Glossary

Box G.1
"Good Practices" (13): Words Matter, So Use the Correct Terminology!

It is crucial to use the correct QCA terminology when writing up a report, publication, etc., in order to:

- Avoid confusing the reader, especially if he or she has been mostly trained in different methods and approaches
- Reinforce the notion that QCA *techniques* are underpinned by a specific *paradigm*, with its specific goals, assumptions, and conception of causality (e.g., "conditions" are not "independent variables," etc.)
- Avoid being criticized on invalid grounds (e.g., a "minimal formula" is not a "general trend," which could be statistically inferred from a sample to a whole population, etc.)
- Be fully understood in your demonstration

It might be useful, if space allows (in footnotes, for instance), to provide short definitions of the key QCA technical terms you are using. It is also advised to clearly mention the technique(s) you are using (csQCA, mvQCA, fsQCA, fuzzy sets, etc.) in your abstract.

In this glossary, we have gathered key technical terms used in QCA and its techniques, along with concise definitions. Some equivalent terms, used by some authors in the literature, as well as by the FSQCA or TOSMANA programs, are also mentioned.

Binary variable (equivalents: *Boolean variable, dichotomous variable*): variable that takes only two values: [0] or [1].

Boolean distance: the number of Boolean (i.e., dichotomized, with [0] or [1] values) conditions by which two cases differ from one another.

Boolean minimization: see *Minimization.*

Complex solution: minimal formula derived without the aid of any *logical remainders.*

Condition (equivalents: *condition variable, causal*[1] *condition*): an explanatory variable that may affect the *outcome.* Note: It is not an "independent variable" in the statistical sense.

Configuration: a combination of *conditions* relevant to a given *outcome.* It may correspond to one, more than one, or no empirical case(s). It corresponds to one row of a *truth table.*

[-] outcome configuration: a *configuration* whose *outcome* value is always [-], indicating it could be [1] or [0]; also known as a "don't care" configuration.

[0] outcome configuration: a *configuration* whose *outcome* value is always [0].

[1] outcome configuration: a *configuration* whose *outcome* value is always [1].

Consistency: the degree to which empirical evidence supports the claim that a set-theoretic relation exists. A subset relation may signal a necessary or a sufficient condition, depending on which is the subset, the cause (sufficiency), or the outcome (necessity).

Contradictory configuration: a *configuration* whose *outcome* value is [1] for some cases and [0] for other cases. It therefore covers a set of empirical cases, which, although they share the same set of *condition* values, display different *outcome* values.

Contradictory simplifying assumption: when the same *logical remainder* is used both in the minimization of the [1] outcome configurations *and* in the minimization of the [0] outcome configurations, thereby making two contradictory assumptions regarding the outcome value of that logical remainder.

Coverage: an assessment of the way the respective *terms* of the *minimal formulas* "cover" observed cases (three types of coverage: raw coverage, unique coverage, and solution coverage).

Fuzzy set membership score: the degree to which a given case belongs to a set, which can be any value between two qualitatively defined states: full membership (1) and full nonmembership (0) in the set.

Implicant: see *Prime implicant.*

Intermediate solution: minimal formula derived with the aid of only those *logical remainders* that are consistent with the researcher's theoretical and substantive knowledge.

Interval level (of measurement): quantitative data that are ordered on a constant scale, with equivalent differences between values; an interval scale with a meaningful zero point is known as a *ratio scale.*

Logical remainder (equivalents: *logical case, logical remainder case, remainder, counterfactual, non-observed case*): a *configuration* (combination of conditions) that lacks empirical instances. Logical remainders may be included in the Boolean *minimization.*

Membership score: see *Fuzzy set membership score.*

Minimal formula (equivalents: *reduced expression, minimal equation, solution*): formula obtained through Boolean or set-theoretic *minimization.* It typically consists of a reduced set of *prime implicants* (terms), connected by the Boolean "OR" [+] operator, also known as a "sums of products" expression.

Minimization (equivalents: *Boolean minimization, Boolean synthesis, Boolean reduction*): the process of reducing, through Boolean or set-theoretic algorithms, complex expressions into a *minimal formula.*

Necessary condition: see *Necessity.*

Necessity: a condition is *necessary* for an outcome if it is always present when the outcome occurs, and if it is never absent when the outcome occurs (thus the outcome cannot occur in the absence of the condition). The outcome is a *subset* of the cause.

Nominal level (of measurement): the data are classified, but not ordered (e.g., religion, gender [male/female]).

Ordinal level (of measurement): the data are ordered, but the differences between the values or ranks are not equal (e.g., social class, rank order of preference for political parties).

Outcome (equivalent: *outcome variable*): the variable to be explained by the *conditions*; usually the outcome is the main focus of a study.

Parsimonious solution: minimal formula *derived with the aid of* logical remainders*, without any evaluation of their plausibility.*

Prime implicant: reduced expressions derived in the course of Boolean minimization. Typically, a subset of the prime implicants that are derived constitute a *minimal formula*, the endpoint of Boolean minimization. A prime implicant is usually a set of conditions joined by the Boolean "AND" [*] operator. Each prime implicant in a minimal formula covers a series of *configurations* from the *truth table* with a given outcome.

Property space: the analytic frame that is defined by a given set of conditions; with fuzzy set, it is a multidimensional vector space defined by the fuzzy-set conditions. The corners of this multidimensional vector space correspond to truth table rows.

Remainder: see *Logical remainder.*

Set: any collection of distinct objects (called *members*) considered as a whole. A set can be described by certain properties or characteristics.

Simplifying assumption: assumption made on the outcome value of a *logical remainder,* so it can be included in the *minimization* procedure, in order to obtain a simpler *minimal formula.*

Solution: see *Complex solution; Intermediate solution; Parsimonious solution.*

Subset relation: with crisp sets, a subset relation exists whenever all the members of one set are contained within another set; with fuzzy sets a subset relation exists whenever membership scores in one set are consistently less than or equal to membership scores in another set.

Sufficiency: a condition (or combination of conditions) is *sufficient* for an outcome if the outcome always occurs when the condition (or combination) is present (however, the outcome can occur for other reasons as well). In short, the cause is a subset of the outcome. Most terms in minimal formulas (e.g., the term AB in the minimal formula AB + CD → Y) constitute subsets of the outcome and therefore can be interpreted as sufficient (but not necessary) for the outcome.

Sufficient condition: see *Sufficiency.*

Term: an element within a Boolean sum. In Boolean or set-theoretic expressions, it is usually a combination of conditions joined by the Boolean "AND" [*] operator (set intersection).

Truth table (equivalent: *table of configurations*): synthetic display of all *configurations* (combinations of conditions) based on a given data set.

Venn diagram: a graph showing all the possible mathematical or logical relationships between *sets.*

NOTE

1. It is, however, recommended to be cautious in the use of the "causality" terminology, unless you have a clear view of the causal mechanisms at work in your field of study.