

Approaching QCA: Software as Wayfinding

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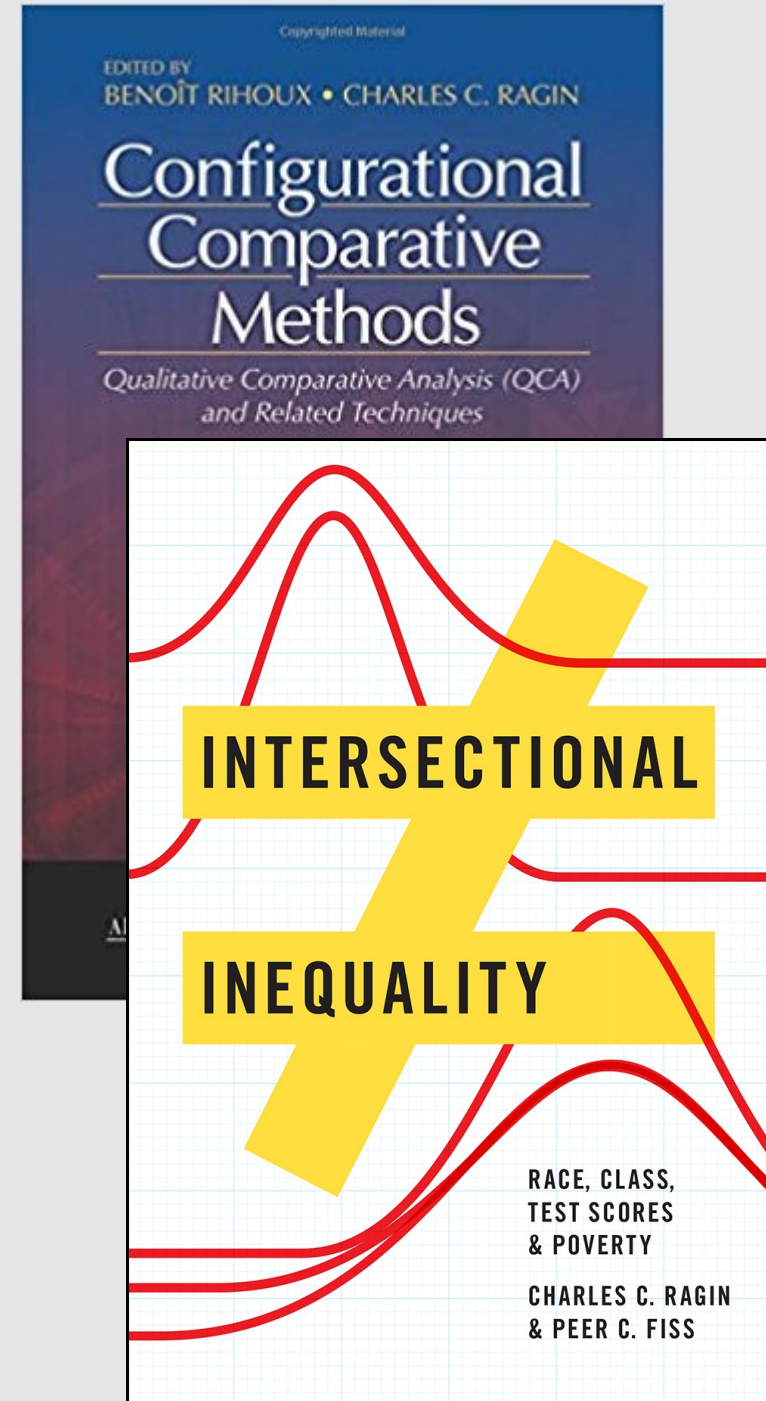
QCA as both Technique and Approach

As a technique

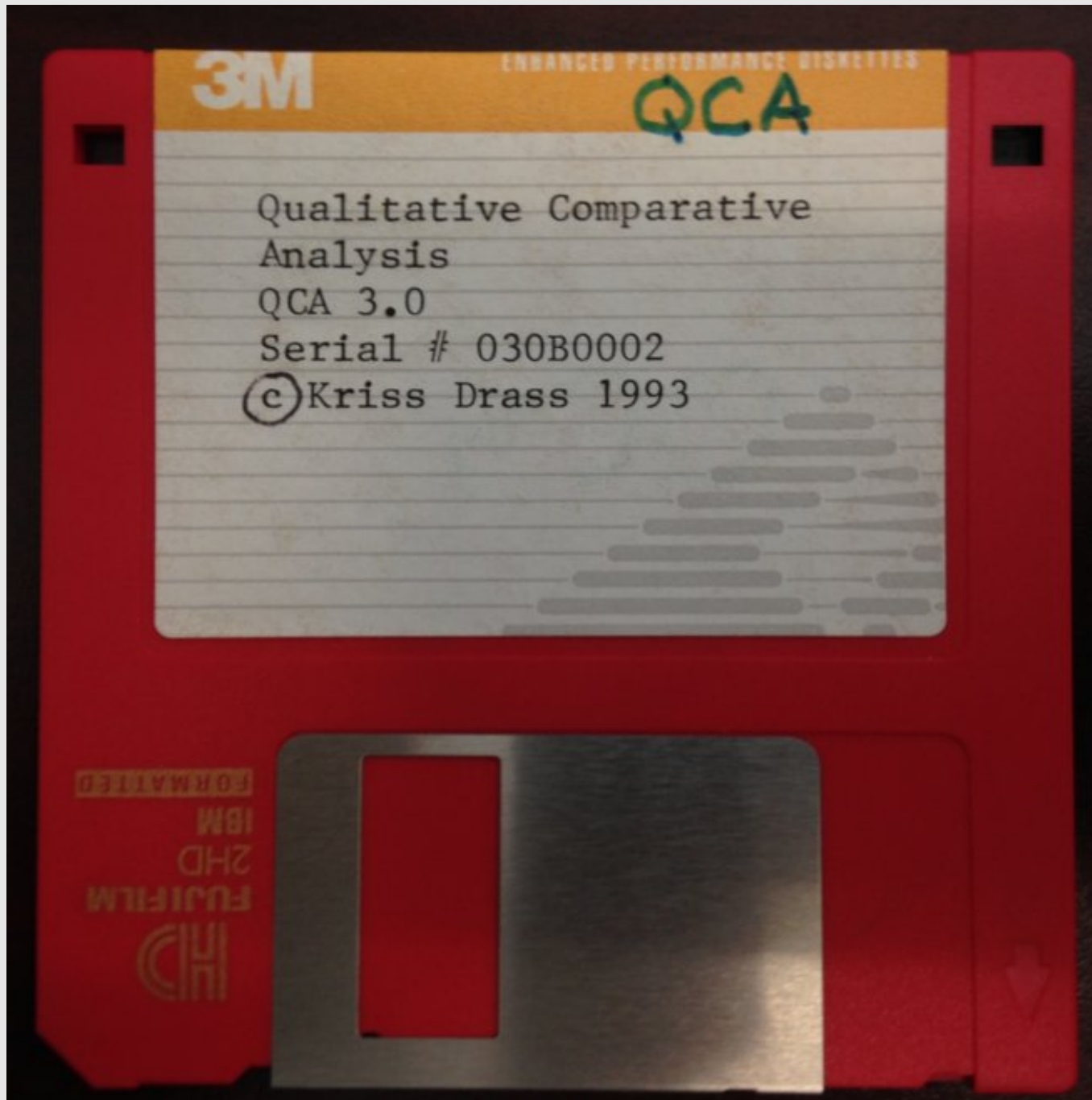
- Measures of degree of set membership
- Subset relations measured by consistency and coverage
- Taxonomies as truth tables
- Sufficiency solutions via Quine-McCluskey minimization

As an approach

- Rihoux, et. al. (2009, Ch 1 of *CCM*)
- Ragin (1997/2004) “Turning the Tables”
- Ragin & Fiss (2017) *Intersectional Inequality*



No Software, No QCA



A Menagerie of QCA Software Packages

(complete list at <http://ww.compass.org>)

QCA

(Drass and Ragin 1993)

TOSMANA

(Cronqvist 2017)

fs/QCA

(Ragin, Drass, and Davey 2017)

QCA (R)

(Duşa 2017)

fuzzy (Stata)

(Longest and Vaisey 2008)

QCA3 (R)

(Huang 2016)

QCApro (R)

(Thiem 2016)

Kirq & acq

(Rubinson and Reichert 2017)

TOSMANA

File Machine View Input Devices Help

rihoux_demeur_2009_41 - Tosmana

File Data (mv)QCA fsQCA About

Data Data for QCA

CASEID	GNPCAP	URBANIZA	LITERACY	INDLAB	Outcome
AUS	1 (720)	0 (33.4)	1 (98)	1 (33.4)	0
BEL	2 (1098)	1 (60.5)	1 (94.4)	1 (48.9)	1
CZE	1 (586)				
EST	0 (468)				
FIN	1 (590)				
FRA	2 (983)				
GER	1 (795)				
GRE	0 (390)				
HUN	0 (424)				
IRE	1 (652)				
ITA	0 (517)				
NET	2 (1008)				
POL	0 (350)				
POR	0 (320)				
ROM	0 (331)				
SPA	0 (367)				
SWE	2 (897)				
UK	2 (1038)				

(mv)QCA

Not used: GNPCAP, URBANIZA, LITERACY, INDLAB

Case Descriptor

Case: CASEID

Outcome: Outcome

Conditions:

Include for reduction: Outcome 0 (radio), Outcome 1 (radio), Contradictions (radio), Reminders (radio)

Use upper-case/lower-case notation:

Include variable information in Output:

Close Reports on Exit:

Compute Simplifying Assumptions:

Output Mode: HTML

Show Truth Table Visualize just result show implicants

File Machine View Input Devices Help

stokke - Tosmana

File Data (mv)QCA fsQCA About

Data Data for QCA

(mv)QCA

Not used:

Case Descriptor

Cases: A, C, S, I, R

Outcome: Y

Conditions:

Show Truth Table Visualize just result

Visualizer

Legend: 0 (white), 1 (green), R (red), C (blue)

Display: Color, Black/White

Show labels: Show labels, Short condition names

Highlight Prime Implicant: -- none --

Highlight Solution: -- none --

save close

Pro 500

3:57 AM

Right Ctrl

QCA (R)

The screenshot displays the QCA (R) software interface. The 'Analyse' menu is open, showing options for 'Truth table', 'Incoherent configurations', and 'Minimization'. The 'Truth table' dialog box is active, showing the following settings:

- Dataset: atest
- Outcome: ES, QU, WS, WM, LP, WNP
- Conditions: ES, QU, WS, WM, LP, WNP
- Sort by: inclusion (checked), frequency
- Decr. (checked)
- cut-off: 1
- Frequency: 1
- Inclusion 1: 0.95
- Inclusion 0: (empty)
- Assign to: att

The 'R console' shows the following commands and output:

```
att <- truthTable(atest, outcome = "WNP", conditions = "ES, QU, WM, LP",
incl.cut = 0.95, show.cases = TRUE, sort.by = "incl")

> test$NUMR <- recode(test$NUMR, "lo:50=0; 51:hi=1")

> att <- truthTable(atest, outcome = "WNP", conditions = "ES, QU, WM, LP",
incl.cut = 0.95, show.cases = TRUE, sort.by = "incl")

> att
```

OUT: output value
n: number of cases in configuration
incl: sufficiency inclusion score
PRI: proportional reduction in inconsistency

	ES	QU	WM	LP	OUT	n	incl	PRI	cases
4	0	0	1	1	1	1	1.000	1.000	NZ
8	0	1	1	1	1	1	1.000	1.000	DE
9	1	0	0	0	1	1	1.000	1.000	FI
12	1	0	1	1	1	1	1.000	1.000	DK
14	1	1	0	1	1	1	1.000	1.000	AT
15	1	1	1	0	1	1	1.000	1.000	ES
16	1	1	1	1	1	4	1.000	1.000	NO,NL,BE,IS
13	1	1	0	0	0	4	0.250	0.250	SE,CH,PT,GR
3	0	0	1	0	0	2	0.000	0.000	CA,US
5	0	1	0	0	0	1	0.000	0.000	IT
7	0	1	1	0	0	4	0.000	0.000	AU,GB,FR,IE
10	1	0	0	1	0	1	0.000	0.000	LU

fs/QCA

Necessity testing

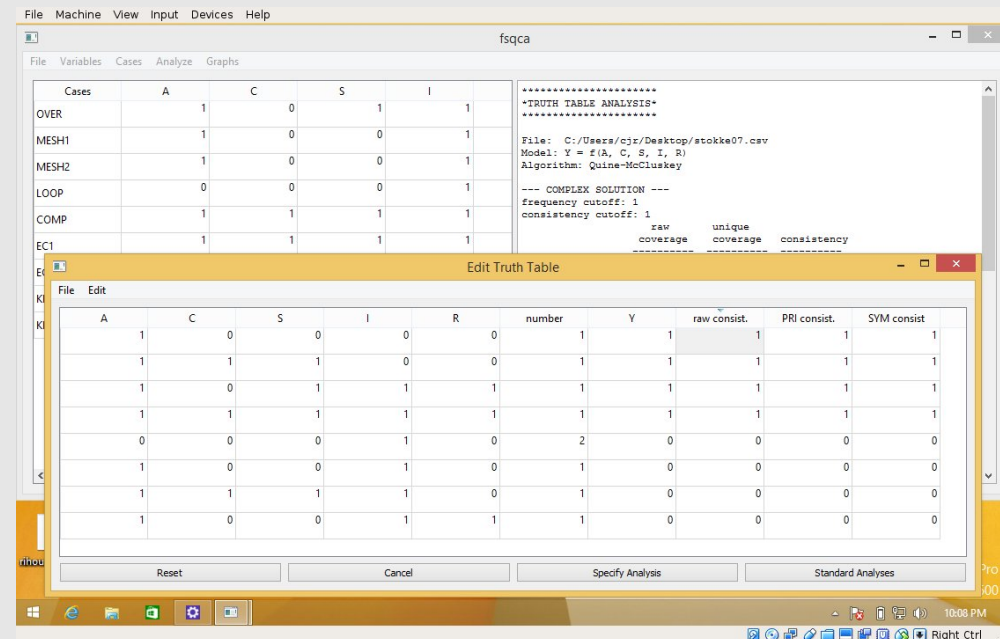
- With fs/QCA, necessity testing often *deductive* (theoretically/substantively-driven)
- Test for substitutable (ORed) conditions

Truth table

- Don't neglect truth table

Standard analysis

- Examine, compare, and discuss all three solutions (complex, intermediate, & parsimonious)



Available visualization: Scatterplot

Kirq

File Options Help

Outcome
Brk

Obs	Brk	Dev	Urb	Lit	Ind	Stb
AT	.95	.81	.12	.99	.73	.43
BE	.05	.99	.89	.98	1.0	.98
CZ	.11	.58	.98	.98	.90	.91
EE	.88	.16	.07	.98	.01	.91
FI	.23	.58	.03	.99	.08	.58
FR	.05	.98	.03	.99	.81	.95
DE	.95	.89	.79	.99	.96	.31
GR	.94	.04	.09	.13	.36	.43
HU	.58	.07	.16	.88	.07	.13
IE	.08	.72	.05	.98	.01	.95
IT	.95	.34	.10	.41	.47	.58
NL	.05	.98	1.0	.99	.94	.99
PL	.88	.02	.17	.59	0.0	0.0
PT	.95	.01	.02	.01	.11	.01
RO	.79	.01	.03	.17	0.0	.84
ES	.94	.03	.30	.09	.21	.20
SE	.05	.95	.13	.99	.67	.91
UK	.05	.98	.99	.99	1.0	.98

Session: []

Necessity | Sufficiency

Consistency Threshold [0.90]

Coverage Threshold [0.50]

Analyze

File Options Help

Row	Dev	Urb	Lit	Ind	Stb	N	Consist	Outcome	ConsistObs	InconsistObs
32	False	False	False	False	False	3	1.00	True	GR;PT;ES	-
31	False	False	False	False	True	2	0.98	True	IT;RO	-
2	True	True	True	True	False	1	0.97	True	DE	-
10	True	False	True	True	False	1	0.97	True	AT	-
27	False	False	True	False	True	1	0.86	True	EE	-
28	False	False	True	False	False	2	0.86	True	PL	HU
11	True	False	True	False	True	2	0.50	False	-	FI;IE
9	True	False	True	True	True	2	0.49	False	-	FR;SE
1	True	True	True	True	True	4	0.25	False	-	BE;CZ;NL;UK

Session: []

breakdown/Brk
- concov nec 1
qt1 suf 2

Necessity | Sufficiency

Consistency Threshold [0.90]

Coverage Threshold [0.50]

Analyze

- Simplest of all QCA software packages (easy to learn; hard to mess up)
- Focus on inductive/exploratory research
- Designed to support and encourage *retroduction*
- Privileges both necessity and sufficiency testing
- Perhaps ironically, no visualizations

Recommendations

- Distinguish between QCA as a technique and QCA as an approach. A good QCA embraces the approach.
- Software is just a means to an end. It automates the mundane and repetitive parts of the analysis, so that you can focus on what's really important—getting to know your cases.
- Different software packages approach QCA in different ways; each will help you think about your analysis in different ways.
- Follow COMPASSS for updates on QCA/CCM software: <http://www.compass.org/>