Introduction

Benoît Rihoux
Charles C. Ragin

WHY COMPARE? WHY CONFIGURATIONAL COMPARATIVE METHODS?

Comparison lies at the heart of human reasoning and is always there in the observation of the world—"thinking without comparison is unthinkable" (Swanson, 1971, p. 45). Indeed, even the observation of singular phenomena is empty if we do not engage in a comparison: A phenomenon or object can be identified as such only if it is recognized as different from other phenomena or objects (Aarebrot & Bakka, 2003). For instance, we know that apples are not pears because we have compared the two.

More specifically, comparison is a key operation in any empirical *scientific* effort. There is a long line of scholars who have reflected upon this—and applied this empirically—all the way from Aristotle (probably the founder of a rigorous comparative approach) to de Tocqueville, Weber and Durkheim, and on to more contemporary works by Sartori (e.g., 1970, 1991), Lijphart (e.g., 1971) and Marradi (1985). For one thing, any descriptive effort, any typology or classification involves comparison (Bailey, 1994). To consider both apples and pears as belonging to the category of "fruits," we must compare "fruits" and "non-fruits" in the broader category of "plants," and so on. Once we have defined the category of "fruits," we can come to the conclusion that an orange is also a fruit, by comparing some key properties of an orange with those of an apple and of a pear. While also being a fruit, an orange shares some specific characteristics with lemons and grapefruits. Thus oranges and lemons, on the one hand, and apples and pears, on the other hand, belong to two different subtypes of fruits.

Of course, such everyday comparisons may seem trivial, and indeed many of those mental operations remain implicit in our reasoning. The purpose of this textbook is to demonstrate that comparison, as a basic and powerful mental operation, can be translated into a set of systematic comparative *methods and techniques*. Although this volume is not about fruits, we shall demonstrate that such methods and techniques can indeed be fruitfully applied in many disciplines, in the social sciences broadly defined, and also beyond.

Systematic comparison is a key operation in all experimental and natural sciences. For instance, we know that water is boiling when it is heated to 100°C because we have compared the state of water below 100°C, at 100°C, and

above 100°C, while controlling for contextual parameters such as atmospheric pressure and altitude above sea level. Incidentally, because we are able to control all these contextual parameters, and because we are able to manipulate one specific condition—temperature—we are able to demonstrate that a change in temperature actually *causes* the water to boil. This is why the experimental sciences are able to make such strong and simple causal statements.

Yet, in most social and behavioral sciences, perhaps with the exception of some branches of psychology, real-life laboratory-like experimentation is neither empirically possible nor ethically desirable. To pursue our example further: In antiquity, slaves were used to scientifically demonstrate that water that is brought to a boiling temperature also happens to burn human skin, by comparing the effect of plunging the hand of a slave into lukewarm, as compared to boiling, water. And Cleopatra used slaves to examine the more or less lethal effects of various poisons in her apples and oranges. Obviously, contemporary social scientists cannot do this, nor would they want to.

This is where the comparative *method* comes into play. It can be considered a crude substitute for experimentation (Lijphart, 1971): We observe empirical phenomena—analytical units, "cases" (Ragin & Becker, 1992)—while also controlling for contextual conditions (see Chapter 1). In social science, those cases, as we know, are intrinsically complex, multifaceted, often with blurred boundaries. This is why "thick," single-case studies have always played an important role in many disciplines: They allow a deep understanding of that single case. The main limitation of single-case studies, however, is that it is very difficult to engage in any form of generalization, as the key findings and conclusions are mostly limited to that single case.

How can one compare these complex cases? During recent decades, an increasing number of social scientists have been opting for *multiple case studies* as a research strategy. This strategy aims at meeting the need to gather in-depth insight into different cases and to capture their complexity, while still attempting to produce some form of generalization (Ragin, 1987). It also coincides, during the last few years, with renewed interest in case-oriented research (e.g., George & Bennett, 2005; Gerring, 2006; Mahoney & Rueschemeyer, 2003). Such a strategy is also adopted because many relevant and interesting objects are "naturally" limited in number: nation states or regions, political crises, wars, firms of a certain type, and so on. These are naturally limited, or "small-N" (or "intermediate-N"—see Chapter 2), populations of cases.

In many instances the (ex post) comparison of case study material is rather "loose" or not formalized. The major ambition of the methods and techniques presented in this textbook is *to allow systematic cross-case comparisons, while at the same time giving justice to within-case complexity, particularly in small- and intermediate-N research designs.*

The cover heading for all these methods and techniques is Configurational Comparative Methods (CCM). In a nutshell, this heading indicates that in order to enable the systematic comparative analysis of complex cases, those cases must be transformed into *configurations.* Simply said, a configuration is a specific combination of factors (or stimuli, causal variables, ingredients, determinants, etc.—we call these *conditions* in CCM terminology) that produces a given *outcome* of interest. As shall be explained at length in the next chapters, the conditions will be envisaged in a combinatorial way—hence enabling one to model quite a high level of complexity even with only a few conditions.

One key question we shall address is the following: Which conditions (or combinations thereof) are "necessary" or "sufficient" (or possibly both necessary *and* sufficient) to produce the outcome? In a non-formal way (for more on this, see p. 10, Box 1.3; see also Caramani, 2008), let us say at this stage that:

- A condition is *necessary* for an outcome if it is always present when the outcome occurs. In other words, the outcome cannot occur in the absence of the condition.
- A condition is *sufficient* for an outcome if the outcome always occurs when the condition is present. However, the outcome could also result from other conditions.

For instance, holding competitive elections is a *necessary* condition for a state to be considered democratic. However, it is not a *sufficient* condition because comprehensive civil liberties must also be present for a state to be considered democratic. Nonetheless, the *absence* of competitive elections is a *sufficien*t condition to qualify a state as *non*-democratic, as a democracy cannot exist without competitive elections.[1]

Under the heading of CCM, we place four specific techniques: Qualitative Comparative Analysis using conventional, crisp sets (csQCA, often simply labeled QCA in the literature), multi-value QCA (mvQCA), fuzzy-set QCA (fsQCA), and MSDO/MDSO (most similar, different outcome/most different, same outcome).

Box 0.1
About Terminology and Labels:
QCA, csQCA, mvQCA, fsQCA, and Software

QCA using conventional Boolean[2] (or "crisp") sets was developed first, which is why the label "QCA" is so often used to name this technique. In this volume, however:

- We use the label *QCA* as an umbrella term that captures the three main types (Boolean, multi-value, and fuzzy set) as a group. After all, they share many commonalities (see Chapter p. 1).

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- When referring explicitly to the original Boolean version of QCA, we use *csQCA*[3] (where "cs" stands for "crisp set"; see Chapter 3, p. 33).

- When referring explicitly to the version that allows multiple-category conditions, we use *mvQCA* (where "mv" stands for "multi-value"; see Chapter 4, p. 69).

- When referring explicitly to the fuzzy-set version, which also links fuzzy sets to truth table analysis, we use *fsQCA* (where "fs" stands for "fuzzy set"; see Chapter 5, p. 87).

- Finally, we use *fuzzy sets* to designate the original fuzzy set analysis as developed by Ragin (2000).

When referring to software, we use:

- *QCA-DOS* to refer to the original program for crisp-set analysis developed by Charles Ragin and Kriss Drass.

- *TOSMANA* to refer to the mvQCA program developed by Lasse Cronqvist.

- *FSQCA* to refer to the fuzzy-set version developed by Charles Ragin, Kriss Drass, and Sean Davey.

Note that all existing versions of QCA software (QCA-DOS, TOSMANA, and FSQCA) are capable of performing conventional crisp-set analysis of the type described in Ragin (1987) and De Meur and Rihoux (2002).

These four techniques form the core of this book. Although these are quite specific techniques, we will also tackle broader issues that any social scientist inevitably confronts, no matter what methodology he or she uses—e.g., causality, operationalization, generalization, temporality, mechanisms, and process.

Box 0.2
Goals of This Textbook

1. Provide a broad introduction to the comparative template: the purpose of systematic comparison and the key operations thereof (especially case and variable selection)

2. Present the main assumptions and underpinnings of the configurational comparative approach

3. Using one concrete example throughout, introduce the key operations and workings of four specific techniques: csQCA, mvQCA, fsQCA, and MSDO/MDSO

4. Examine the strengths and limitations of these techniques, and provide a critical overview of real-life applications produced so far

5. Provide useful resources and tips, and identify "good practices" for practitioners, so they can better exploit the potential of these techniques

STRUCTURE OF THIS BOOK

After this introductory chapter, whose aim is to lay out the basic purpose and aims of this book, Chapter 1 presents the whole approach behind QCA and related techniques. First, this approach is discussed more at the epistemological level, with a key focus on "small- and intermediate-N" research situations. Some key features of QCA are also laid out: the interplay between theoretical and case-oriented knowledge, a specific understanding of causality and complexity, and particular goals when it comes to generalizing findings. We also present different ways to exploit QCA—it is indeed suited for several different purposes.

In Chapter 2, we tackle issues of comparative research design and all the practical steps that need to be performed before QCA techniques (csQCA, mvQCA, or fsQCA) are actually implemented. The key practical questions deal with strategies of case selection, as well as model specification—especially the selection of the explanatory variables (called *conditions*). In this context, MSDO/MDSO is presented as a specific technique that can be used as a help in this challenging process of selecting cases and conditions. An empirical study is introduced as an example: a comparative analysis of the survival or breakdown of democracies in Europe during the inter-war period.

Chapters 3 to 5 then present the three core QCA techniques: first crisp-set QCA (csQCA), followed by multi-value QCA (mvQCA), and finally fuzzy-set QCA (fsQCA)—this sequence follows the way the data are coded: from completely dichotomous (only [0] or [1] scores on all variables) to much more fine-grained ones. All three techniques are discussed from A to Z, along with their key practical steps. The specificity of each technique is also underlined, along with the more basic or more advanced uses. Throughout these three chapters, the same "inter-war project" data are used, so as to show which added value is brought by each of the techniques. Many good practices tips are given along the way.

In Chapter 6, we provide a broad review of applications of these techniques, in many different fields, on different topics, and with different uses of the techniques. The real-life applications presented here have been selected because they exemplify some good practices, as well as the potential and limitations of the techniques. All the main steps of a QCA procedure are revisited in this way, from the prior steps of case selection and model specification to more advanced features such as the treatment of the so-called contradictory simplifying assumptions. Because of their specificities, csQCA, mvQCA, and fsQCA applications are discussed separately.

Next, Chapter 7 addresses all the main critiques that have been issued vis-à-vis QCA and its different techniques. There are many of such critiques, from dichotomization to temporality, through case sensitivity and the use of non-observed "logical remainder" cases. For each one of these critiques, we discuss to what extent the critique is valid and, if it is, to what extent the difficulty or limitation can be technically addressed.

Finally, in Chapter 8, we provide an open and prospective conclusion, as indeed QCA is an expanding and moving field. Some particularly promising paths are further discussed, such as using the different QCA techniques in a sequence or engaging in a fruitful dialogue (or confrontation) with other techniques, qualitative or quantitative. The last sections are devoted to specific topics on which some innovations can be expected or are already underway, particularly in terms of software development and more advanced uses of the techniques.

At the end of the book, we have also gathered a set of key resources, such as a glossary, an extensive bibliography, author and subject indexes, and links to various resources on the Web.

HOW TO READ THIS BOOK

This volume has been designed to follow a logical sequence, from general considerations to the presentation of specific techniques, then from these techniques to comments on applications, strengths, and limitations, with practical tips throughout. Readers who intend to engage in rigorous hands-on use of these techniques are thus best advised to read the whole textbook from beginning to end. Readers who wish to have a quick overview of the possibilities and key features of the techniques are advised to start from Chapter 6 (review of applications) and then to consult, in a selective way, sections from Chapters 3 to 5, depending on which pertain most directly to their specific research purposes. Six types of pedagogical resources have been inserted for all readers.

Box 0.3
Pedagogical Resources in This Textbook

- Chapter-opening summaries, listing the main goals of each chapter

- Chapter-concluding summaries, listing key points as well as key complementary readings for each chapter

- Illustrations and examples, to make technical aspects more accessible

- Basic technical definitions, explicating specific terminology

- "Good practices" boxes, listing key hands-on advice for using the techniques in appropriate ways

- A glossary, an index, and a list of key resources, toward the end of the volume—and more on a specific "resources" Web page at www.compasss.org/Textbook.htm.

COMPANION READINGS

Naturally, as this textbook covers a lot of ground in a relatively restricted volume, some key companion readings are recommended to get a more fine-grained picture of QCA and its techniques. Although many volumes have touched upon QCA to some extent,[4] there are three core companion volumes to this one. On the one hand, the two agenda-setting volumes by Charles Ragin, *The Comparative Method* (1987) and *Fuzzy-Set Social Science* (2000), lay out all the fundamentals and the overall ambition of QCA in its different variations. They have been recently complemented by a volume updating and extending the whole discussion around fuzzy sets (Ragin, 2008).

On the other hand, the focus of the textbook by Schneider and Wagemann (2007 in German; forthcoming in English) is, altogether, more technical; it provides, in particular, detailed discussions on necessity and sufficiency, consistency and coverage, Boolean algebra and set theoretic operations, measurement, concept formation, advanced features of fuzzy sets, and more information on the use of software. As a contrast, our textbook is more broad and encompassing, at a more introductory-to-intermediate level. What's specific about this volume is that it provides a state-of-the-art, basic treatment of all three main QCA techniques as well as what is "upstream" (comparative research design in particular), an extensive discussion of the strengths and limitations as well as published applications in many fields and disciplines—all of this in a relatively compact format. Thus the more focused and technically

elaborate Schneider and Wagemann textbook is to be considered as a comple-mentary resource to our textbook—along with resources on the Web (see p. 179). A specific piece on good practices in QCA, by Wagemann and Schneider (2007; Schneider & Wagemann, 2008) as well, is also complementary to the advice offered in this book.

For those who read French, the De Meur and Rihoux textbook (2002) can still be useful, in particular in its discussion of the Boolean foundations of QCA and in its visual representations of the data and key operations. The con-cise textbook by Caramani (2008) is useful for an in-depth look into the "black box" of QCA (technical aspects, fine-grained discussion of causation and con-trol) and to reflect more thoroughly on epistemological and practical issues of comparative research design. Finally, two recent volumes are particularly helpful "upstream": that of Goertz (2006b), for the practical stages of com-parative research design, case selection, concept formation and measurement; and that of Gerring (2006), also for case selection and for a reflective view on how case-oriented knowledge and "case intimacy" can be gained before engaging in comparative analysis.

Key Points

- Comparison is a key operation in any empirical scientific effort.

- This book is about specific comparative *methods and techniques* that enable systematic cross-case comparisons, while at the same time attending to within-case complexity, particularly in small- and intermediate-N research designs.

- The "QCA" label designates the whole approach, and more specific labels (csQCA, mvQCA, fsQCA) designate particular techniques.

- In QCA, complex cases are transformed into *configurations*: specific combinations of *conditions* linked to a given *outcome*.

Key Complementary Readings

Caramani (2008), Lijphart (1971), Ragin (1987, 2000, 2008), Schneider & Wagemann (2007, forthcoming).

NOTES

1. Example suggested by Lasse Cronqvist.

2. "Boolean" simply means that variables can be coded only [0] or [1]—that is, they have to be dichotomized. See the subsection on dichotomization, p. 39.

3. Note that, in most publications so far, csQCA has simply been referred to as "QCA"—hopefully, the more precise and unambiguous label "csQCA" will be used from now on.

4. Quite a few other textbooks with a broader methodological purpose cover QCA to some extent. We particularly recommend the following three, because they put QCA (and its logical foundations) within a broader setting in a thoughtful way: Becker (1998), Pennings, Keman, & Kleinnijenhuis (1999), and Peters (1998).