8

Conclusions—The Way(s) Ahead

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Goals of This Chapter

After reading this chapter, you should be able to:

- Have a clear view of the key "good practices" throughout the textbook
- Understand the key remaining challenges facing QCA techniques, as well as expected developments in the near future
- Possibly, in your own work, try to bring an original contribution to these developments
- Reflect on the possibility of combining (or confronting) QCA techniques with other methods in your own research

MAINSTREAMING "GOOD PRACTICES" IN APPLICATIONS OF QCA

Remember that a key goal of this textbook is to present the most important "good practices" for QCA techniques. During the last few years, more and more practitioners have become aware of these good practices, thus enabling an increasingly homogeneous quality of applications. Within the next few years, the further mainstreaming of good practices will be of crucial importance for the further progress of Configurational Comparative Methods in general and of QCA techniques in particular.

An important overarching good practice is that QCA techniques are best applied with transparency. In concrete terms, this means that at least some information must be provided with respect to each one of the practical steps

and decisions made in the course of the analysis. Remember that transparency is what allows replicability, more pertinent critiques (hopefully), and more cumulative knowledge.

Box 8.1
"Good Practices" (12): Transparency

For all QCA techniques, the buzzword is *transparency*. Even in short publication format (e.g., conference papers and journal articles), the following elements should be provided in some form:

- The raw data table
- The operationalization (dichotomization, trichotomization, or fuzzy-set calibration) of all variables (conditions and outcome)
- The computer software used (TOSMANA or FSQCA, or other available program). The minimization should not be performed by hand
- The truth table
- The analysis of necessary conditions
- The treatment of contradictory configurations (if any)
- The main iterations leading to the final (contradiction-free) model
- The way logical remainders are being used (if applicable)
- The full minimal formulas, not only as narratives, but also in formal notation. If there are many possible minimal formulas, all should be mentioned—or at least, the choice of a specific minimal formula should be well-documented and justified
- The minimal formulas before and after you factor them by hand (if applicable; see Box 3.7)
- The consistency and coverage measures
- The interpretation of the minimal formulas (which "paths" are more important and why?, etc.)

Of course, in short publication format, it might be difficult to find enough room to lay out all these elements. Experience indicates that it can nevertheless be done, in a synthetic way (some good examples: Chan, 2003; Hagan & Hansford-Bowles, 2005; Kilburn, 2004; Osa & Corduneanu-Huci, 2003; Redding & Viterna, 1999; Vanderborght & Yamasaki, 2004). It is also always possible to make available (e.g., on a Web page) some elements that would be too cumbersome for a short publication (e.g., a raw data table that would be too large, qualitative threshold justification for some conditions, a long list of minimal formulas).

CONNECTING THE DIFFERENT QCA TECHNIQUES

Beyond their specifics, the different QCA techniques share a common perspective: contributing to the development of "meaningful 'medium-range' social science," situated "between the extremes of over-generalizing and 'universalizing' macro-quantitative approaches, on the one hand, and purely individualizing case-oriented approaches, on the other" (Cronqvist & Berg-Schlosser, 2006, p. 164; see also p. 6). Because they share this perspective, QCA techniques should be viewed as complementary. Depending on the researcher's needs, and on the nature of the data, it is possible to concentrate on a single technique, or possibly try different combinations.

As explained above (p. 28), MSDO/MDSO is useful mostly at the preliminary stages of research, in the process of case and condition selection. As for the three other techniques (csQCA, mvQCA, and fsQCA), there are different perspectives on how they articulate. Herrmann and Cronqvist (2008), for example, argue that the three respective techniques are best used in different research situations, following two dimensions: the sheer number of cases (the size of the data set) and the necessity to preserve the richness of the data information in the raw data set.

Another perspective is to consider that the crisp-set approach works best when there is a careful articulation with in-depth case knowledge, especially given the important impact that dichotomization has on findings. The fuzzy-set approach, by contrast, is probably more useful when the evidence is more quantitative in nature and lends itself to fine-grained calibration. Whether or not these perspectives on differences are accepted, there are important overlaps among these techniques. For instance, all three techniques can be used for large, intermediate, and small Ns. Indeed, it has been demonstrated that csQCA can be used fruitfully in larger-N settings and that fsQCA is also compatible with a small-N research design (see p. 174). Whatever choice is made, one should not be too rigid when approaching these techniques. Testing the different QCA techniques can indeed be part of the iterative research process.

In general, if the data are mostly dichotomous by nature, or if dichotomizing does not pose too serious difficulties, it is best to try csQCA first and then shift to mvQCA if contradictions are numerous and there is no way to resolve them via in-depth analysis of cases. By contrast, if the raw data vary systematically and meaningfully by degree, it is probably better not to dichotomize or trichotomize them and to use fsQCA instead. Also, as explained in Chapter 5, fsQCA has a stricter definition of sufficiency, and the assessment of each causal combination is based on data for all cases included in a study. Thus, the results of an application of fsQCA are likely to be more narrowly circumscribed—by the evidence—than the results of either csQCA or mvQCA.

CONNECTING QCA TECHNIQUES AND OTHER QUALITATIVE AND QUANTITATIVE TECHNIQUES

Remember that Configurational Comparative Methods, and QCA techniques in particular, display some features (and strengths) of both "case-oriented" and "variable-oriented" approaches. In short, these techniques are case-oriented, holistic techniques, but at the same time they are also analytic in nature as it is necessary to break down cases into variables—conditions and an outcome (see pp. xviii, 6, 13). Because of the dual nature of QCA techniques, they can be fruitfully connected to many other techniques, be they "qualitative" or "quantitative."

By definition, most QCA applications are de facto developed in sequence with more qualitative, thick case-oriented methods. Especially in the smaller-N analyses, applications often stem from qualitative case studies. Thus, there is already a lot of upstream qualitative work involved in the process of achieving an in-depth understanding of cases. One of the recent illustrations is Grimm's (2006) analysis of entrepreneurship policy and regional economic growth in the USA and Germany. She uses QCA in an exploratory way, to enrich her qualitative knowledge of specific cases, by helping her to identify specific contextual factors that influence some cases but not others. Indeed, QCA minimal formulas can be interpreted in useful ways by qualitatively oriented researchers, for these results may shed light on key elements of their "thick" case narratives. In other words, QCA techniques can be used to gain leverage in the process of unraveling thick case narratives—both for individual cases (within-case perspective) and for comparisons across cases (cross-case perspective) (Curchod, Dumez, & Jeunemaître, 2004). True, as explained above, QCA does not in itself open up the "black box" of complex phenomena and processes (see p. 159). However, it rather acts like a flashlight that points at some crucial spots in the black boxes of the cases under investigation.

As for the connection with mainstream statistical methods, in numerous recent contributions, especially in medium-N and larger-N settings, researchers have used both statistical techniques and QCA techniques to analyze the same initial data and to confront the conclusions of both techniques. Quite often, the empirical conclusion is that QCA techniques help researchers learn more from their data. For instance, by reanalyzing with fsQCA the bell curve data on social inequalities in the United States, Ragin (2006a) demonstrates that there is much more to be found when one takes into account the configurational nature of social phenomena, which cannot be grasped with standard statistical procedures. Another example is Luoma's (2006) study of social sustainability in local Finnish communities, in which QCA enriches the conclusions reached by prior regression analyses. The same goes for Cronqvist and Berg-Schlosser's

(2006) aforementioned mvQCA analysis of explanatory factors of AIDS prevalence in sub-Saharan Africa (see p. 138).

Other examples include the confrontation between fuzzy-set analysis and regression analyses by Katz, Vom Hau, and Mahoney (2005) (see p. 140). csQCA has in fact already been confronted with quite a few different statistical techniques: discriminant analysis (Berg-Schlosser & De Meur, 1997), factor analysis (Berg-Schlosser & Cronqvist, 2005), descriptive statistics on individual conditions (Sager, 2004), various types of multiple regression (e.g., Amenta & Poulsen, 1996; Ebbinghaus & Visser, 1998; Kittel, Obinger, & Wagschal, 2000; Nelson, 2004), logistic regression (Amoroso & Ragin, 1999; Ragin & Bradshaw, 1991), and logit regression (Dumont & Bäck, 2006; Heikkila, 2003; Peters, 1998). Other attempts to "cross" QCA techniques with other (non-statistical) formalized techniques have been made, such as social network analysis (Stevenson & Greenberg, 2000; Yamasaki & Spreitzer, 2006) and game theory (Brown & Boswell, 1995).

At this stage, the most contested topic is probably the respective pros and cons of QCA techniques versus statistical techniques. This debate can become somewhat confrontational. Probably a useful way to put things is that the intention of QCA techniques is certainly not to supplant regression and related analyses, especially since the underlying logic and goals of the respective methods display stark differences (see Chapter 7). As mentioned above (see p. 9), one of the key differences is that regression-based methods focus primarily on the problem of estimating the net, independent effect of each variable included in an analysis on the outcome. By contrast, it would be a serious mistake to apply QCA techniques to this task, as the latter focus on combinations of conditions. From the perspective of QCA, the idea of isolating the net, independent effect of each condition variable makes no sense (Ragin & Rihoux, 2004b; Ragin, 2006a). Fundamentally, QCA techniques attempt to explain specific outcomes in particular cases (hopefully also producing "modest" generalizations; see p. 11); statistical analysis, by contrast, tries to generalize about averages across all cases in a population, without attention to any specific case. Without taking into account this ontological difference, it is all too easy to formulate misplaced critiques with regard to QCA (see Chapter 7), and it is difficult to meaningfully confront the two approaches. Probably a useful way to combine QCA techniques and other formal (typically statistical) techniques is to consider them sequentially. This is a rejoinder to growing debates on how to combine, or possibly even "mix," methods in real-life empirical research (see, e.g., Creswell, 2003; Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003). Note that one should always remain cautious when confronting different types of methods: To what extent is it meaningful to compare results obtained using different methods with different ontological assumptions? Researchers

who wish to seriously compare results from different methods should first become knowledgeable of the literature on methodological triangulation (see references in: Flick, 2004; Lobe, 2006; Massey, 1999).

To sum up: There is still much work to be done on this topic—the added value of comparing different methods—and more specifically on the confrontation between QCA techniques and other techniques. In any event, it is important to take into account the type of (causal) relationships we expect to find in a given universe of investigation, as Skaaning (2006) argues:

> [If] the area under investigation is best described by a general linear, additive logic, then conventional statistics . . . is probably the most appropriate methodological tool, and if it is characterized by complex causality and sufficient and/or necessary explanations, the QCA methods have a strong standing because of their ability to handle set-theoretical propositions. . . . [In] general it depends on the character of the phenomena under consideration whether it is more rewarding to see [statistics and QCA] as complementary or competitive alternatives. As we cannot determine the character of social phenomena a priori, we have to apply methods based on different assumptions and subsequently evaluate the plausibility of their respective results based on theoretical and substantial insight. (p. 184)

On the more qualitative, case-oriented side as well, there is a lot to be gained from a rich dialogue between QCA techniques and more interactive qualitative methods (see Rihoux & Lobe, 2009).

PURSUING INNOVATIONS

As we write these lines, many avenues are being opened up for further innovation in the use and development of QCA techniques as well as for MSDO/MDSO. On the one hand, software development (see the "software" page at www.compasss.org) is continually underway. At this stage, the two major programs, FSQCA and TOSMANA, offer complementary tools, in user-friendly environments. Some additional tools have been developed. For instance, in addition to implementing the procedures described in Ragin (2000), FSQCA now has new routines for truth table analysis of fuzzy-set data (fsQCA, as described in Chapter 5). It now also includes calculations of "consistency" and "coverage" measures for both crisp- and fuzzy-set analyses, as described in Ragin (2006b, 2008; see also pp. 47, 67). Additionally, coverage can be partitioned to show the relative empirical weight of the combinations of conditions shown in a truth table solution. The task of calibrating interval and ratio scales as fuzzy sets is now automated, based on thresholds for full membership, full

nonmembership, and the crossover value, input by the user. Finally, a new procedure has been implemented that allows the derivation of three solutions for each analysis: the complex solution, the parsimonious solution, and the intermediate (theory and knowledge informed) solution, as described in pp. 110–118 and in Ragin (2008). As for TOSMANA, in addition to the standard csQCA procedure, this software fully implements mvQCA as described in Chapter 4. A number of tools have also been developed to make the csQCA and mvQCA procedures more accessible and to enable a more dynamic use of the software. A "visualizer" tool allows one to display Boolean data as Venn diagrams, with different visualizing options. Further tools have also been developed to help the user in the threshold-setting exercise (e.g., the "thresholdssetter" tool, see p. 79, as well as some clustering algorithms; see p. 84) and to easily compute contradictory simplifying assumptions. All these are documented in the TOSMANA manual (Cronqvist, 2007b).

Thanks to increasing computing capacity, both programs now enable the treatment of a larger number of conditions. Nevertheless, such capacities should be used sparingly in order to avoid "individualizing" cases completely in the ongoing dialogue between theory and evidence. Indeed, just because a computing operation is *technically feasible doesn't mean that it is useful or even desirable.* Once again: The QCA programs should never be used in a "push-button" manner but rather in a reflexive way. Needless to say, the same should apply to any formal tool—statistical tools as well—in social science research.

Some further software innovations will surely follow in the next few years. Some other efforts are being undertaken on other platforms, especially R, by Dusa (2007) as well as STATA (Longest & Vaisey, 2008). Here are some issues on the agenda, which will hopefully materialize at some stage in the software development, through FSQCA, TOSMANA, or other platforms: a more explicit inclusion of the time dimension in the procedures, some further improvements in the user-friendliness of the platforms, new ways to visualize the configurations as well as the minimal formulas (Schneider & Grofman, 2006, 2007), better linking between the minimal formulas and the cases, some interconnections with other software (e.g., importing/exporting data), and so on. The developers of those programs are open to comments and suggestions from users.

On the other hand, the range of QCA applications, and the way QCA techniques are being exploited, is broadening in at least four directions. First, a new trend that is only just now beginning concerns the *level* at which cases are defined. So far, in almost all QCA applications, cases and outcomes are situated at the macro- or meso-levels, such as policy fields, collective actors, organizations, and country or regional characteristics. Only a few users have applied QCA to micro-level data, though there is arguably a potential to do so,

especially in fields such as educational research and psychology—and surely other disciplines as well (sociology, political science, criminology, etc.), where it makes sense to engage in a small- or intermediate-N research design with individuals as cases. Apart from some already mentioned large-N micro-level analyses (e.g., Ragin, 2006b, using the bell curve data; see p. 170), original applications of this type have been recently completed or are currently in progress—e.g., the work of Lobe (2006) on students taking part in an experiment or that of Scherrer (2006) on the political socialization of individuals. Especially in more participatory research designs—i.e., when the researcher is able to engage in regular interaction with the individuals (the "cases") that are the object of the study—it is possible to argue that he or she gets an even better understanding of each individual case than would be the case for meso- or macro-level phenomena. Indeed, the researcher is literally able to interact directly with each and every case, which is much more difficult when cases are meso- or macro-level entities (Lobe, 2006; Lobe & Rihoux, forthcoming).

Second, with regard to the *number* of cases, there is already a lot of variation in the applications. Up to the present, quite a few applications have very small N's, as few as three (Häge, 2005), five (e.g., Kitchener, Beynon, & Harrington, 2002), six (e.g., Vanderborght & Yamasaki, 2004), or seven cases (e.g., Brueggemann & Boswell, 1998; Hellström, 2001). In the intermediate-N range, most applications are to be found in the broad range from 10 to 50 cases. However, several applications address between 50 and 80 cases (e.g., Williams & Farrell, 1990; Rudel & Roper, 1996; Nomiya, 2001). Still further, some applications are to be found in the large-N domain, up to a more than 100 (Drass & Spencer, 1987; Ishida, Yonetani, & Kosaka, 2006) or even more than 1,000 cases (Ragin & Bradshaw, 1991; Amoroso & Ragin, 1999; Miethe & Drass, 1999). There is surely further room for innovation when one "stretches" the potential of techniques such as QCA on very small-N or, conversely, large-N situations. Of course, the key question to be asked in such situations is: what "added value" does QCA bring, as compared with other techniques? For instance, if one only has four cases, what is the added value of a QCA as compared to four "thick" case studies compared in a more (non-formal) qualitative way?

Third, in terms of disciplinary and topical profiles, more than two-thirds of existing applications are still found in political science (comparative politics, welfare state studies, policy analysis, etc.) and sociology (historical sociology, organizational sociology, etc.). However, there is a growing number of applications in other disciplines such as political economy, management studies, and criminology, and a few applications can be found in history, geography, psychology, and education. For sure, many other fields of study could exploit QCA techniques—even in the natural and biological sciences. For instance, in

medical research, for some topics (e.g., rare diseases, infections in very specific subgroups of a population), it is impossible to engage in large-N designs where biostatistical tools can be applied or to fulfill strict conditions of an experimental procedure. QCA techniques could offer some solutions in these research areas.

Fourth and finally, there is still a largely untapped potential in the use of QCA, specifically in terms of exploratory (hypothesis-testing) applications. If QCA is used in this way, we strongly recommend that researchers present their hypotheses in algebraic form (e.g., as Boolean statements). This simple step raises several important questions as to how hypotheses are structured and also as to how the results will be interpreted. For example, in csQCA, there is a difference between positing that a given phenomenon is associated with or caused by the presence of condition A or the presence of condition B or the presence of condition C and positing that the same phenomenon is associated with or caused by the simultaneous presence of condition A and condition B and condition C. In Boolean terms, these two hypotheses appear, respectively, as:

H1 = A + B + C

H2 = A * B * C

Needless to say, their implications are very different. Remember that the methodological assumptions behind QCA are those of conjuncturality (see p. 8) and that, as Amenta and Poulsen (1994; and pp. 125, 128) have already pointed out, QCA hypotheses should also posit conjunctural, contextual, or conditional hypotheses. Until now, QCA hypotheses have mainly rested on the expected *individual* effect of a condition on the outcome, and even if an overall joint effect was expected (see "multiple conjunctural causation," p. 8), the precise joint effects between specific conditions have seldom been exposed (for some exceptions, see Amenta, Caren, & Olasky, 2005 [see p. 128]; Bochsler, 2006; Peillon, 1996; Watanabe, 2003; Yamasaki, 2003, 2007).

ENGAGING IN COLLECTIVE RESEARCH EFFORTS AND INFORMED METHODOLOGICAL DEBATES

Until the last few years, there were several factors hampering the growth and diversification of QCA techniques and their applications (De Meur & Rihoux, 2002, pp. 143–144). One factor was the lack of training opportunities and the lack of guidance for students and researchers not (yet) specialized in these techniques. This limitation has now broadly been lifted, as the training opportunities

increase (standard courses and seminars, summer courses, etc.) and as many resources are now available online through the COMPASSS resource site (www.compasss.org) and related Web sites. The pool of published applications is also quite broad and diversified at this stage, which constitutes another key resource for users. Further, as an increasing number of scholars have actually used the techniques to some extent, they are more able to provide guidance to beginners.

A second obstacle had to do with limitations in the first versions of the QCA software. In the late 1980s and 1990s, though they were technically operational, QCA-DOS 2.0 and 3.0 were not user-friendly, operating under a DOS environment and rather slow as the number of conditions increased. This limitation has now been largely lifted, through the development of the more user-friendly, Windows-type FSQCA and TOSMANA software (see p. 172).

A third obstacle was the lack of a full-size, English-language textbook designed to reach a broad audience across various disciplines. This is exactly the ambition of this volume, so hopefully this hampering factor will also be lifted.

So what other obstacles remain? Let us rather phrase them in terms of challenges, two of which are probably particularly crucial. The first challenge is to further improve case knowledge in systematic comparative, small- or intermediate-N research designs. Remember that case knowledge—empirical "intimacy" with each case—is a key pillar for QCA techniques (p. 24). However, also remember that, as the number of cases grow, it becomes increasingly difficult to develop a sufficient level of knowledge of all individual cases. This task is especially difficult if it is the *individual* effort of a solitary researcher. Probably some key advancements will be achieved by bringing together *pools* of researchers—typically case specialists—in concerted efforts. Provided that flows of communication and the design of the case studies is well thought out, such concerted research efforts could provide excellent material for even richer QCA applications. For example, if a researcher wants to apply QCA to a phenomenon of interest across the 25 European Union member states, the ideal template would be to rely on a network of country experts to help with data collection and the operationalization of the variables with due consideration of context-specific features and, last but not least, to develop meaningful interpretations of the results, taking these findings back to the individual cases. The inter-war project (revisited in Chapters 3 to 5) is a good illustration of such a research effort.

The second challenge is to pursue the debates on the strengths and limitations of QCA techniques, obviously also as compared with those of other techniques (qualitative or quantitative). However, only very seldom do such discussions produce sufficient progress, probably because, on the one hand, when it comes to methodological debates (not only with regard to QCA, also

much more broadly), they are much more often destructive than constructive. They look more like "paradigms wars," where the goal is to destroy or disqualify the enemy—namely, the advocate of some other methodological perspective. On the other hand, until recently at least, relatively few scholars were adequately informed regarding the underpinnings of QCA as an *approach*, let alone on the more technical aspects of QCA techniques. One can only hope that, with the further development, broadening, and sophistication of QCA applications, potential detractors will become better informed regarding these techniques, so they can also make more useful critiques. Hopefully, this textbook will be of some help in this process.

Key Points

- Transparency: Because QCA techniques require an active input from the user at several stages of the procedure, the key choices have to be well-documented in any publication or report.
- QCA techniques can be connected with other techniques in several different ways, including both "qualitative" and "quantitative" techniques. A lot of progress can be expected in this field.
- When confronting or connecting QCA techniques with statistical techniques, one should not forget their ontological differences (different purposes, assumptions, and conceptions of causality); the same holds for any endeavor of methodological "triangulation."
- User-friendly programs are available and offer many useful tools; these programs are still under development and being improved on a regular basis.
- QCA applications are opening up to various disciplines, to different levels of analysis (micro, meso, macro), and to a broad range of research designs (from very small-N to large-N).
- A still underexploited and yet powerful feature of QCA is its "hypothesis-testing" function.
- *Collective* research projects (bringing case experts together) are a suitable environment for fruitful applications of QCA techniques.
- Debates on the strengths and limitations of QCA techniques need to be pursued in an informed way, so as to pursue the improvement of these techniques.

Key Complementary Readings

Ragin (2008), Rihoux (2006, 2008a, 2008b), Schneider & Wagemann (2007, forthcoming).