

Chapter 3


Fuzzy Set Qualitative Comparative Analysis: Application of Fuzzy Sets in the Social Sciences

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ABSTRACT

Qualitative comparative analysis allows for the breadth of analysis associated with quantitative data and the depth of case knowledge provided by qualitative analysis. In particular, fuzzy-set qualitative analysis (fsQCA) provides a nuanced analysis of data and offers actionable insights. Despite this, fsQCA has been underutilized in the social sciences. This chapter explores the application of fsQCA in the social sciences. The authors advance an argument for its wider adoption due to fsQCA's ability to disentangle the causal complexity involved in person- and policy-based contexts by applying a set-theoretic understanding of causation. The chapter provides an introduction to fsQCA for readers unfamiliar with the approach and advocates for its suitability within a broad range of social science studies.

INTRODUCTION

Qualitative Comparative Analysis (QCA) was developed to bridge case based and traditional quantitative approaches to research, and harness the best of both approaches (Ragin, 2014). QCA is commonly used to guide public policy and has been applied to multiple policy contexts. Examples include intersectional (Ragin & Fiss, 2017) and multidimensional (Neff, 2013) understandings of poverty, organizational structures (Florea, et al. 2019), outcomes of social organizations (Cress & Snow, 2000), pro-environmental

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behaviors (Schmitt, Grawe & Woodside, 2017), and entrepreneurial decision making (Pappas & Brown, 2020). It has been used to assess policy performance in relation to issues such as policy accountability (Pérez-Durán, 2013), funding (Vis, 2011), service delivery (Gasparro & Walters, 2017) public opposition to policy proposals (Kirchherr, Charles & Walton, 2016), and the development of new policy approaches (Feldman, 2021). It can also be used to conduct cross-jurisdictional comparisons which can generate policy learnings and contribute to effective policy transfer (Ingrams, 2018).

Despite its continued uptake in public policy application, QCA has largely been underutilized in the social sciences. Probability-based null hypothesis significance testing remains the dominant approach (Woodside, 2017). This chapter explores the application of fuzzy-set Qualitative Comparative Analysis (fsQCA) to the social sciences and advances an argument for its wider adoption. This chapter provides an overview of fsQCA and its application as both a methodology and analysis technique. The authors argue that fsQCA should be more widely adopted within the social sciences due to i) the prevalence of set-theoretic rather than correlational relations within social phenomena (Ragin, 2014), and ii) the ability of fsQCA to unravel the causal complexity often involved in person- and policy-based contexts (Rihoux, Rezöhazi & Bol, 2011). In advancing this argument the chapter explores the key underpinning principles of fsQCA, namely; conjunctural causation, equifinality, asymmetry and multifinality (Gerrits & Verweij, 2013). Using illustrative examples, the utility of fsQCA is demonstrated. The chapter includes a discussion of the key characteristics and benefits of fsQCA analysis with comparisons made to linear/correlational techniques and the dominance of symmetric theory construction and null hypothesis statistical testing in the social sciences. To assist those intending to use fsQCA, the chapter also describes the analytical steps required to perform fsQCA analysis, including calibration of set memberships, truth table construction, and analyses of necessity and sufficiency. Finally, the chapter considers the strengths and limitations of fsQCA. The aim is to provide a middle ground between journal articles that explore a single aspect of QCA, and books that provide highly detailed discussions.

BACKGROUND

Qualitative Comparative Analysis (QCA) in its original form is referred to as crisp-set Qualitative Comparative Analysis (csQCA) because membership in condition sets was limited to binary measures of 1 “full membership” or 0 “full non-membership” and relied on Boolean logic. Ragin later developed fuzzy-set Qualitative Comparative Analysis (fsQCA) which allows membership on a continuous scale between 0 and 1 (Ragin, 2000, 2008; Zadeh, 1965). This development substantially progressed QCA as a research approach and an analysis technique, making it applicable to a broad range of applications (Rihoux et al., 2013). As a research approach, QCA is able to uncover the five possible types of causes common to “historical explanations” of causality (Mahoney, Kimball, & Koivu, 2009). These are: causes which are necessary but not sufficient for the outcome; causes which are sufficient but not necessary for the outcome; SUIN and INUS causes (discussed further in this chapter); and causes which are both necessary and sufficient for the outcome (note that while theoretically and logically possible, causes that are both necessary and sufficient are rarely, if ever, uncovered in social sciences).

The research approach and theorizing aligned with QCA are configurational, rather than correlational. This allows for the incorporation of heterogeneity and diversity in data. Unlike techniques such as regression, QCA does not identify which constructs have the most predictive power. Rather, QCA attempts to identify conditions- or more commonly combinations of conditions- deemed necessary or sufficient

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