What is QCA?

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Qualitative Comparative Analysis (QCA)

- QCA is a set of systematic ways of studying causality in a simple data table of binary or ordinal variables. It is mainly used in comparative research, or with qualitative data, or as part of case-study research methods. QCA helps discern necessary causality as well as sufficient causality in small samples of N=8 to N=200. QCA offers formal methods for analyzing qualitative data about the characteristics and the contextual backgrounds of these cases.

Aims

- 1. To set out first the usual basic assumptions in QCA.
- 2. To present the logic of crisp set QCA using an established seminal paper (Cress and Snow)
- 3. To show how the estimation of a model is done using Boolean algebra
- 4. To illustrate the main software packages used.
- 5. To present additional examples and references.

1. Methodological Assumptions of QCA

1.1 regional ontologies

‘One of the primary difficulties in assessing the factors theorized to affect outcome attainment is operationalising them in a fashion that is consistent with the literature and yet relevant to local contexts. ‘ (Cress and Snow, 2000: 1077).

- If Context+Mechanism➔ Outcome, then context matters to how the mechanism ‘is’ as well as to how it works.

1.2 A Conjunctural Logic Reflects The Nature Of The World

QCA, ... is conjunctural in its logic, examining the various ways in which specified factors interact and combine with one another to yield particular outcomes. " (Cress and Snow, 2000: 1079)

However... the world's conjunctures are subject to change at greater/lesser speeds ...

So our claims are **definite** with respect to the past/present

But **conjectural and contingent** with regard to the future.

In these ways, the QCA analyst uses qualitative methods and assumes fluidity in the social world.

1.3 Avoid Overstating the Findings as a Modelling Result

- There is some modelling involved, but avoid using a black-box approach.
- Omitting contradictory configurations would be ‘overly deterministic’ (Snow and Cress, 2000: 1084). For example if Ab and AB both are associated with outcome Y, then we do not just ignore factor B. However, QCA would argue that A may be a cause of Y.
- It then seeks to know whether this is necessary or sufficient causality, and whether A requires other conjunctural factors in order for A to work on Y.

1.4 How QCA Data Are Organised

- The Truth Table.
  - Crisp-Set Truth Table. All 0s and 1s.
  - One column can be used to count cases which are of the same overall configuration.
  - One column is set aside as the ‘outcome’.
- The NVIVO Approach.
  - The “casebook” in NVIVO.
  - The concept of multilevel cases.

2. An Example. Cress and Snow ethnographic research in USA

- In 2000 the *American Journal of Sociology* published a QCA article which has become a standard reference work.
- The topic is the mobilisation of resources to help homeless people in USA.
- Their paper uses QCA very creatively by first of all noting (from their literature review) that four outcomes, not one, need to be taken into account. R1 R2 R3 R4 take up four columns of the data table.
- These outcomes are qualitatively compiled based on a series of ethnographic interactions with homelessness activists, homeless people, politicians and officials in 17 US cities. From the 17 cities of their research work, 8 were chosen for this paper's QCA analysis. Among these 8 cities, 15 cases of Social Movement Organisations cover homelessness.
- The crisp-set QCA data table has 4 outcomes, 15 cases (rows), and about 8 causal factors. (12 columns in total)

A quote from Cress and Snow (2000) illustrates their cautious, almost inductive, approach:

- ‘Our primary concern is not with generalizing to the universe of homeless SMOs, but with using our case findings to refine and extend understanding of the determinants of movement outcomes. Given the similarities and differences among our cases in terms of the causal factors and the range of outcomes obtained, they are well suited for assessing the influence of factors thought to affect outcome attainment.’ (Cress and Snow, 2000: 1074).
- These authors are very careful with their data. They do not claim to make generalizations outside of the sample. NOT INFERENTIAL. NOT DEDUCTIVE.

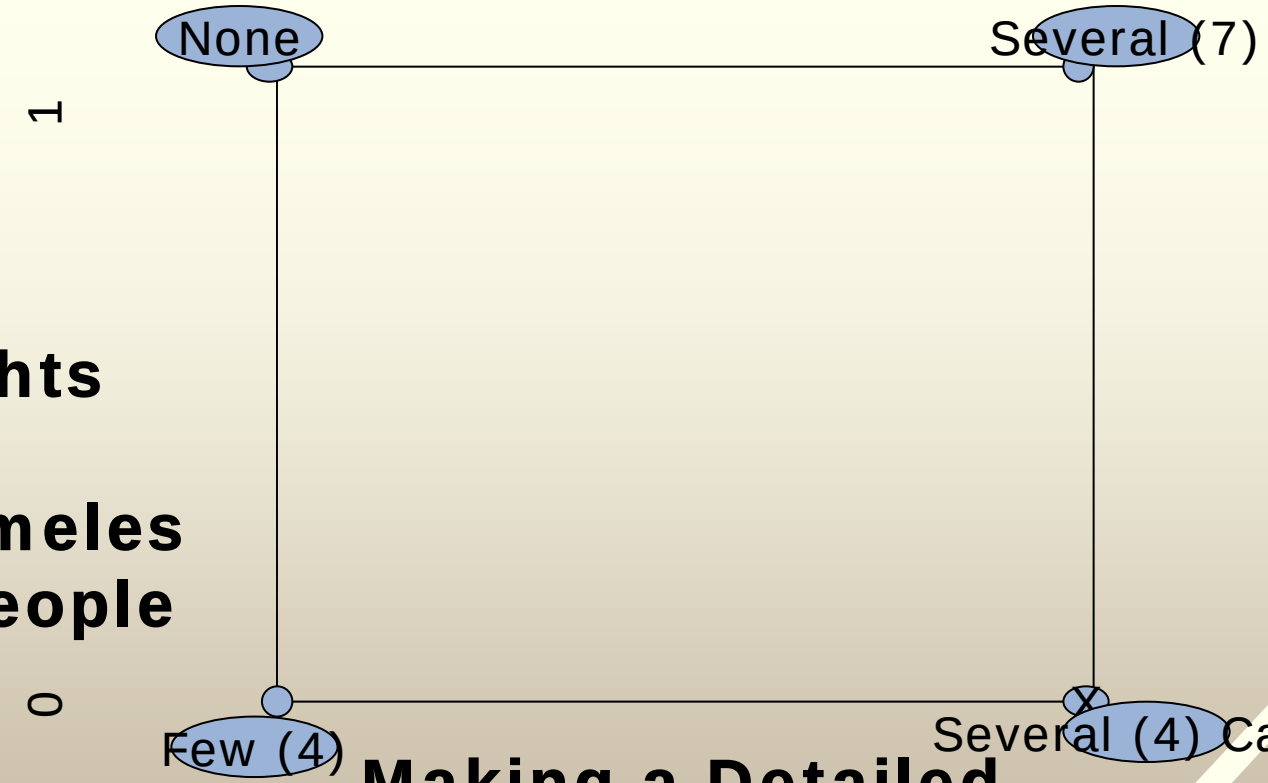
QCA Offers Originality

- QCA can be based on existing, well-known explanatory theories or models. These can be embedded in a fresh comparative project of small scale.
- QCA can then add new ‘columns’ of summary data. When systematizing the data, new concepts are introduced.
- Thus it is retroductive: Why THIS pattern?
- QCA is not just inductive, nor simply hypothesis-testing.

QCA for Comparative Research

- When N is just 5, 8, 10 or 23, we cannot use inferential methods.
- QCA allows for the whole history of each case.
- It allows for a macro history encompassing all cases.
- When N is not a random sample, but is a whole population (such as “all the countries”) we should not pay attention to “Significance Levels”.
- When the sample is arbitrarily chosen, such as “all those who died and who had given permission for post-mortem brain scans”, we should not use inferential methods. There is a sampling bias.

Snow and Cress's Findings Used Crisp Sets



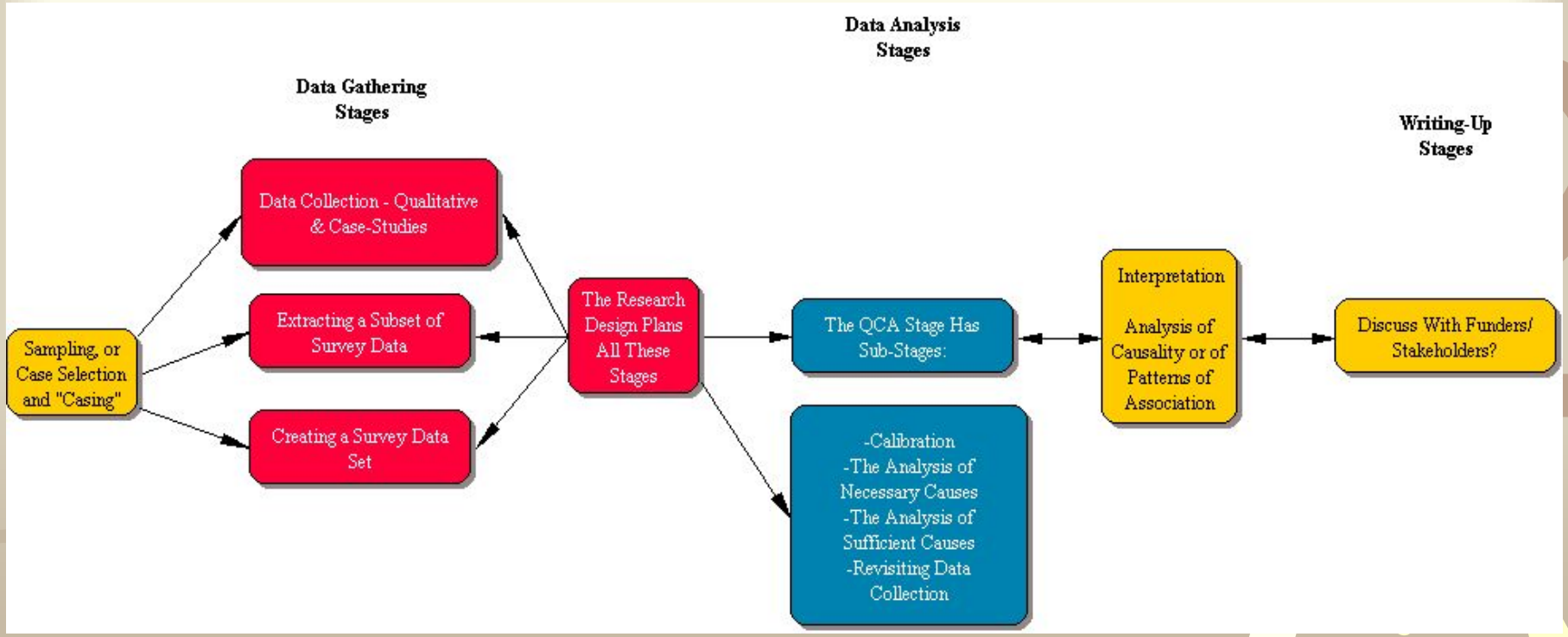
'Rights' was one of the four outcomes, R1. The diagram illustrates necessary cause.

Making a Detailed Prognosis of Homelessness and SMO Viability

Snow and Cress's Findings in Words

- There was no single pathway for a single outcome
- There was no general or universal causal pathway for the whole set of positive outcomes.
- See the paper for a summary of findings.
- Detailed study of each pathway was carried out, reporting on ethnographic, observational (shadowing, buddying) methods.

Typical QCA Research Design

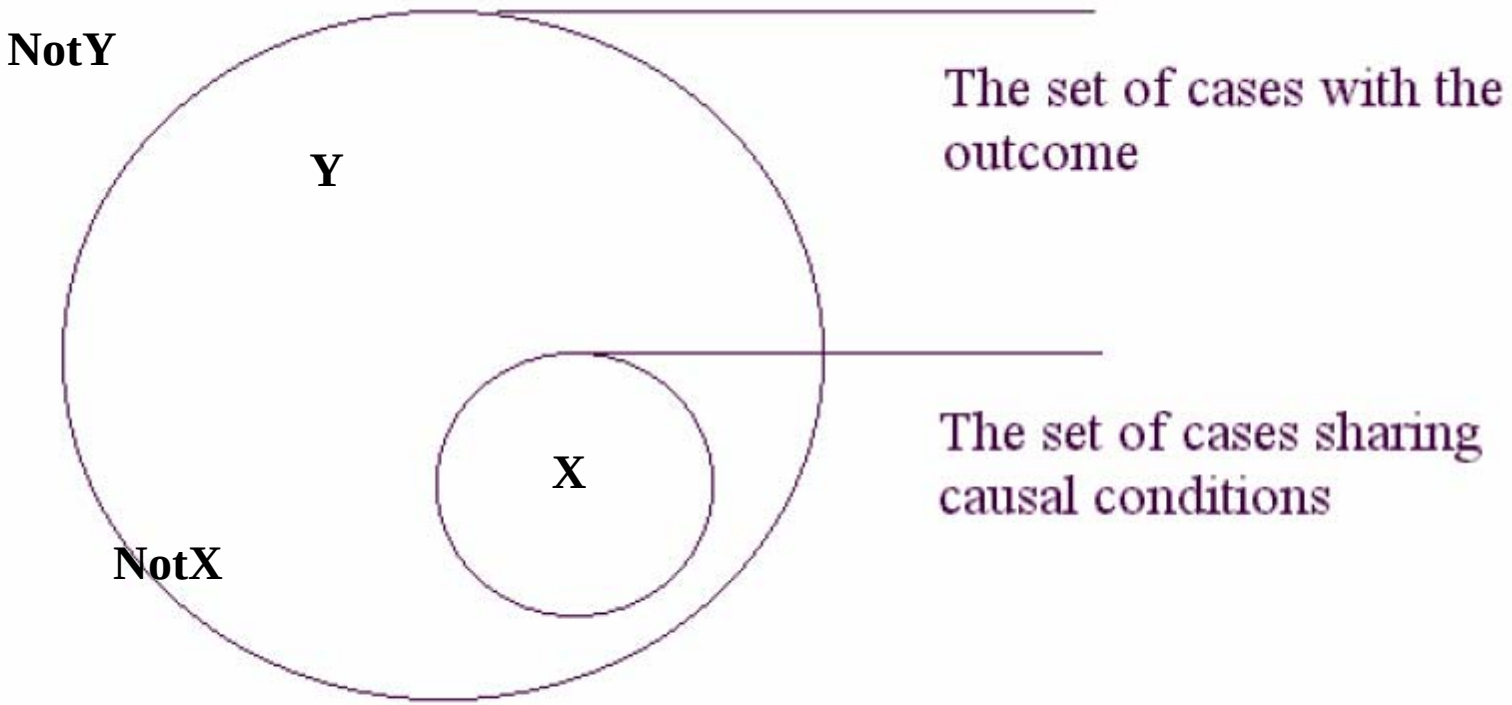


3. How the estimation of a model is done using Boolean algebra

- If AbY and ABY then B seems superfluous to the outcome Y.
- If ACY and Acy then we begin to suspect that AC is also either necessary or sufficient for Y.
  - We use Venn Diagrams to illustrate necessity and sufficiency. If Y embeds the vector X completely, then X is sufficient for Y.
  - If the vector X embeds the Y set completely, then X is necessary for Y.
  - If it is ambiguous, then this X is ‘contradictory’ for Y. We then seek to add more facets or dimensions to the data table.

Venn Diagram Illustrations
A) X is Sufficient for Y.

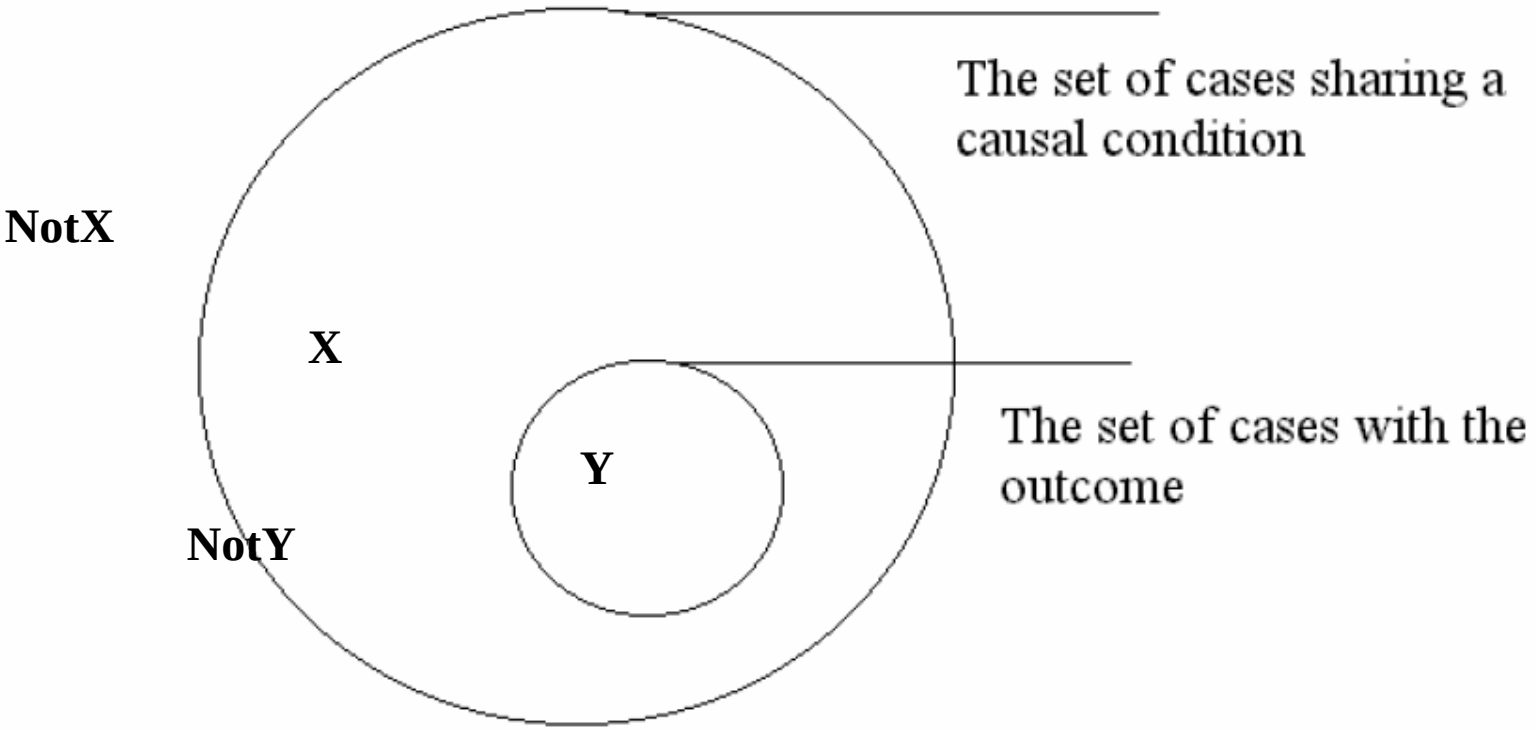
If X then Y and if NotY then NotX.



Source: Ragin, ***Redesigning Social Inquiry: Fuzzy Sets and Beyond***, 2008, page 11.

Venn Diagram Illustrations
B) X is Necessary for Y.

If Y then X and if NotX then NotY.

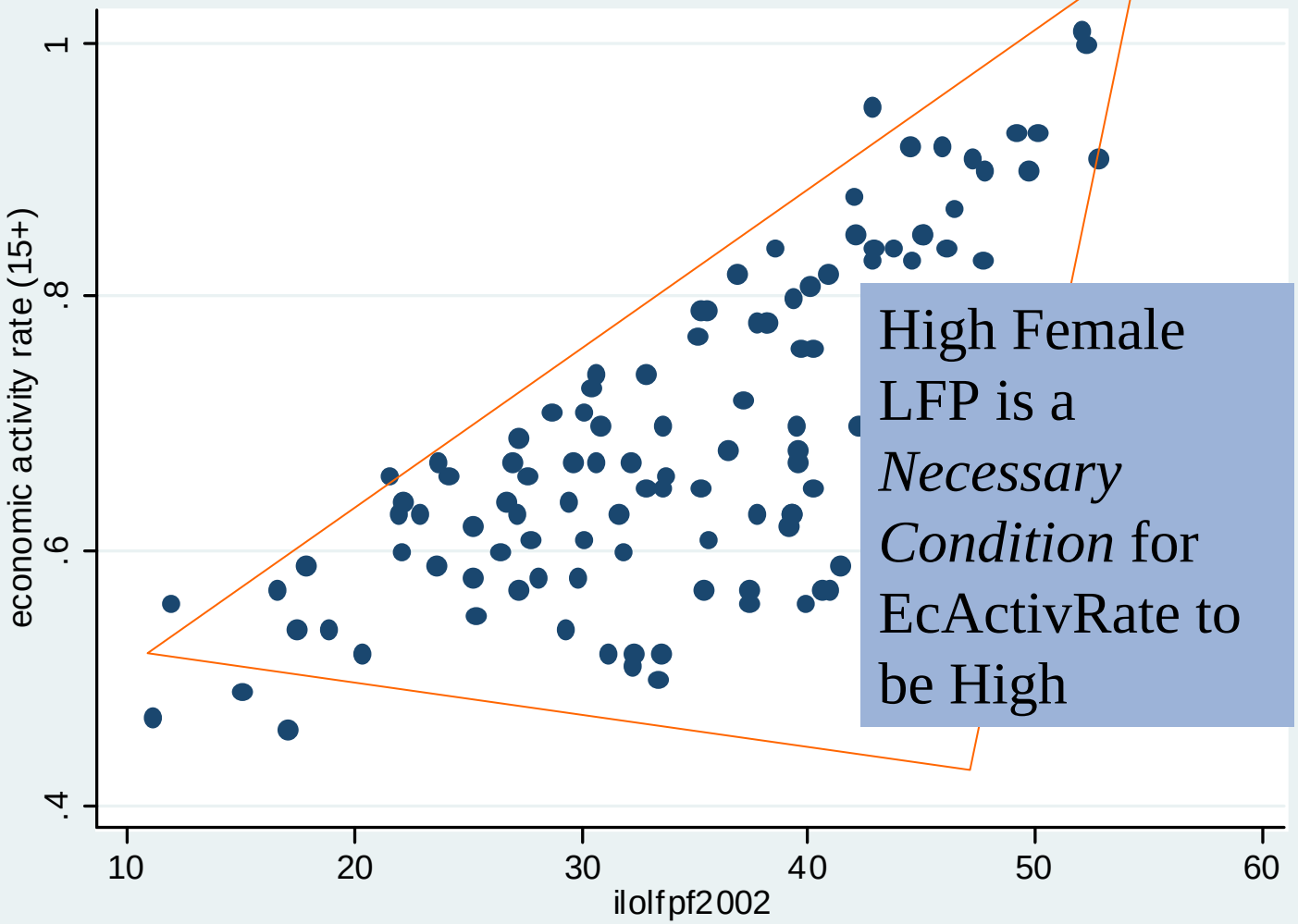


Source: Ragin, ***Redesigning Social Inquiry: Fuzzy Sets and Beyond***, 2008, page 11.

(The Fuzzy Set Variant: Here, X appears to be ‘necessary’, not sufficient, for)

- the next slide is based on ordinal measurement, with one dot for one country.
- x axis is the 1992 percentage of the labour force **female**
- y axis is the 2002 percentage of the **population** which is in the active labour force

Econ. Act. Rate = LF/Pop.



High Female LFP is a *Necessary Condition* for EcActivRate to be High

The Economic Activity Rate Age 15+ is constrained by the Women's Labour Force Participation Rate 15+ (data for 2002)

The Boolean Reduction

- The raw truth table is large.
- Many permutations but only limited diversity.
- The table is reduced to a few statements by logical reduction following de Morgan's law and other rules of Boolean algebra.
- Example: In the Northeast of UK,
- SCHOOL PERFORMANCE IS HIGH IF:
- NotSociallyDeprivedArea&Catholic OR LotofSEN&SelectiveAdmissions
- aB or CD = Y describes sufficient causality

The Qualitative Final Steps

- Interpreting exceptions is also important.

- For instance, in the Northeast of England, even for a school inside a low-performing group, if there is a peer-mentoring scheme in place then performance overall is higher.
- See Byrne's chapter in Byrne and Ragin book, eds., 2009.

4. Notes on Software

- Excel is useful to hold both qual've and Tabular data.
- NVIVO is useful to code and summarise qual've data.
- Casebook in NVIVO is used to export the data to Excel.
- fsQCA freeware is then used for Boolean reduction
  - -fsQCA software includes CRISP and FUZZY QCA.
- TOSMANA freeware is used for crisp-set QCA and for a multi-valued outcome QCA.
- TOSMANA illustrations offer a squarish Venn Diagram. The one on the next slide illustrates.
- SURVIVAL of democracy in the inter-war years (1920-1939) is conditioned on four factors. See Ragin, 2009.

Venn Diagram QCA: Two 'Instances', Ireland and Czech

KEY: Darkest=1, yes on Survival. (N=2)

White: Remainder, ie. empty set.

Pale grey=0, no on Survival of Democracy.

Middle grey = Contradiction

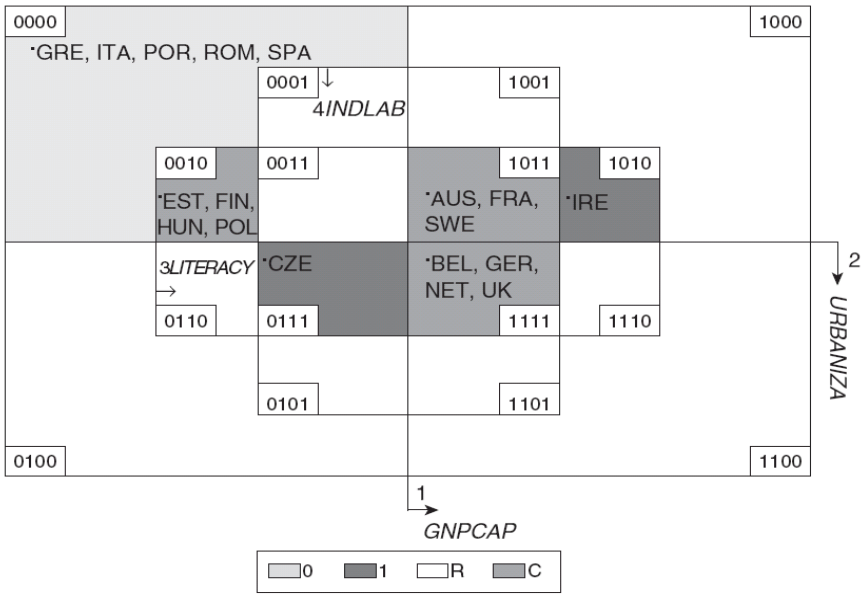


Figure 3.2 Venn Diagram Corresponding to Table 3.4 (4 Conditions)*

* Venn diagram produced by the "visualizer" tool, TOSMANA 1.3.0.0 software.

From four causal factors, two are illustrated here on the main axes. Urbanisation is vertical, GNP per capita on the horizontal. Within the diagram Literacy and Indep. Lab. are illustrated. UK is in a group that is contradictory on the outcome, which is 'survival of democracy'.

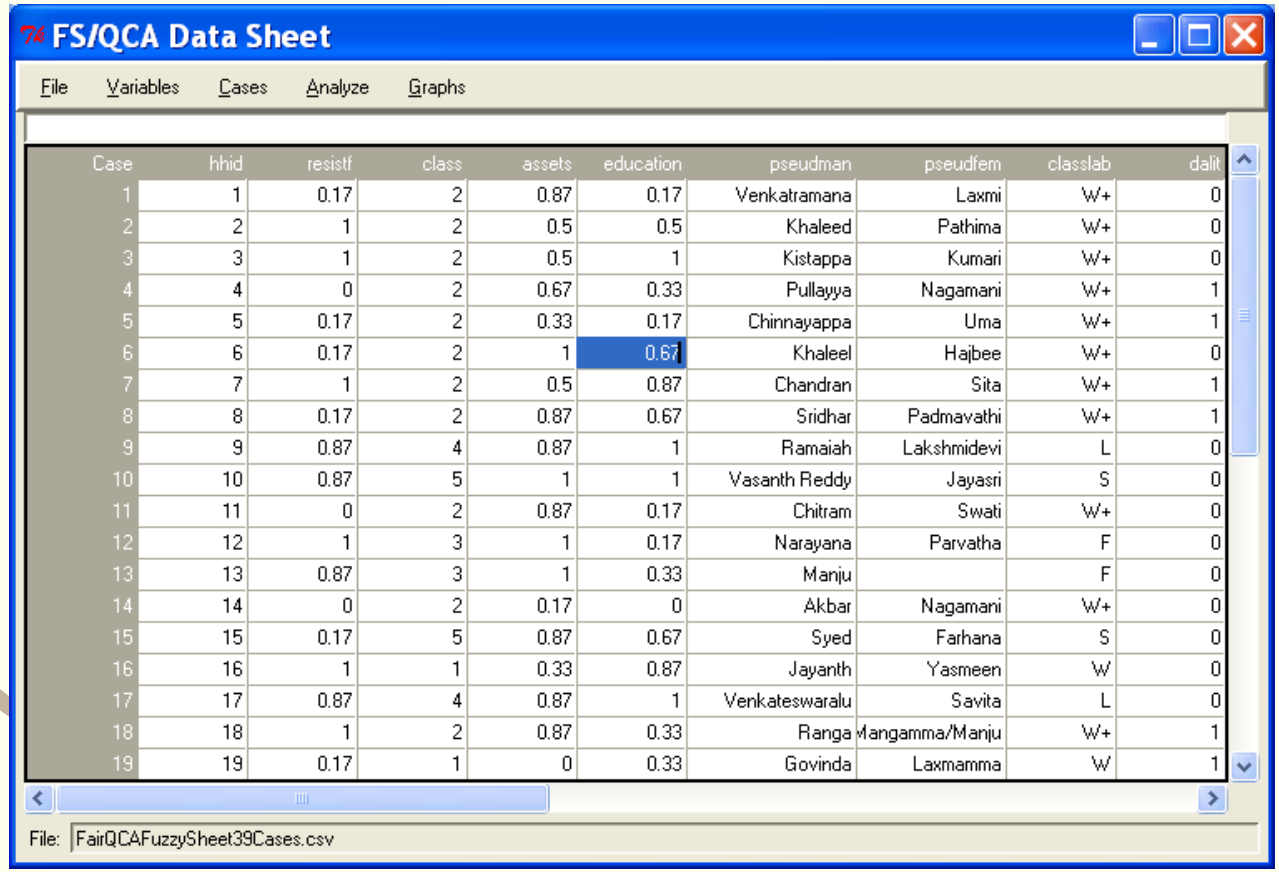
Source for This Venn Diagram

- Rihoux, B., and De Meur, G. (2009) Crisp-Set Qualitative
- Comparative Analysis (csQCA), ch. 3 in B. Rihoux, & C. C. Ragin (eds), Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques . Thousand Oaks and London: Sage. Page 47.
  - (The contradiction shown is resolved by Ragin by recoding one of the available variates.)
- Sometimes it is useful to find a fresh factor that can help to resolve a contradiction.

Appendix: A Fuzzy Set Interim Truth Table (Olsen, 2009)

Y	X1	X2	X3	X4	X5	X6	Number Of Cases	Configuration
Fuzzy	Fuzzy	Fuzzy	Crisp	Crisp	Fuzzy	Crisp		
0	0	0	1	0	1	0	1	1
0	0	0	1	1	0	0	4	2
0	0	1	0	0	0	1	1	3
0	0	1	1	0	0	0	2	4
0	1	0	0	0	1	1	3	5
0	1	1	0	0	0	0	1	6
0	1	1	0	1	1	0	1	7
0	1	1	1	1	1	1	1	8
1	0	0	0	0	0	1	1	9
1	1	0	0	1	1	1	4	10
1	1	0	1	0	0	0	1	11
1	1	0	1	0	1	1	1	12
1	1	0	1	1	0	1	1	13
1	1	0	1	1	1	1	1	14
1	1	1	0	0	1	0	2	15
1	1	1	0	0	1	1	4	16
1	1	1	0	1	0	0	1	17

The Corresponding Raw Data Table (Olsen Chapter in Byrne and Ragin, eds., *Handbook*, Sage 2009)



FS/QCA Data Sheet

File Variables Cases Analyze Graphs

Case	hhid	resistf	class	assets	education	pseudman	pseudfem	classlab	dalit
1	1	0.17	2	0.87	0.17	Venkatramana	Laxmi	W+	0
2	2	1	2	0.5	0.5	Khaleed	Pathima	W+	0
3	3	1	2	0.5	1	Kistappa	Kumari	W+	0
4	4	0	2	0.67	0.33	Pullayya	Nagamani	W+	1
5	5	0.17	2	0.33	0.17	Chinnayappa	Uma	W+	1
6	6	0.17	2	1	0.67	Khaleel	Hajbee	W+	0
7	7	1	2	0.5	0.87	Chandran	Sita	W+	1
8	8	0.17	2	0.87	0.67	Sridhar	Padmavathi	W+	1
9	9	0.87	4	0.87	1	Ramaiah	Lakshmidevi	L	0
10	10	0.87	5	1	1	Vasanth Reddy	Jayasri	S	0
11	11	0	2	0.87	0.17	Chitram	Swati	W+	0
12	12	1	3	1	0.17	Narayana	Parvatha	F	0
13	13	0.87	3	1	0.33	Manju		F	0
14	14	0	2	0.17	0	Akbar	Nagamani	W+	0
15	15	0.17	5	0.87	0.67	Syed	Farhana	S	0
16	16	1	1	0.33	0.87	Jayanth	Yasmeen	W	0
17	17	0.87	4	0.87	1	Venkateswaralu	Savita	L	0
18	18	1	2	0.87	0.33	Ranga	Mangamma/Manju	W+	1
19	19	0.17	1	0	0.33	Govinda	Laxmamma	W	1

File: FairQCAFuzzySheet39Cases.csv

Calculations Found in QCA Software

- Tosmana and fsQCA software can calculate **consistency** and **coverage** for sufficient causality.
  - consistency = % instances within a configuration (what % of the ABY and AbY cases had AB associated with Y?)
  - coverage = the % of all available cases that is covered by a configuration (That is, if we had five factors A to E, and we are looking at AB currently, then what % of all cases have the AB configuration? That is the coverage of AB in the whole set of cases.)

Conclusions

- QCA is systematic but qualitative.
- QCA is sophisticated yet holistic.
- QCA affects the research design by supporting an iterative method. The researcher can return to the data-gathering stage after having done some analysis.
- QCA can support causal interpretations.
  - It can also support non-causal interpretations of patterns in texts, i.e. hermeneutics.

Thank you.

References

Major reference works:

- **Rihoux, B., & Ragin, C. C. (2009). Configurational comparative methods. Qualitative Comparative Analysis (QCA) and related techniques (Applied Social Research Methods). Thousand Oaks and London: Sage.**
- **Rihoux, B., and M. Grimm, eds. (2006). Innovative Comparative Methods For Policy Analysis: Beyond the quantitative-qualitative divide. New York, NY, Springer.**
- **Ragin, C.C. (2008). Redesigning social inquiry: Set relations in social research. Chicago: Chicago University Press.**
- **Ragin, C. C. (2000). Fuzzy-set social science. Chicago; London, University of Chicago Press. (One only needs to read the first half to cover QCA; the second half covers Fuzzy Set Analysis.)**
- **Byrne, D., and C. Ragin, eds. (2009), Handbook of Case-Centred Research Methods, London: Sage.**

Exemplars

- Snow, D. and D. Cress (2000). "The Outcome of Homeless Mobilization: the Influence of Organization, Disruption, Political Mediation, and Framing." American Journal of Sociology **105**(4): 1063-1104.
- Chapter 15 of R. Kent (2007), Marketing Research: Approaches, Methods and Applications in Europe, London: Thomson Learning.
- Cronqvist, L., & Berg-Schlosser, D. (2008). Multi-value QCA (MVQCA). In B. Rihoux, & C. C. Ragin (eds), Configurational comparative methods. Qualitative Comparative Analysis (QCA) and related techniques . Thousand Oaks and London: Sage.
- Rantala, K. a. H., Eeva. (2001). "Qualitative Comparative Analysis - a Hermeneutic Approach to Interview Data." International Journal of Social Research Methodology **4**(2): 87-100.
- Schneider, C. Q., & Wagemann, C. (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.

Background Reading

- Byrne, D. (2005). "Complexity, Configuration and Cases", Theory, Culture and Society 22(10): 95-111.
- Ragin, C. C. (1987). The Comparative Method: moving beyond qualitative and quantitative strategies. Berkeley ; Los Angeles ; London, University of California Press.

Relevant Grants

British Academy Funded 3-Day Roundtables on QCA (Jointly held with the Japanese JSPS)

- University of Manchester, June, 2008
- Sapporo, Japan, Sept. 2009

Additional One-day Workshops Held

- University of Manchester, 2008 and 2010

Application to FP-7 for an EU-wide network 2011-2013