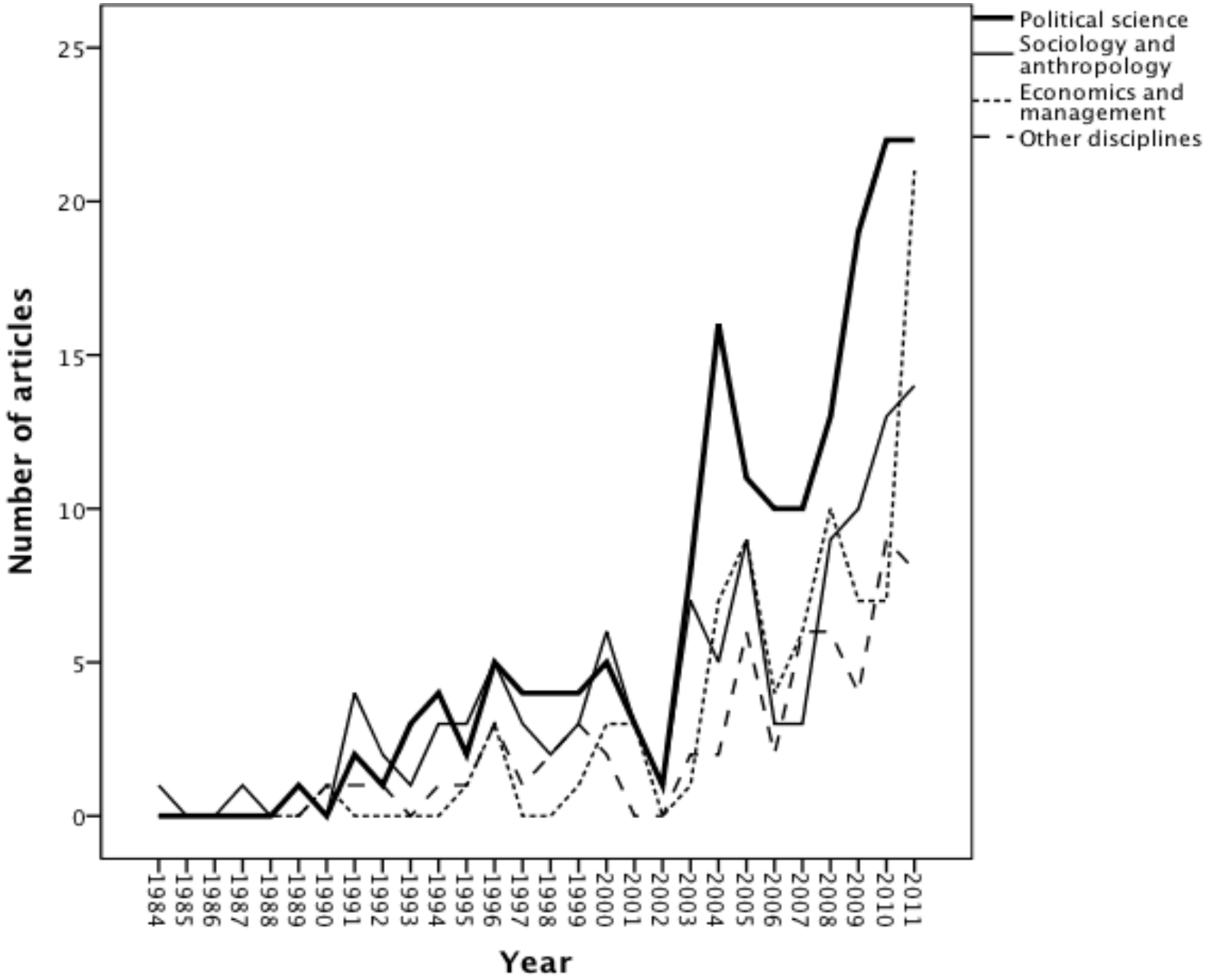
1. Descriptive: Summarize data (truth table) and check its coherence
2. Create empirical typologies (e.g. Fuzzy set ideal type analysis; Kvist 2007)
3. **Explanatory: Testing hypotheses and theories (subset relations)**
4. **Explanatory: Testing propositions**
5. **Development of new, refinement of theoretical arguments**

> 5 Variants of QCA:

1. **Crisp-set QCA (csQCA) (Ragin 1987)**
   - **Dichotomous data**
2. **Fuzzy-set QCA (fsQCA) (Ragin 2000)**
   - **Ordinal and continuous data**
3. **Multi-value QCA (mvQCA) (Cronqvist and Berg-Schlosser 2008; Thiem 2014)**
   - **Multinomial data**
4. Temporal QCA (tQCA) (Caren and Panofsky 2005)
   - Accounts for time sequences (cf.Garcia and Arino 2013 for panel data; Fischer & Maggetti 2016; Hino; etc.)
5. Two-step QCA (Schneider and Wagemann 2006)

Schneider and Wagemann 2012: 253-269, 276; see also Thiem 2014 on gsQCA

Discipline


Political science
Sociology and anthropology
Economics and management
Other disciplines
Number of articles
0
5
10
15
20
25
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Year

3. How to use QCA?

[Illustration: theory- and hypotheses-testing use]

NB:

- all data types possible
- small, intermediate & large N all OK

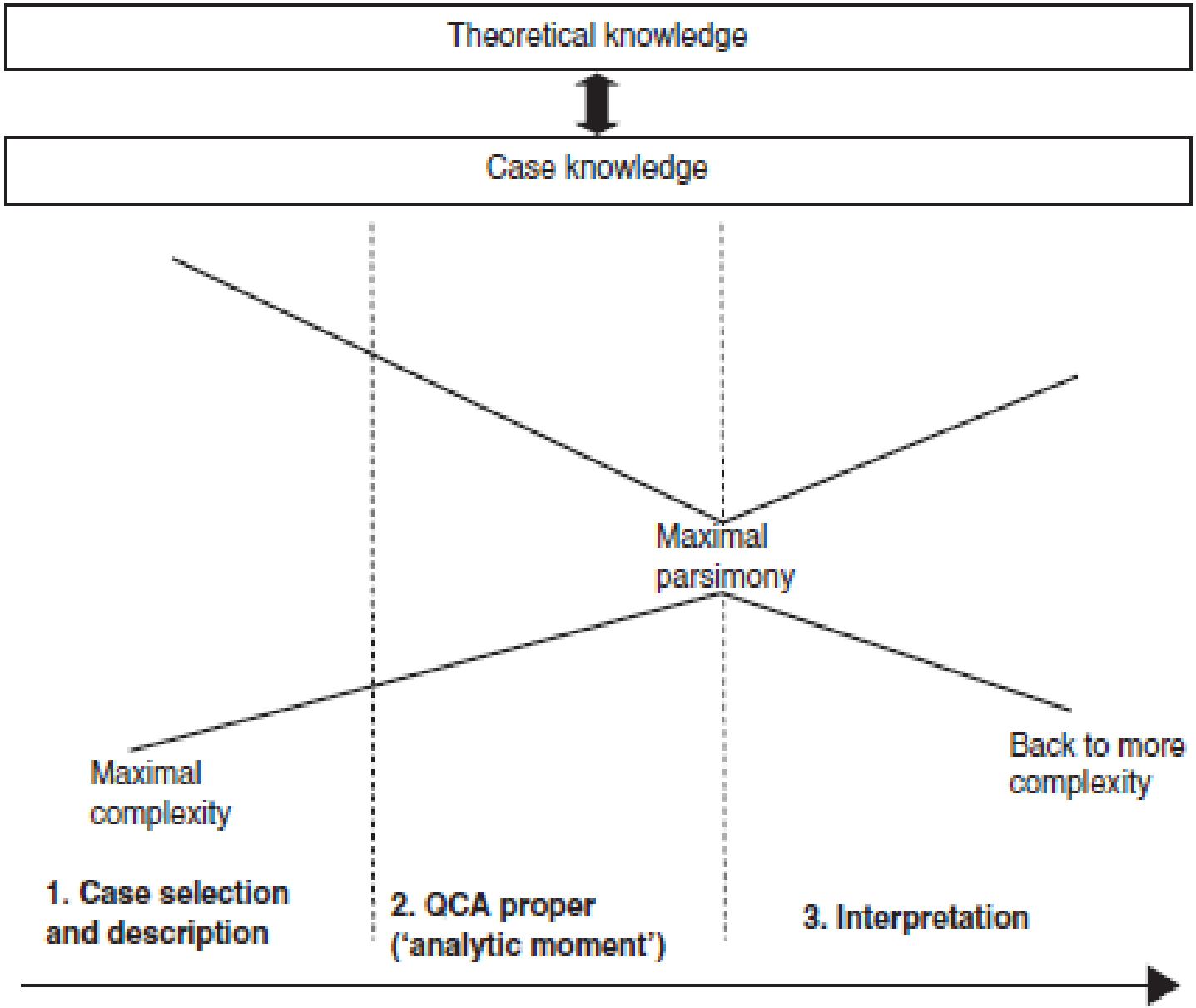


Figure 12.1 QCA and the funnel of complexity. Rihoux & Lobe - 2009

Upstream steps

- Research question ← → ‘casing’
  - Level
  - Concept
- ← → outcome definition
- Case selection
  - Population?
  - How many / which ones? [diversity → full population?]
- Model-building
  - Role of theory v/s case knowledge?
  - N of conditions?
  - Directional hypotheses (& Nec/Suff)
  - Configurational hypotheses (& Nec/Suff)
- Raw data gathering
  - → raw data table

An empirical illustration (csQCA & mvQCA)

Topic : evolution of HIV prevalence

Ref: CRONQVIST, L. & BERG-SCHLOSSER, D. 2006. Determining the conditions of HIV/AIDS prevalence in sub-Saharan Africa. Employing new tools of macro-qualitative analysis. *In: RIHOUX, B. & GRIMM, H. (eds.) Innovative comparative methods for policy analysis. New York: Springer.*

.

[…] Tosmana demonstration

[thresholds-setting, final mvQCA, 18 cases]

- **HIVChange**: negative: 0; positive: 1
- Agrar : > 25%: 1
- GenderEI : > 40: 1
- Litteracy: > 50% : 1
- Mortality:
  - < 2%: 0
  - between 2% & 4%: 1
  - > 4%: 2

[minimizations]

[1] outcome, no logical remainders	→ 'complex' solution
[1] outcome, all useful logical remainders	→ 'parsimonious' solution
[1] outcome, only 'easy' logical remainders	→ 'intermediate' solution
[0] outcome, no logical remainders	→ 'complex' solution
[0] outcome, all useful logical remainders	→ 'parsimonious' solution
[0] outcome, only 'easy' logical remainders	→ 'intermediate' solution

4. Resources

- Thru: http://www.compasss.org

Further readings

- *Textbooks: Ragin 1987; Rihoux & Ragin 2009; Schneider & Wagemann 2012*
- *On the spread of QCA (types, disciplines, journals, etc.)*: Rihoux et al. 2013
- *On the relationship between complexity and QCA, and QCA's epistemological underpinnings*: Gerrits & Verweij 2013
- *On large-N QCA*: Greckhamer et al. 2013, Fiss 2011, Vis 2011, Wagemann et al. 2015
- *Rules of thumb for ratio of cases and conditions in csQCA*: Marx & Dusa 2011
- *On set-theoretic methods and time*: Schneider & Wagemann 2012: 263-274, Fischer & Maggetti 2016.
- *On theory in QCA*: Schneider & Wagemann 2012: 295-305

Further readings

- *On comparative research design*: Berg-Schlosser and De Meur 2009
- *On formal theory evaluation*: Ragin 1987; Schneider & Wagemann 2012: 295-305; Thomann 2015b.
- *On skewed data with QCA*: Cooper and Glaesser 2011, Schneider and Wagemann 2012: 244ff
- *On the principles of post-QCA case selection*: Schneider & Rohlfing 2013
- *On issues surrounding the selection of cases on the dependent variable*: Ebbinghaus 2005

Literature

Aarebrot, F.H. and Bakka, P.H. (2003) „Die vergleichende Methode in der Politikwissenschaft', in: Berg-Schlosser, D. and Müller-Rommel, F., (Eds.) *Vergleichende Politikwissenschaft: Ein einführendes Studienhandbuch*, pp. 49-66, 57-76. Wiesbaden: VS-Verlag.

Bara, C. (2014). Incentives and opportunities: A complexity-oriented explanation of violent ethnic conflict. *Journal of Peace Research* 51(6): 696–710.

Baumgartner, Michael. "Parsimony and causality." *Quality & Quantity* (2015): 1-18.

Berg-Schlosser, D. and De Meur, G. (2009) «Comparative research design : case and variable selection», in: Rihoux, B. and Ragin, C.C., (Eds.) *Configurational comparative methods. Qualitative Comparative Analysis (QCA) and related techniques*, pp. 19-32. Thousand Oaks and London: Sagepub

Brady, Henry E. (2010). “Data-set observations and causal-process observations: The 2000 U.S. presidential election”. *In Rethinking social inquiry: Diverse tools, shared standards*, ed. H. E. Brady and D. Collier, 237–42.

Berg-Schlosser, D., DeMeur, G., Rihoux, B. and C. C. Ragin (2009). “Qualitative Comparative Analysis (QCA) as an Approach”. 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, 1-18.

Caren, N. and A. Panofsky (2005). “TQCA. A Technique for Adding Temporality to Qualitative Comparative Analysis”, *Sociological Methods & Research* 34(2): 147-172

Cooper, B. and J. Glaesser (2011). "Paradoxes and pitfalls in using fuzzy set QCA: Illustrations from a critical review of a study of educational inequality", *Sociological Research Online* 16(3): 1-18.

Literature

Cronqvist, L. and D. Berg-Schlosser (2009). “Multi-Value QCA (MVQCA)”. 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, chapter 4.

Ebbinghaus, B. (2005). When Less is More. Selection Problems in Large-N and Small-N Cross-National Comparisons. *International Sociology* 20(2): 133–152.

Eliason, S. R., and R. Stryker (2009). "Goodness-of-fit tests and descriptive measures in fuzzy-set analysis", *Sociological Methods & Research* 38(1): 102-146.

Emmenegger, P. (2010). „Job security regulations in Western democracies: A fuzzy set analysis“, *European Journal of Political Research* 50(3): 336-364.

Fischer, M. (2014). "Institutions and coalitions in policy processes: a cross-sectoral comparison", *Journal of Public Policy* 35(2) 245-268.

Fiss, P. C. (2011). "Building better causal theories: A fuzzy set approach to typologies in organization research", *Academy of Management Journal* 54(2): 393-420.

Fiss, P., Dmitry Sharapov, and Lasse Cronqvist.(2013) "Opposites attract? Opportunities and challenges for integrating large-N QCA and econometric analysis." *Political Research Quarterly* 66(1): 191-197.

Ganghof, Steffen (2005). „Kausale Perspektiven in der vergleichenden Politikwissenschaft: X-zentrierte und Y-zentrierte Forschungsdesigns“. In: Kropp, Sabine und Michael (Hrsg.). *Vergleichen in der Politikwissenschaft*. Wiesbaden: VS Verlag für Sozialwissenschaften, 76-94.

Literature

Gerrits, L. M., and S. Verweij (2013). "Critical Realism as a Meta-Framework for Understanding the Relationships between Complexity and Qualitative Comparative Analysis", *Journal of Critical Realism* 12(2): 166-82.

Goertz, G. (2006). “Assessing the Trivialness, Relevance, and Relative Importance of Necessary or Sufficient Conditions in Social Science”. *Studies in Comparative International Development* 41(2): 88-109.

Goertz, Gary 2006b. *Social Science Concepts. A User's Guide*, Princeton, N.J.: Princeton University Press.

Goertz, G. and J. Mahoney (2005). “Two-level Theories and Fuzzy-Set Analysis”. *Sociological Methods & Research* 33(4): 497-538.

Greckhamer, T., V. F. Misangyi, and P. C. Fiss (2013). "The two QCAs: From a small-N to a large-N set theoretic approach." *Research in the Sociology of Organizations* 38: 49-75.

Grofman, B., and C. Q. Schneider (2009). "An introduction to crisp set QCA, with a comparison to binary logistic regression", *Political Research Quarterly* 62(4): 662-672.

Hinterleitner, M., Sager, F. and E. Thomann (2015). *The Long and Winding Road to Fiscal Adjustment: The IMF’s Assessment of Austerity Programs during the European Debt Crisis*. Paper resented at the 2015 International Conference on Public Policy, Milano, July 2015.

Klir, G. J., St. Clair, U. and B. Yuan (1997). *Fuzzy Set Theory. Foundations and Applications*. Upper Saddle River (NJ): Prentice Hall PTR, 1-9, 47-72, 90-95.

Literature

Kvist, J. (2006). «Diversity, ideal types and fuzzy sets in comparative welfare state research.» In Rîhoux und Grimm (eds), 167-184.

Kvist, J. (2007). "Fuzzy set ideal type analysis." *Journal of Business Research* 60(5): 474-481.

Ledermann, S. (2012). „ Exploring the Necessary Conditions for Evaluation Use in Program Change“, *American Journal of Evaluation* 33(2): 159-178.

Lijphart, A. (1975). “The comparable-cases strategy in comparative research”, *Comparative Political Studies* 8(2): 158-177.

Lijphart, A. (1971). “Comparative politics and the comparative method”, *American Political Science Review* 65(3): 682-693.

Lott, John R. (2000) “Gore might lose a second round: media suppressed the Bush vote." *Philadelphia Inquirer* November 14: 23A.

Maggetti, M., and D. Levi-Faur (2013). "Dealing with Errors in QCA." *Political Research Quarterly* 66(1): 198-204.

Maggetti, M. (2014). "Promoting Corporate Responsibility in Private Banking Necessary and Sufficient Conditions for Joining the Wolfsberg Initiative Against Money Laundering”, *Business & Society* 53(6): 787-819.

Mahoney, J. (2006). “Strategies of Causal Assessment in Comparative Historical Analysis”. In Mahoney, J. and D. Rueschemeyer. *Comparative historical analysis in the social sciences.* Cambridge: CUP, 337-72.

Mahoney, James, and Gary Goertz (2006). "A tale of two cultures: Contrasting quantitative and qualitative research." *Political Analysis* 14.3: 227-249.

Literature

Mahoney, J. and R. Sweet Vanderpoel (2015). "Set Diagrams and Qualitative Research", *Comparative Political Studies* 48(1): 65-100.

Marx, A. and A. Dusa (2011). "Crisp-Set Qualitative Comparative Analysis (csQCA): Contradictions and consistency benchmarks for model specification", *Methodological Innovations Online* 6.2: 103-148.

Przeworski, A. and H. Teune, (1970). *The Logic of Comparative Social Inquiry*. New York: Wiley-Interscience.

Ragin, Charles C. 1987. *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies.* Berkeley and Los Angeles: University of California Press

Ragin, C. C. 2000. *Fuzzy-Set Social Science*. Chicago/London: University of Chicago Press.

Ragin, C.C. (2004) 'Turning the tables: how case-oriented research challenges variable-oriented research', in: Brady, H.E. and Collier, D., (Eds.) *Rethinking social inquiry: diverse tools, shared standards*, pp. 123-138. Lanham, MD: Rowman & Littlefield Publishers, Inc.

Ragin, C. C. 2006. “Set Relations in Social Research: Evaluating Their Consistency and Coverage.” *Political Analysis* 14(3): 291-310.

Ragin, Charles C. (2008a). "Measurement versus calibration: a set-theoretic approach." In: Box-Steffensmeier, Janet M., Henry E. Brady, and David Collier (eds). *The Oxford handbook of political methodology*. Oxford Handbooks Online : 174-198.

Ragin, C. C. 2008b. *Redesigning Social Inquiry - Fuzzy Sets and Beyond*. Chicago: University of Chicago Press.

Literature

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

Ragin, C. (2009). “Qualitative Comparative Analysis Using Fuzzy Sets (fsQCA)”. 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, 87-121.

Rihoux, B., and Ragin, C. (ed.) (2009). *Configurational comparative methods. Qualitative Comparative Analysis (QCA) and related techniques*. Thousand Oaks and London: Sage.

Rihoux, B. and G. DeMeur (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.

Rihoux, B., Alamos, P., Bol, D., Marx, A. and I. Rezsohazy (2013). “From niche to mainstream method? A comprehensive mapping of QCA applications in journal articles from 1984 to 2011”, *Political Research Quarterly* 66(1): 175-184.

Rohlfing, I. and C.Q. Schneider (2014). „Clarifying Misunderstandings, Moving Forward: Towards Standards and Tools for Set-Theoretic Methods”, *Qualitative & Multi-Method Research* 12(2): 27-34.

Sartori, G. (1970). Concept Misformation in Comparative Politics. *American Political Science Review* 64(4): 1033-1053 .

Sartori, G. (1991) “Comparing and miscomparing”, *Journal of Theoretical Politics* 3(3): 243-257.
Schneider, C. Q., and I. Rohlfing (2013). "Combining QCA and process tracing in set-theoretic multi-method research", *Sociological Methods & Research*.

Literature

Schneider, C. Q., and C. Wagemann (2006). "Reducing complexity in Qualitative Comparative Analysis (QCA): Remote and proximate factors and the consolidation of democracy", *European Journal of Political Research* 45(5): 751-786.

Schneider, C. Q. and C. Wagemann (2010). “Standards of Good Practice in Qualitative Comparative Analysis (QCA) and Fuzzy Sets”, *Comparative Sociology* 9(3): 397-418.

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.

Schneider, C. Q., and C. Wagemann (2012). „Notions and operations in set theory“. *Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis.* New York: Cambridge University Press, 42-56.

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

Skaaning, Svend-Erik (2011). "Assessing the robustness of crisp-set and fuzzy-set QCA results", *Sociological Methods & Research* 40(2): 391-408.

Thiem, Alrik(2014). "Navigating the Complexities of Qualitative Comparative Analysis Case Numbers, Necessity Relations, and Model Ambiguities." *Evaluation Review* : 0193841X14550863.

Thiem, A. (2014). “Unifying Configurational Comparative Methods Generalized-Set Qualitative Comparative Analysis", *Sociological Methods & Research* 43(2): 313-337.

Literature

Thiem, A. (2014). "Parameters of fit and intermediate solutions in multi-value Qualitative Comparative Analysis", Quality & Quantity: 1-18.

Thiem, A., & Dusa, A. (2013a). “QCA: A package for qualitative comparative analysis”, *The R Journal 5*(1): 1-11.

Thiem, A. and A. Dusa (2013b). Boolean Minimization in Social Science Research: A Review of Current Software for Qualitative Comparative Analysis (QCA). *Social Science Computer Review* 31(4) 505-521.

Thiem, A., Baumgartner, M. and D. Bol (forthcoming). “Still Lost in Translation! A Correction of Three Misunderstandings between Configurational Comparativists and Regressional Analysts”, *Comparative Political Studies*.

Thomann, E. (2015a). Is output performance all about the resources? A fuzzy-set Qualitative Comparative Analysis of street-level bureaucrats in Switzerland. *Public Administration* 93(1): 177-194.
Thomann, E (2015b). Customizing Europe: Transposition as bottom-up implementation. Journal of European Public Policy. DOI: 10.1080/13501763.2015.10085.

Thomann, E. and M. Maggetti (2015). *Designing research with Qualitative Comparative Analysis (QCA): Mapping approaches, challenges and tools*. Paper for presentation at the 2015 QCA experts conference in Zurich, Switzerland, December 2015.

Thomann, E., Tummers, L. and N. van Engen (2015). *Policy alienation as motivator or hygiene factor: Applying Herzberg's two-factor theory to policy implementation.* Paper for presentation at the 2015 EGPA Annual Conference, Toulouse, France, 26.- 28. 8. 2015 .

Vis, B. (2011). “The Comparative Advantages of fsQCA and Regression Analysis for Moderately Large-N Analyses”, *Sociological Methods & Research* 41(1): 168–198.