Using Qualitative Comparative Analysis (QCA): A Way to Explore Complex Connections

By Donna Sedgwick

The purpose of my research was to understand why, how, and to what extent collaboration occurred between administrators of two separate publicly funded preschool programs: the federally funded Head Start program and the state-funded Virginia Preschool Initiative. I used QCA as one of the methodological tools for my dissertation research. In particular, I used QCA to help explore whether there is a connection between five collaborative process dimensions (administration, governance, organizational autonomy, norms of trust, and mutuality (Thomson, Perry, & Miller, 2007)) *and* to what degree these two programs engaged in collaborative activities together. I will be discussing the research as an example of QCA throughout this short summary.

Qualitative Comparative Analysis (QCA) is an analytical tool useful for identifying patterns of causal combinations that link to an outcome. It was developed to help researchers who conduct comparative case studies, a type of qualitative method, to identify patterns of causal conditions within and between cases. That is, it is especially well suited for answering *why* certain outcomes occur. In my case, I wanted to understand *why* collaboration between these separate preschool programs looked very different across the Commonwealth of Virginia. That is, in some places these two programs worked together in a highly collaborative manner; in other places, the programs barely collaborated.

QCA is more suitable for a traditional deductive approach, when researchers investigate “why” a specific outcome occurs and use theoretical insight to guide the development of including causal factors. It is particularly useful for theory building, however, because it helps to explore various combinations of factors that may independently lead to the same outcome. Unlike more traditional quantitative research, QCA pushes researchers to consider the cases as a whole and not simply a sum of individual factors (Ragin, 1987; Rihoux & Ragin, 2009).

Generally speaking, when comparing more than five cases with multiple causal conditions, simply comparing causal factors and outcomes among cases becomes cumbersome and challenging for a researcher to observe patterns. By using QCA, and in many cases the accompanying software, such as fsQCA[[1]](#footnote-1) (Ragin, Dress, & Davey, 2006), researchers can identify patterns of causal factors that aid in developing theoretical insight to why certain social phenomenon occurs. For example, researchers could use QCA when trying to understand what factors lead to *why* states adopt the Common Core (see www.corestandards.org), or factors that lead to varying rates of women representation in parliament (Krook, 2010). For my own research, I used QCA to explore the relationship between factors that may comprise collaboration (such as trusting partners, coordination of efforts, and understanding collaborative roles) and how these or combination of these lead to varying degrees of collaborative activities between dyadic partners.

Although “qualitative” is in the title, do not assume that interview data and field notes are the only suitable data for QCA. In fact, in many cases, researchers collect quantitative data for their small n (5–50 cases) or case study approach or assign ranges for factors, and these comprise the heart of the analysis. For example, if studying why certain states adopt the *Common Core*, researchers may include a binomial factor such as if a state has a democratic governor (yes/no), but may also include per capita income as a relevant factor. Findings from interview data and field notes may become the primary basis for conducting a QCA, but only after more traditional thematic parsing of text has occurred and a researcher can develop operational definitions of important causal factors and an outcome.

Like most analytical tools, QCA is a multi-step process that involves readying data first before analysis begins. The first step is identifying the outcome and the accompanying potential causal factors. As stated above, these are typically driven by theoretical insight, but factors that emerged from the course of initial case analysis could be included for potential theory building. Whether using more traditional quantitative data or qualitative data, researchers need to create operational definitions of concepts that allow for each case to be assigned to various condition attributes. For the simplest QCA approach, the crisp-set analysis[[2]](#footnote-2), the outcome and conditions are designated with the presence or absence of the factor, so researchers must also decide on cutoff thresholds.

In my study on preschool collaboration, I examined five conditions as potentially leading to the outcome of “strong” (highly involved partners) or “weak” (not highly involved partners) collaborative activities. For example, I included the condition “strong administration” as a potential causal condition for the outcome “strong collaborative activities” between preschool partners. After operationalizing “strong administration” to include attributes such as clear roles and coordination among partners, and compiling interview data, each case had to be assigned as either having “strong administration” or not – that is, as “strong administration” being present or absent. The rest of the causal conditions and outcome were put through the same process. Researchers should document their decision logic well so that others could repeat their process.

After each case in the study has been designated as having the outcome and all of the causal conditions as “present” or “absent,” researchers can conduct the QCA. The first step involves entering data into the fsQCA software (Ragin, Dress, & Davey, 2006), which will generate a “truth” table for the researcher. A truth table includes all possible combinations of causal conditions, including both when the conditions are “present” as well as “absent.” For crisp set QCA, all of the conditions are dichotomized; thus, the total possible combinations is two raised to the total number of conditions (2x). However, just because a combination of conditions is theoretically possible does not mean that any empirically observed cases fit the combination. These “unobserved” patterns are also called logical reminders (Rihoux & Ragin, 2009; Schneider & Wagemann, 2010). The logical remainders typically are removed from the final analysis. Below is an example of a truth table for “strong collaboration.” Following traditional Boolean logic a “1” means that the condition is “present” and a “0” means the condition is absent. The logical remainders have been removed from this truth table. The “Number” column indicates the number of cases in the study that had these combination of conditions and either had “Strong Collaborative Activities” *present* or *absent.*

Truth Table for Strong Collaborative Activity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Causal Conditions* | | | | |  | *Outcome* |  |
| Strong Gov. | Strong Admin. | Strong Auto. | Strong Norms | Strong Mutuality | Number | Strong Collab. Act. | Consistency |
| 1 | 1 | 0 | 1 | 1 | 5 | 1 | 1.0 |
| 1 | 1 | 0 | 1 | 0 | 4 | 1 | 1.0 |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1.0 |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1.0 |
| 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0.0 |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.0 |

(Sedgwick, 2015)

The next step is for the researcher to identify which combination of conditions will be used to generate the possible causal recipes. This decision is based upon assessing the number of observed cases per each combination of conditions and the “consistency” of the combination. Consistency is the measurement of sufficiency, or the percentage of observed cases that have the combination of conditions *and* have the outcome variable present. Perfect consistency (100 per cent) indicates that the combination of conditions is perfectly sufficient; there are no cases where the same combinations of conditions do not produce the outcome variable. Best practice guidelines for QCA (Schneider & Wagemann, 2010) suggest a consistency cutoff point of .75 for including condition combinations in the logical minimization process. After selecting the condition combinations to be included, fsQCA conducts a logical minimization to produce causal recipes for the outcome variable. In the example above, the first four combinations were used to produce the causal recipes for when “strong collaborative activities” is present. Below is an example of a table produced to display causal recipes from the preschool collaboration study.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Causal Combinations – Strong Collaborative Activity | | | | |
| Causal Recipe | Interpretation | Unique Coverage | Consistency | Cases |
| sauto\*SADMIN\*SGOV | Dyads with strong administration and strong governance and weak organizational autonomy | .454545 | 1.0 | 10/10 |
| SMUTUAL\*SNORM\*sauto\*SGOV | Dyads with strong mutuality, strong norms, and strong governance, and weak organizational autonomy | .090909 | 1.0 | 6/6 |
| Solution Coverage | 1.0 (11/11 Cases) | | | |
| Solution Consistency | 1.0 | | | |
| Consistent with QCA best practices, uppercase letters indicate presence of a condition and lowercase indicates absence of a condition.  Model: SCOLLABACT = f(smutual, snorm, sauto, sadmin, sgov)  Consistency Cutoff: 1  Assumptions: smutual (present), snorm (present), sauto (absent), sadmin (present), sgov (present) | | | | |

(Sedgwick, 2015)

The fsQCA produces three different types of recipes: complex, parsimonious, and intermediate. Many researchers use the intermediate recipes. The causal recipes offer the researcher insight to what combination of conditions connect to the outcome (or the absence of the outcome) and when linked to theoretical explanations, allow researchers to develop much insight to why phenomenon occur. Measures of fit, called consistency and coverage are used to allow researchers to assess how well the causal conditions explain the outcome. In the above example, the intermediate recipes were selected and two recipes were produced offering insight to the combination of factors that lead to strong collaboration between preschool partners. Overall, QCA is very useful and powerful analytical tool to aid in finding and exploring causal explanations in the social sciences.

**Works Cited**

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1. The fsQCA software is available free online to download. [↑](#footnote-ref-1)
2. To learn more about other types of QCA, including fuzzy-set analysis, see Ragin, 2000 or Rihoux and Ragin, 2009. [↑](#footnote-ref-2)