Introduction to Qualitative Comparative Analysis: A Cross-Disciplinary Methodology for Studying Similarities & Differences

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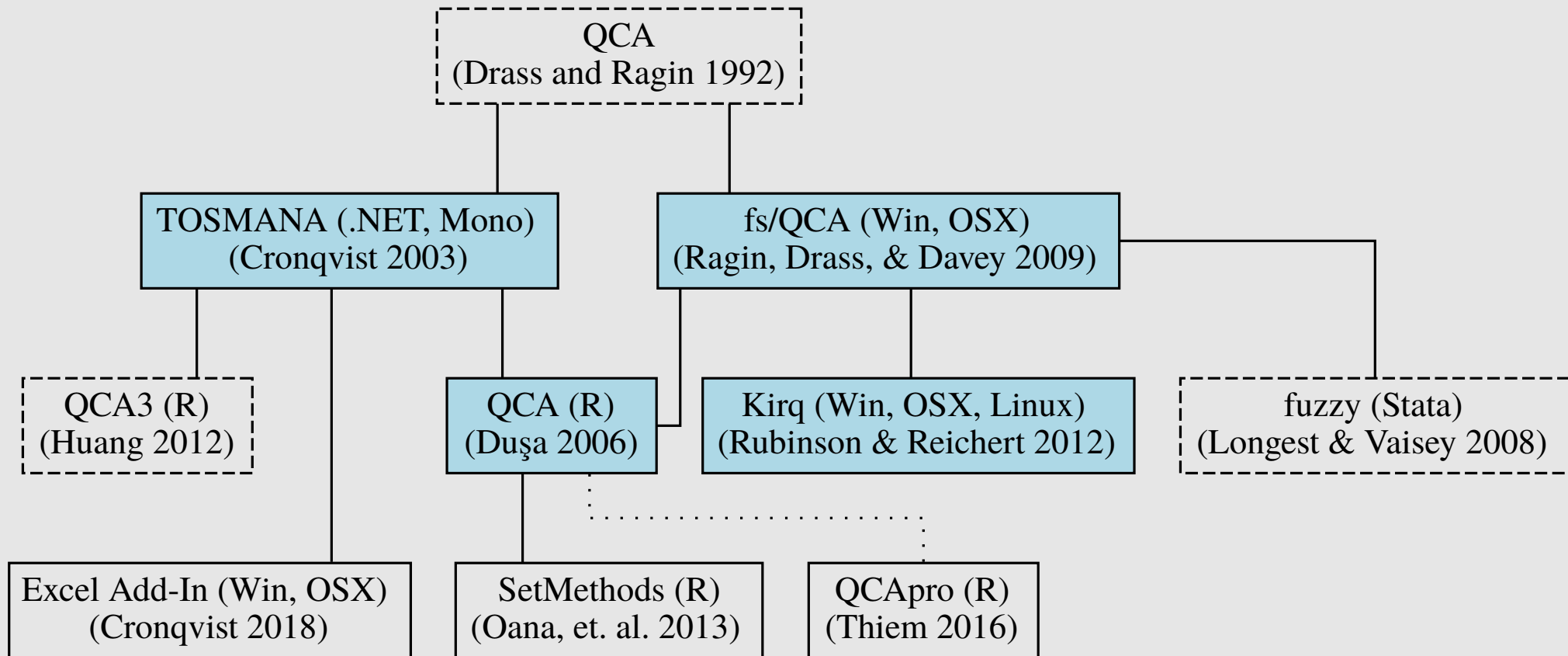University of Houston—Downtown
October 3, 2019

Overview

- Review of QCA readings, resources and software
- Varieties of QCA
- What is QCA?
  - QCA as a formalization of the comparative method
  - QCA as an investigation of invariance
  - Software demonstration
  - Distinguishing features of QCA
- Three analytic components of QCA
  - Data set calibration
  - Necessity analysis
  - Sufficiency analysis
- Interpreting solutions
- Types of QCA projects

Readings and Resources

- Ragin (2008) *Redesigning Social Inquiry*
- Ragin (1987) *The Comparative Method*
- Ragin and Rubinson (2009) "The Distinctiveness of Comparative Research"
- Ragin and Rubinson (2011) "Comparative Methods"
- Ragin and Fiss (2016) *Intersectional Inequality*
- Rubinson, et. al. (2019) "Common Errors in QCA"
- COMPASSS web site (http://www.compasss.org)
  - international, inter-university QCA consortium
  - news, events, resources, bibliographies, working papers series

QCA Software Packages
(complete list at http://ww.compasss.org)

QCA
(Drass and Ragin 1992)

TOSMANA (.NET, Mono)
(Cronqvist 2003)

fs/QCA (Win, OSX)
(Ragin, Drass, & Davey 2009)

QCA3 (R)
(Huang 2012)

QCA (R)
(Duşa 2006)

Kirq (Win, OSX, Linux)
(Rubinson & Reichert 2012)

fuzzy (Stata)
(Longest & Vaisey 2008)

Excel Add-In (Win, OSX)
(Cronqvist 2018)

SetMethods (R)
(Oana, et. al. 2013)

QCApro (R)
(Thiem 2016)

Varieties of QCA: csQCA, fsQCA, and mvQCA

- *The Comparative Method* (1987) describes "crisp-set QCA"

- *Fuzzy-Set Social Science* (2000) describes "fuzzy-set analysis"

- *Redesigning Social Inquiry* (2008) unifies "crisp-set QCA" and "fuzzy-set QCA"

  - csQCA is a special form of fsQCA

  - *fs/QCA, acq/Kirq,* and R packages are all based on the RSI algorithms

- What about multi-valued QCA?

What is QCA?

- QCA is a formalization of the comparative method, using Boolean algebra

What is QCA?

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What is the comparative method?

- Many names: comparative research, small-N analysis, comparative case studies, cross-case studies
- A cross-disciplinary technique used to:
  - study diversity, clarify similarities and differences among cases.
  - identify and analyze invariant relationships.
  - search for necessary and sufficient conditions.
- Is comparative research necessarily small-N?
- Is comparative research necessarily case-oriented?
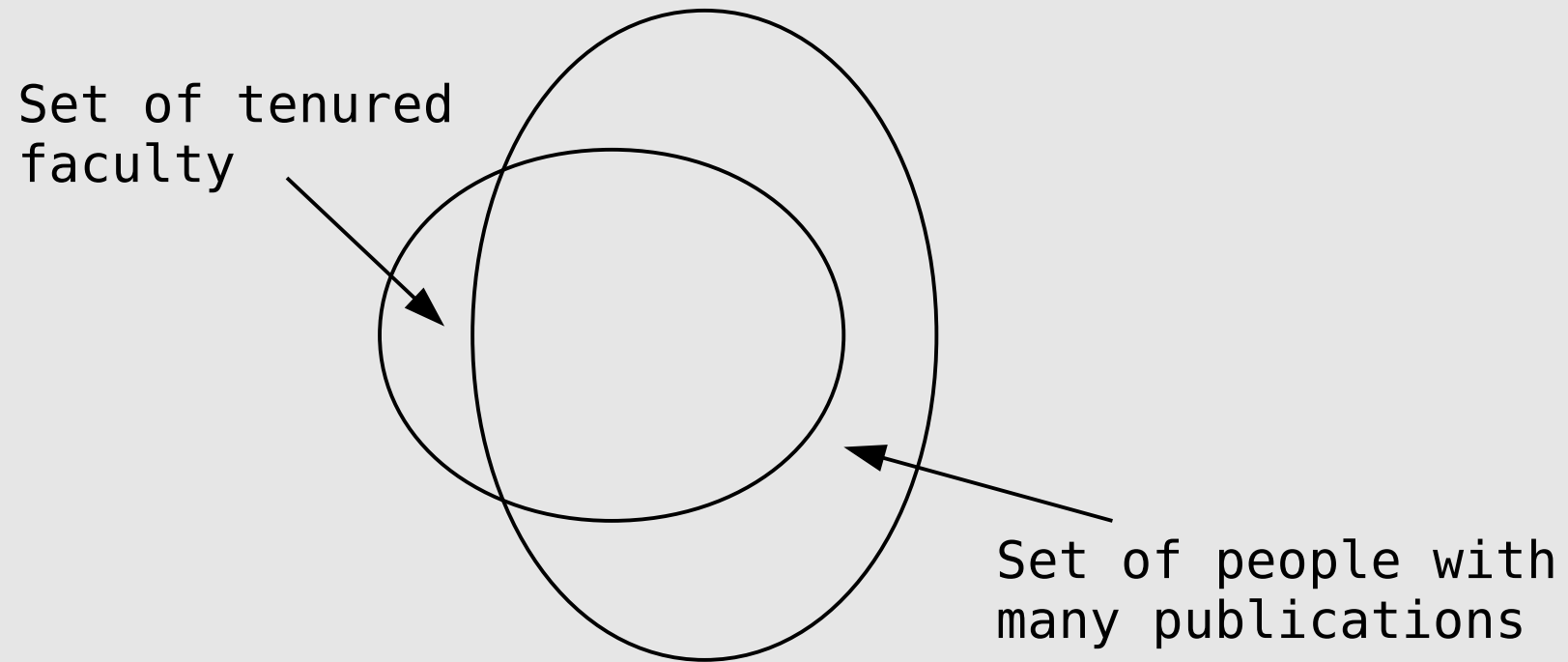
Invariant Relationships
Certain Aspects of Cases Tend to Co-occur

- "All happy families are alike; each unhappy family is unhappy in its own way."

- Tenured faculty tend to have many publications

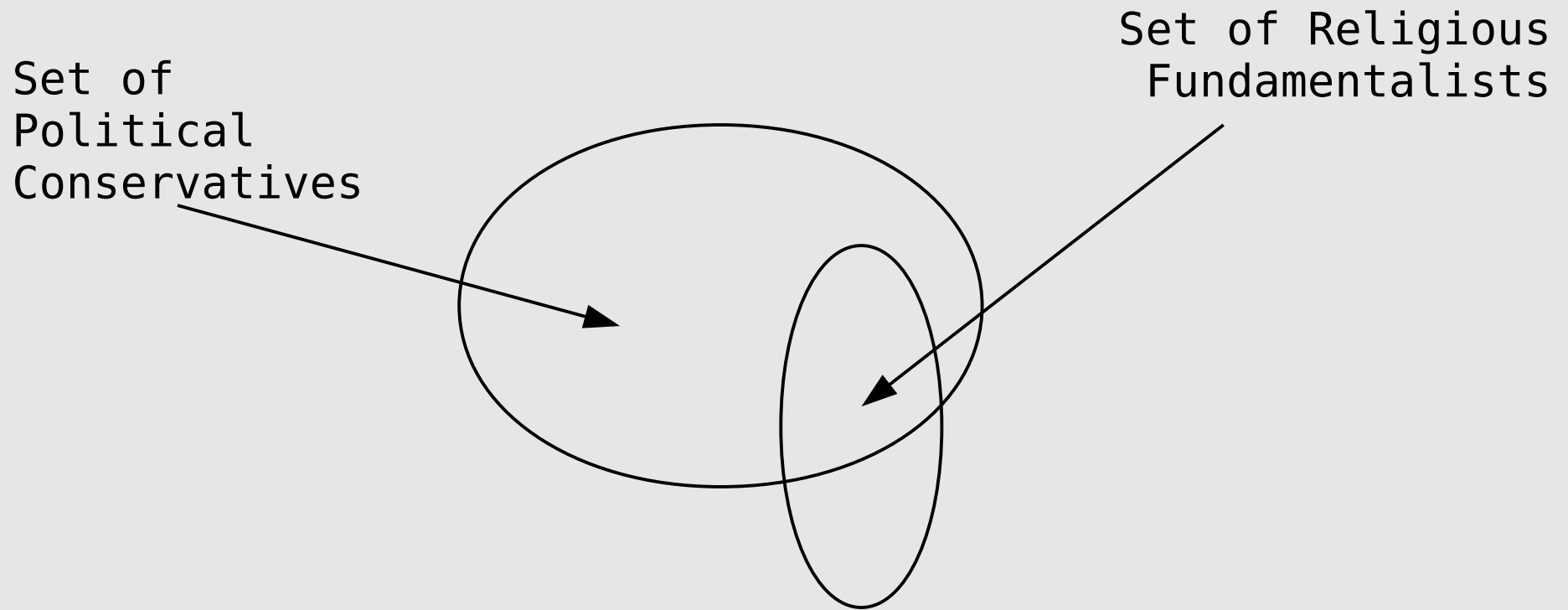- Religious fundamentalists tend to be politically conservative

- HIV causes AIDS

Invariant Relationships
Certain Aspects of Cases Tend to Co-occur

Set of tenured
faculty
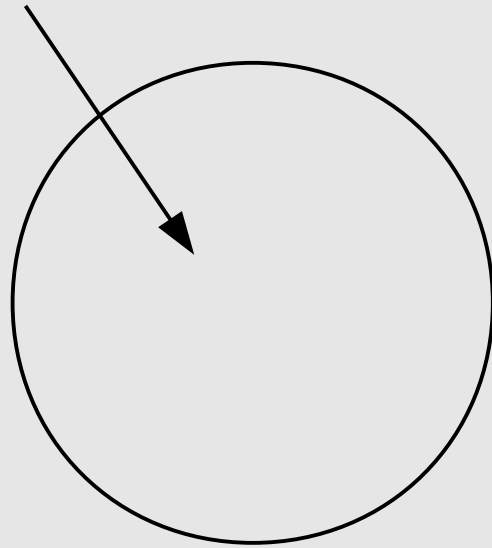
Set of people with
many publications

Invariant Relationships
Certain Aspects of Cases Tend to Co-occur

Set of
Political
Conservatives
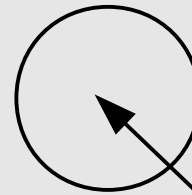
Set of Religious
Fundamentalists

Invariant Relationships
Certain Aspects of Cases Tend to Co-occur

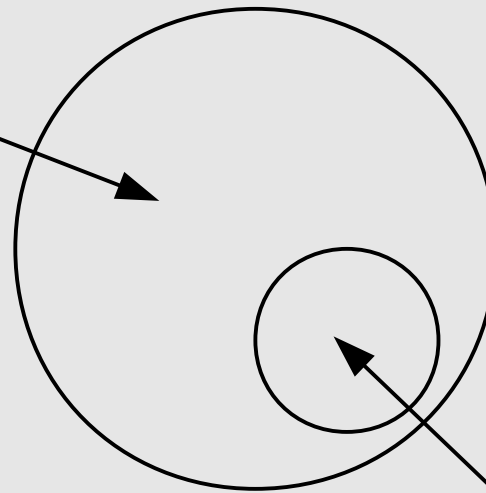Set of people who are HIV-negative

Set of people with AIDS

Invariant Relationships
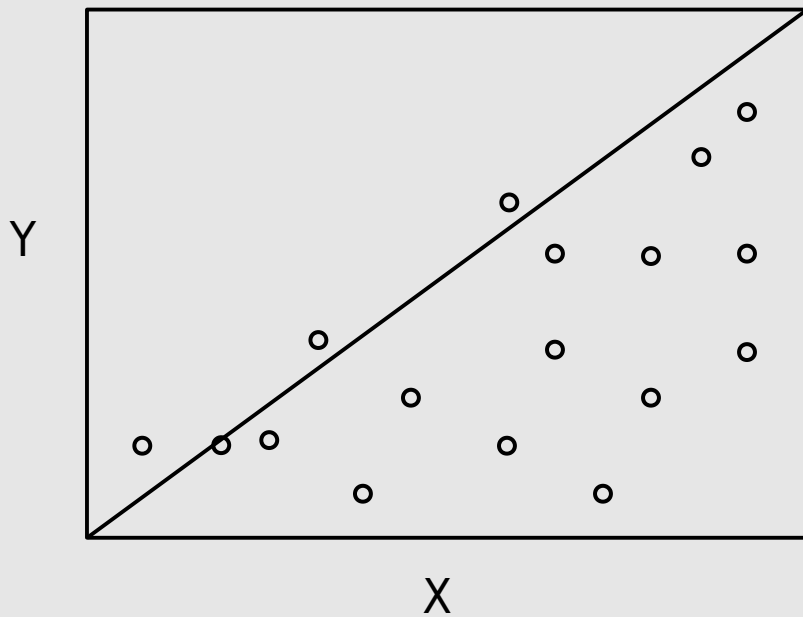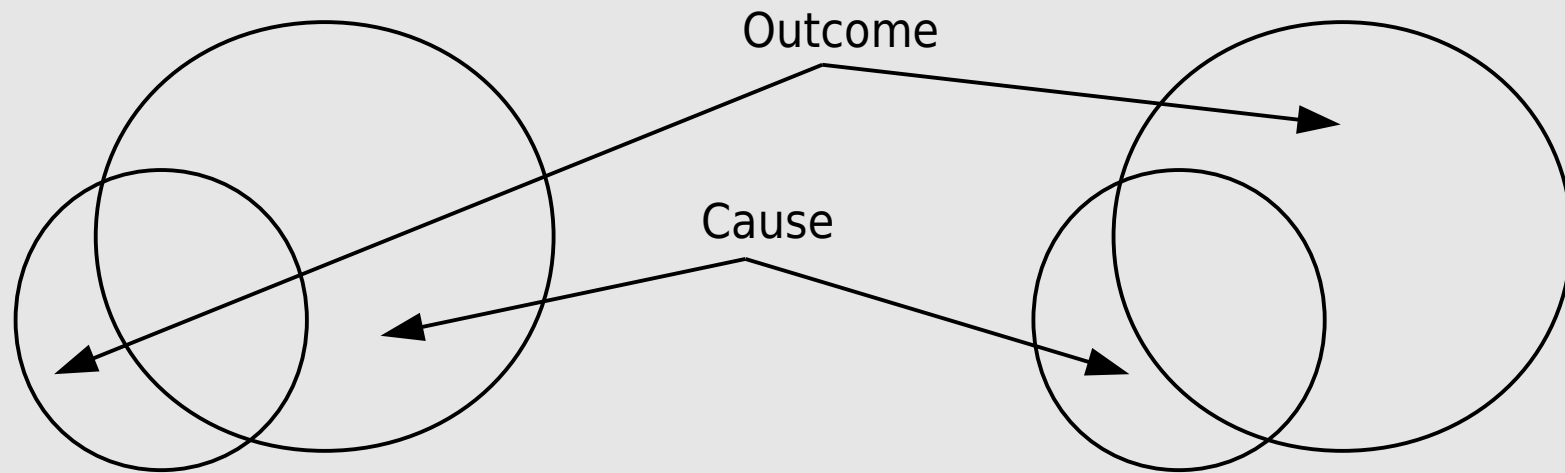## Certain Aspects of Cases Tend to Co-occur
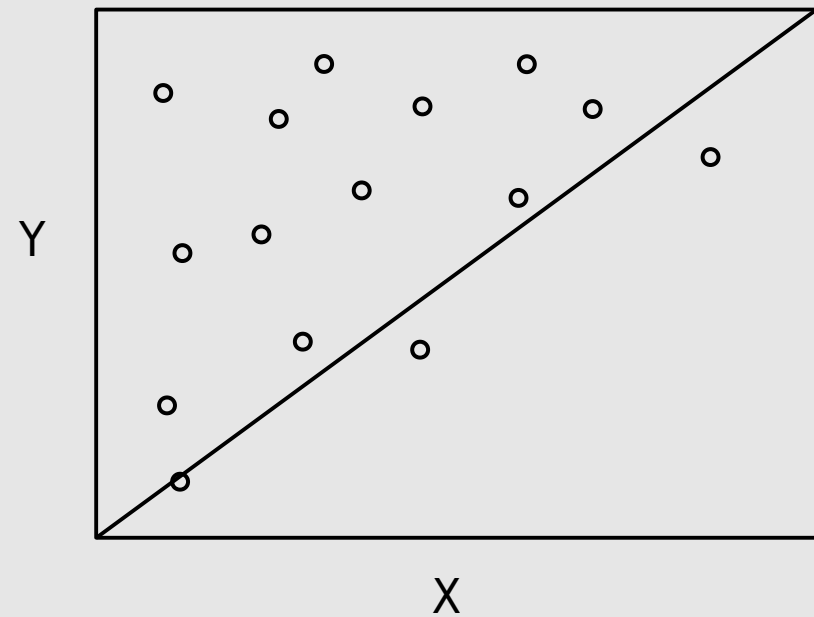

Set of people who are HIV-positive

Set of people with AIDS

Invariant Relationships
Certain Aspects of Cases Tend to Co-occur

Subset relationship consistent
with *necessity* (X≥Y)

Subset relationship consistent
with *sufficiency* (Y≥X)

Invariant Relationships
Certain Aspects of Cases Tend to Co-occur

- Does not imply determinism (or stochasticism)

- Is not vulnerable to a single disconfirming case

- Is fundamentally set-theoretic

- Parallels how we typically understand causation:

    - A subset of people exposed to influenza will contract the flu.

    - Use condoms to avoid STDs.

    - Oscars are awarded to films that are both popular and critically-acclaimed.

    - A particular intervention may work in one context but not another (e.g., small vs. large city; public vs. private university)

# Software Demonstration
Example: Brown and Boswell (1995)

Distinguishing Features of QCA

- Fundamentally set-theoretic
- Assumption of invariance
- Assumption of causal complexity
  - Identification of necessary and sufficient conditions
  - There can be multiple paths to the same outcome
- No degrees-of-freedom restrictions
  - Appropriate for small-, medium-, and large-N analysis
- Encourages retroductive analysis (moving back and forth between theory and data)
  - Uses a malleable analytic frame
  - Must identify, measure, and scale (calibrate) your explanatory conditions and outcome
  - Data set must include both positive and negative outcomes
  - Identifying and resolving contradictions is key

Three Analytic Components of QCA
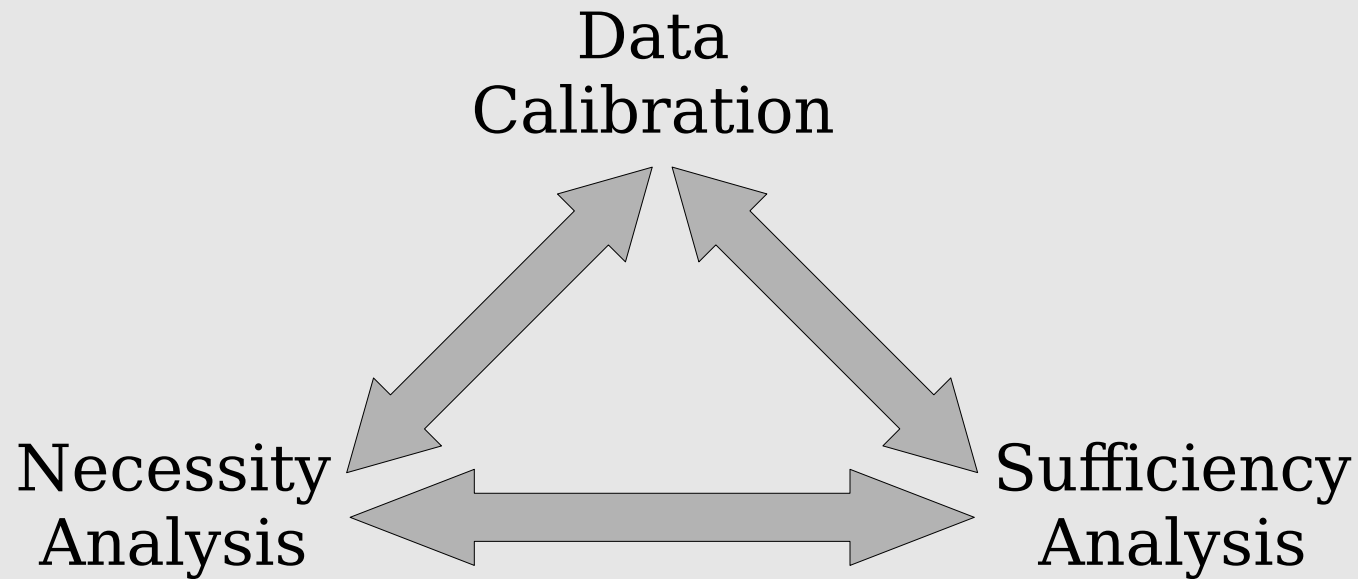
Dataset Calibration

- The process of constructing fuzzy-sets
- May be crisp {0,1} or fuzzy {$0.0 \leq x \leq 1.0$}
- Is about defining set memberships
  - degree of membership in the set of rich people (vs annual income)
  - degree of membership in the set of developed countries (vs GDP/capita)
- Importance of negation and asymmetry
  - degree of membership in the set of *not* rich people
 - degree of membership in the set of *not* developed countries

Analysis of Necessary and Sufficient Conditions

- Necessity analysis is underdeveloped in the literature; QCA development—and applications—have focused on sufficiency
  - but: *Kirq* and *acq* have sophisticated necessity testing
- Sufficiency analysis assumes causal complexity and emphasizes *multiple conjunctural causation*
  - Intersectionality: combinations of conditions explain empirical phenomena
  - Equifinality: different combinations of conditions can produce the same outcome
- Measures of model fit:
  - *Consistency* measures the strength of a superset/subset relationship (a perfect subset relationship=1.0)
  - *Coverage* measures the empirical importance of a particular solution (explaining all instances of the outcome=1.0)

Assessing Necessary Conditions
Causal condition must (almost always) be present for outcome to occur.

Significant decrease in AKI rate (outcome)

5 hospitals

6 hospitals
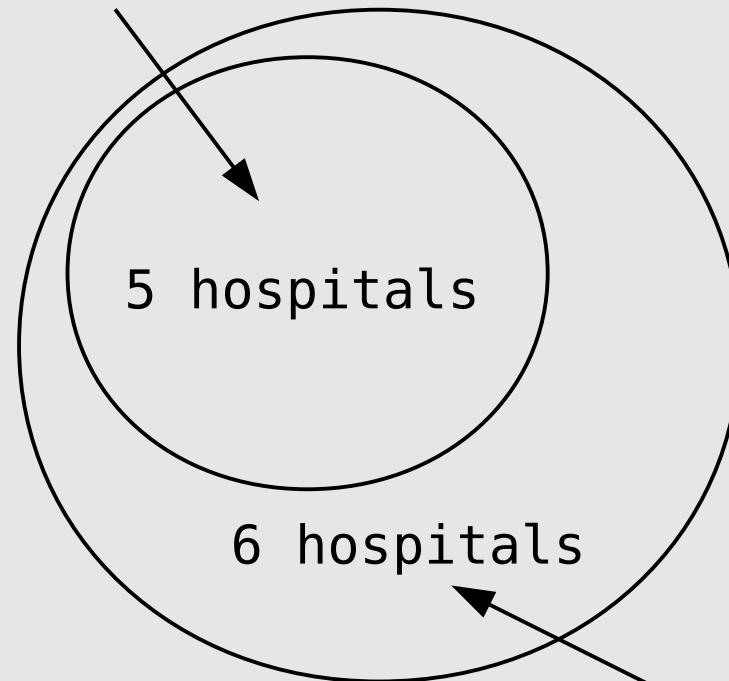
Initial AKI rate > 1.0 (ncon=1.0, ncov=0.83)

Assessing Sufficient Conditions
When causal condition is present outcome will (almost always) occur.

Recently deported women who do not plan to cross again (Outcome)

High SES women who haven't lived in the U.S. and aren't traveling with family (scon=0.90, scov=0.32, ucov=0.13)

High SES women who haven't lived in the U.S., have only attempted cross a few times and felt that their last crossing experience was very dangerous (scon=0.82, scov=0.46, ucov=0.26)

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Women belonging to both sets

High SES women who haven't lived in the U.S., have only attempted cross a few times and felt that their last crossing experience was very dangerous (scon=0.82, scov=0.46, ucov=0.26)

A Range of Solutions are Possible

More Complex

↑

(a) Acsir *or* ACSir *or* ASIR

(b) Air   *or* ACSi   *or* ASIR

(c) Air   *or*   ASIR

(d) Ai   *or*   ASR

(e) i   *or*   SR

↓

More Parsimonious

Intermediate solutions constructed manually, or via directional expectations

Key: (A)dvice, (C)ommittment, (S)hadow of future, (I)nconvenience, (R)everberation

Three Types of QCA Projects

Uncovering causal recipes

- The most popular use of QCA, and how we typically describe the method's goal

- Seeks to identify invariant relationships, necessary and sufficient conditions

Identifying taxonomies and types

- Based on truth table analysis
- Often engaged in "along the way" but can be its own end

Analyzing context

- What are the conditions under which phenomena do, or do not, occur?