COMPASSS
Working Paper
2011-64
www.compasss.org

# Two-Level Theories in QCA: A Discussion of Schneider and Wagemann's Two-Step Approach

Tom Mannewitz
*Technical University of Chemnitz*
tommannewitz@hotmail.com

**Abstract**

By the introduction of Qualitative Comparative Analysis Charles C. Ragin offered a middle way between case-oriented, qualitative studies and large-n, quantitative studies. It has enjoyed many improvements, among them Carsten Schneider's and Claudius Wagemann's two-step approach (cf. Schneider and Wagemann 2007; Schneider and Wagemann 2006; Schneider 2009) that can reduce the number of logical remainders, i.e. solve the problem of limited diversity, and make social scientific analyses more informative and hence more fruitful.

This article aims at opening the methodologically innovative two-step approach for a broader scientific public: It argues for the use of the approach in every QCA study, i.e. also for the enquiry of necessary conditions, and shows, how this can be achieved. It introduces new classification criteria of conditions (next to remote and proximate ones) and shows how to grasp the contexts after step one in a logically manner – a hitherto unmentioned problem. However, the core point of the paper is the introduction of an application of the approach to Multi Value QCA.

## INTRODUCTION

Since its development by Charles C. Ragin in 1987 (Ragin 1987) Qualitative Comparative Analysis (QCA) enjoyed innumerable enhancements and greater popularity among social scientists. Even though it is not always accepted as an equal value approach to csQCA (Vink and van Vliet 2009) Lasse Cronqvist's Multi-Value QCA and the computational software TOSMANA (Cronqvist 2007; 2011) are one of the largest extensions of the original ideas of Ragin. Another enhancement of QCA is Ragin's own idea to make fuzzy sets useful for a QCA whereas csQCA can be seen as the dichotomous special case of fsQCA, of course (Ragin 2000). Both are so meaningful for the qualitative comparative approach because they break open the dichotomy that is characteristic for csQCA by allowing for the use of multinomial (mvQCA) and fuzzy conditions (fsQCA). However, there is still a number of reasons for which the qualitative comparative method is still exposed to criticism.

Representatives of one of the most strenuous defended position argue that QCA's most urgent insufficiency is that the causal statements it produces may rest on simplifying assumptions on logical remainders. Logical remainders are combinations of conditions that have not occurred but are logically possible. This problem QCA has to deal with is known as "limited diversity" (Ragin 1987, p. 104-113). As a response to those critics Carsten Schneider and Claudius Wagemann (Schneider and Wagemann 2003; 2006; 2007, p. 256-262) designed a two-step approach that would allow for an immense reduction of logical remainders by analysing sufficient conditions in two separate steps. The approach is in part inspired by Herbert Kitschelt's ideas about deep and shallow explanations of post-communist regime change (Kitschelt 1999; 2003) but enlarges it with own ideas and thus makes it fruitful for a use within QCA.

I believe this approach to be one of the most important developments in QCA's short tradition. Anyhow, some of its aspects call for further consideration to unfold the complete potential for causal explanations. For reasons of clarification I will briefly present QCA. At the same time I renounce an in-depth-illustration of the method at this point because after more than 20 years after its design it should have found at least primal consideration among those who are involved with the methodological discussion in social sciences. Notwithstanding there is a slight selection of helpful since fundamental literature I would recommend to the interested reader (Patzelt 1997; Ragin 1987; 2000; 2008; Rihoux and Ragin 2008; Schneider and Wagemann 2007).

This article aims at improving what Schneider and Wagemann have developed and at making it easier for QCA-newcomers to apply this module deliberately. I consider it as a very promising concept that not only improves (fs)QCA as a whole by dint of its chance to reduce logical remainders but also to enlighten the study of social phenomena by arranging

analysing steps into separate phases: the consideration of deep conditions first and shallow ones afterwards.[1] That, however, presupposes improvements in the following aspects: the differentiation of variables according to previously defined criteria, the analysis of necessary conditions with the two-step approach, the notion of the contexts we elicit in step one and – finally – the application of the module to mvQCA.

## QCA, THE PROBLEM OF LIMITED DIVERSITY AND THE TWO-STEP APPROACH

QCA was originally designed by Charles C. Ragin as a third way in social sciences to overcome the division into a rather qualitative, single-case oriented area on the one side and the quantitative tradition on the other. Whereas qualitative studies try to capture all the complexity of at the utmost a handful of cases, works of a rather quantitative dimension focus on variables and the explanation of say hundreds of cases by use of statistical instruments (cf. Ragin 1987; Schneider and Wagemann 2007, p. 13-29). QCA instead allows for the investigation of sufficient and necessary configurations of conditions in middle-sized case sets by using set theory.

In the first version of QCA – nowadays known as crisp set QCA – the conditions were entitled only to dichotomous values: present (1) or absent (0). From this starting point a truth table is generated in which each row represents one unique combination of differently formed conditions – not necessarily cases, since different cases might display the same combination of conditions. By use of a bottom-up process or the Quine-McClusky-Algorithm information of this table are minimized according to the logic of Boolean Algebra (see Schneider and Wagemann 2007, p. 49-73; Ragin 1987, p. 93-102; Rihoux and Ragin 2008, p. 56-64) into a solution formula that displays sufficient and necessary conditions respectively and omits conditions not relevant for this outcome. The use of software is recommended in consequence of the extensiveness of this step (Cronqvist 2005; 2007a; Ragin 2006a; 2006b).

I want to concentrate on one certain issue that enters stage at this step of QCA; it will be the leitmotif of this article in a manner of speaking: the problem of limited diversity that unfolds its problems for QCA when the solution formula is supposed to be parsimonious (i.e. consist only of a few paths and conditions). When we want to achieve parsimony, also logically possible, but not occurred configurations are used in addition to real configurations (i.e. combinations of conditions that have occurred) in order to minimize the terms.[2] Thus the proportion of unoccured configurations (i.e. configurations for which there is no empirical

[1] I will introduce the notions of both dimensions below.
[2] For other strategies of handling limited diversity and designing solution formulas see below.

observation) of possible configurations might rise exceedingly with the increase of embraced conditions (see below).

Since these simplifying assumptions are used in most QCA studies, the animadversion on this strategy is justified for most QCA studies, too. I will briefly illustrate what that means: As mentioned before QCA works with combinations of conditions the researcher defines directly before analysing his data. Assuming we face eight variables which all allow for only dichotomous values, no less than $2^8 = 256$ different combinations of conditions are at least theoretically possible. Assuming further we observe 30 cases that can be subsumed under 20 different combinations of conditions (because some configurations are represented by at least two cases), there are 256 – 20 = 236 theoretically possible configurations for which there is no empirical evidence for whatever reason. Depending on our intentions we may

1) cede the creation of the most parsimonious solution to the computer's simulation processes what may include numerous assumptions on logical remainders or
2) decide to get a solution that rests exclusively on the truth table information by eliminating logical remainders from the minimization process or
3) code certain not occurring configurations according to own theoretical suppositions. The last mode requires some good reasons to code a configuration in this or that way of course. Depending on how you handle the remaining logical remainders (if there are any) this procedure comes close to the parsimonious or the complex solution. Another strategy,
4), consists of using only easy counterfactual configurations and thus producing intermediate solutions. It was introduced by Ragin and Sonnett (Ragin and Sonnett 2004) and builds a bridge between highly complex and overly parsimonious solutions. It thus resembles strategy 3). However, here conditions are excluded "from the complex solution that are inconsistent with existing knowledge, while [...] the [...] solution constructed [...] must be a subset of the most parsimonious solution" (Ragin and Sonnett 2004, p. 17). Whereas in strategy 3) the number of potential assumptions about logical remainders is decreased artificially by coding rows in the truth table, strategy 4) removes redundant conditions in the above mentioned manner. It thus contains only some of the logical remainders the most parsimonious solution comprises. Both modes, 3) and 4), are based on prior knowledge and theoretical reasoning.

Albeit the deliberate handling of this problem must be seen as a tremendous advantage of QCA to create transparency, each of this strategy exhibits further sets of problems. I will address this issue later on – it will demand our attention in connection with my thoughts about the two-step approach.

Carsten Q. Schneider and Claudius Wagemann perceived these crucial points as well and thereupon designed the frequently mentioned two-step approach. I refer to their above mentioned methodical contributions (Schneider and Wagemann 2003; 2006; 2007, p. 256-262) Anyhow, some propositions are to be found only in some sections of Carsten Schneider's study on consolidation of democracy in Europe and Latin America (Schneider 2009).

The approach enters stage of a QCA after the determination of all variables. But how does it work? All of the variables can be delineated according to their remoteness and proximity respectively to the outcome. According to Schneider and Wagemann remote factors are relatively stable over time, they are remote in a spatiotemporal way, too and they are out of a manipulative reach of the actors. Proximate factors in turn display quite different features: They change easily over time, are spatially and temporally very close to the outcome and are subject to manipulations of actors.

**Table 1. Remote and proximate factors according to Schneider and Wagemann**

| Remote Factors | Proximate Factors |
|---|---|
| • spatiotemporally distant to the outcome<br>• stable over time<br>• out of manipulative reach of the actors involved | • spatiotemporally close to the outcome<br>• vary easily over time<br>• can be manipulated by actors |

Source: Own compilation.

We cannot always say easily whether a variable is definitely a proximate or remote one. According to the authors we rather have to grasp the remoteness/proximity issue as a continuum whose poles are labelled according to both features. Dependent on what the researcher examines his groups of remote and proximate variables may be entirely different from the groupings another investigator makes, even if both of them make use of identical variables. As a matter of fact this is mainly due to their observed outcomes because the question of remoteness of variables legitimately depends basically on this factor.

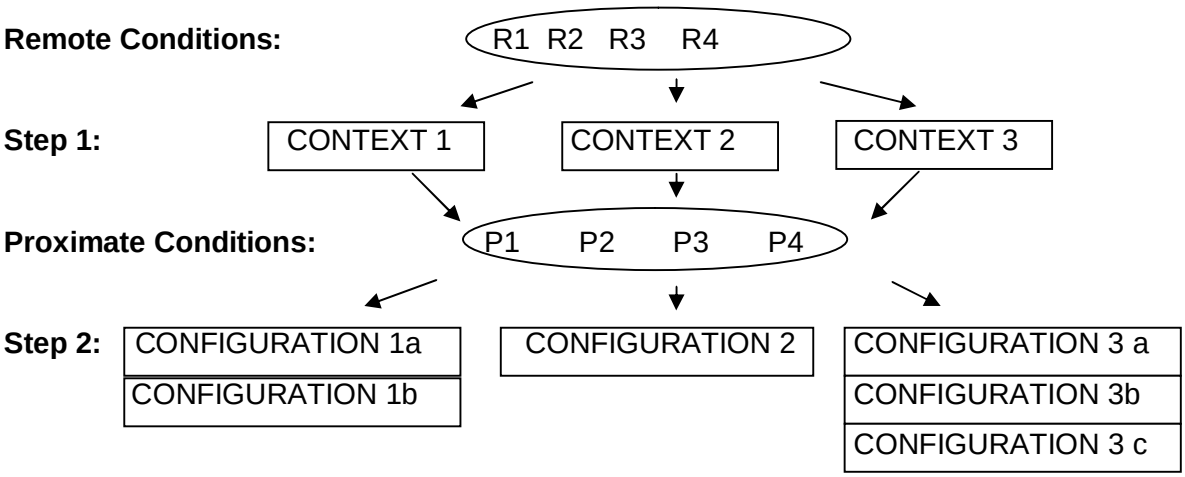
The next stage is the heart of the module since here analysing begins: *Step one* comprises the enquiry of remote variables only. Here the authors recommend the inclusion of simplifying assumptions on logical remainders. The results of this step will be outcome-enabling conditions, contexts in some measure that need not meet high requirements. Thus the required consistency values in this step should not be too rigorous.[3] In their examples a

[3] In csQCA and MVQCA consistency of sufficient conditions says how many cases that display a certain value cause the outcome, too, in relation to all cases where the value is present. This factor

configuration must capture at least one case and pass a threshold of 0.7 to be included into the reduction process. Schneider instead proposes a value of 0.8 in his study on democratization in Europe and Latin America (cf. Schneider 2009, p. 81). The consistency value of the achieved formula may be surprisingly low – but that is no problem because that just says that there are cases that display a certain context but not the outcome. Consistency will rise after the second step because this will specify the explanations.

The subsequent *second step* consists of multiple QCAs for different data sets because it aims at identifying combinations of proximate factors that lead to the observed outcome within the contexts found in step one. Thus we have to conduct as many second-step-analyses as there are contextual, i.e. remote, configurations: in one analysis one context is examined in conjunction with all proximate factors. However this analysis is not conducted for all cases, but only those who exhibit the context. Whereas both authors recommend the unmodified consistency value of 0.7 in step two of their example, Schneider (cf. Schneider 2009, p. 85) uses a threshold of 0.9. He justifies this decision with higher requirements in order to achieve consistent solutions. In both works they exclude assumptions on logical remainders and thus opt for a conservative approach in handling limited diversity. Of course this leads them to the most complex, though highly consistent, solution.

**Figure 1. How to use the two-step module (scheme)**




Source: Own compilation.

ranges from 0 (no case that displays the value also displays the outcome) to 1 (all cases that exhibit the value exhibit the outcome, too) (cf. Schneider and Wagemann 2007, p. 86-90). For instance a consistency of 0.8 says that 80 percent of cases that display one value of condition in question also cause the outcome whereas 20 percent do not. What matters for the consistency value of the sufficient condition X in a csQCA or fsQCA is the sum of X-values that are higher than the corresponding Y-values (what should not happen too often according to the underlying set relations) (cf.Schneider and Wagemann 2007, p. 202-211).

From a theoretical perspective the module helps to contextualize certain effects on outcomes and therefore to build middle-range theories (cf. Schneider and Wagemann 2006, p. 775-776). That is to say: We can find out which proximate factors in combination with remote ones display the outcome whereas other combinations do not. Furthermore, according to the authors from a methodological perspective the two-step approach helps to handle the problem of limited diversity (esp. when assumptions on logical remainders are made) just because of the partition of a one-step fsQCA into two steps. A calculation will serve as an illustration: In the abovementioned example of eight dichotomous variables the number of possible configurations in a one-step QCA equals $2^8$=256. The less observations we have the more logical remainders we get: When we have, say, 10 different observations, the number of logical remainders is 256-10=246. If we apply the two-step module to the identical analysis it is possible to reduce the number of configurations dramatically. According to the authors the best case occurs, when all eight variables are dispersed equally in step one and step two: $2^4+2^4$=32 unique configurations. It seems astonishing that just by a split of the analysis the number of possible configurations has been reduced to mere 12,5%.

This is, however, not true because in step two not only the proximate conditions are included but also one remote context condition. Thus the formula should be: $2^4+2^5$=48 unique configurations. Moreover, this holds true only for *one* data set (i.e. for only one context). In order to find out the total number of unique configurations for the entire second step we have to multiply the number of configurations resulting from one second-step analysis ($=2^{\text{number of proximate conditions} + 1}$) with the number of contexts. Thus the number of unique configurations cannot be calculated a priori. In the abovementioned example of 8 equally distributed conditions the number of terms leading to the outcome should actually be lower than 6 in order to get a smaller number of possible configurations than in a one-step QCA. The original formula for calculating the number of unique configurations in the two-step approach was:

$$n=2^{k1} + 2^{k2}$$

where n is the number of unique configurations and k the number of conditions in the respective step. The actual formula for the number of unique configurations in the two-step approach should be:

$$n=2^{k1} + 2^{k2+1} * c$$

where n is the number of unique configurations and k the number of conditions in the respective step. C is the number of elicited contexts.

$2^{k1}$ is thus the number of possible configurations in step one, $2^{k2+1}$ is the number of possible configurations of only one analysis in step two. It therefore has to be multiplied with the number of analyses c that actually have to be made.

Thus, against all prior statements the two-step approach does not necessarily get a grip on limited diversity. It has a chance to do so, but only if the number of elicited contexts does not get too high. This parameter and the distribution of conditions are the only ones to decide about this. Schneider's and Wagemann's formula would exclusively apply if: 1) the context conditions were not included into the second analysis step and 2) the second-step analysis was done in one process (and not one analysis for each context).

However, if the approach is conducted according to both authors' applications (i.e. inclusion of logical remainders in step one, exclusion of logical remainders in step two or no minimization in step two at all) we can elicit solutions that find a good way between parsimony and complexity. Conducted this way the number of logical remainders will stay high, however the number of assumptions on them can be kept low since they are allowed only in step one. Thus by help of the two-step approach it is possible to get medium parsimonious solutions without at the same time raising the number of assumptions on logical remainders exceedingly – not because the analysis is split into two steps *per se*, but because assumptions on logical remainders are admitted only to one single step that contains not all conditions.

Furthermore, the approach reflects the (often implicit) structure of social scientific studies explicitly and makes further work more transparent. All in all fsQCA's core function of eliciting causally complex results is strengthened since its configurational demand is supported by the introduction of two levels even though its methodical merits are not as big as it has been claimed.

## 1) DISTINCTION CRITERIA FOR CONDITIONS

Because of the crucial role of the distinction of variables according to their remoteness to the observed outcome, this distinctive criterion deserves some clarification. I have already depicted Schneider's and Wagemann's notion of proximity and remoteness respectively.

Accordingly, the answer to several questions decides whether a condition has to be seen as a proximate or remote one with respect to the outcome:

1) Are the variables at hand fairly stable over time and are they temporally distant from the outcome respectively?
2) Are the variables spatially distant from the outcome?

3) Can the variables be manipulated by the involved actors?

So Schneider and Wagemann present various dimensions (causal, spatial, and temporal distance between condition and outcome, fluctuation of conditions along the time, malleability), which in turn can be applied *separately* or even *together* (as they do). When all dimensions are applied altogether it seems that the notion of remote and proximate explanations is quite fuzzy because all three questions mentioned above are mixed up. What, for instance, happens when actors were capable of manipulating the variables at hand years ago? Or what if variables cannot be manipulated by the actors but are temporally constant and spatially very close to the outcome or vice versa?

What, for example, if we want to decide whether electoral law is a remote or proximate condition for the electoral success of midget parties? I guess, when three researchers were asked to classify this condition according to the remoteness-proximity-distinction according to Schneider and Wagemann we'll get at least four different solutions since they are facing the problem to place this factor on three continua. That leaves many degrees of freedom. But what is the problem about that? First of all, the classification of variables influences the number of logical remainders and thus the quality of causal statements the researchers have to make. Second and more important, different classifications of variables lead to different middle-range theories: In one case the election law could be the cause of electoral success, in another case it could be just the context in which the actual causes are placed. Third, especially the question of malleability shifts the ontological statements the researchers derive from the formulas. It may, for example play a major role, whether electoral law was influenced by the midget party in former times or not. Thus the distinction of conditions according to Schneider and Wagemann is plain sailing in most cases; however, it is not convincing when we face problem childs in social science since the remoteness-proximity-distinction leaves so much space to interpret.

What seems to be a mere side note in Schneider's and Wagemann's paper is the fact that apart from their own distinction of conditions there are numerous ways to construct a distinctive criterion in a two-step QCA – criteria that might be more clear (Schneider and Wagemann 2007, p. 258). However, they don´t show how this idea can be applied practically. Thus I will subsequently present two distinction criteria that have played a major role in political science.

Causal depth

Herbert Kitschelt (Kitschelt 1999; 2003) suggests the differentiation of the depth and shallowness of explanatory factors according to their temporal distance to the outcome. Deep explanations most notably emerge from the involvement of temporally stable factors,

shallow ones from factors that vary vastly over time. Admittedly, what he seems to embody is not just the temporal stability of factors alone, but their *causal depth* for the dependent variable of course. He conceives certain outcomes as the effect of deep factors causally transmitted by proximate ones. What results is the way out of explanations that are either too deep or too shallow: “In order to appreciate the power of deeper explanations and reveal the structure of relations among causal mechanisms characterized by varying temporal depth, social science therefore should concentrate on multi-equation causal models that do not easily suppress the contribution of deeper mechanisms in favour of shallower mechanisms on some outcome. What social science should explore are chains of causation, organized around variables of different levels of causal depth” (Kitschelt 1999, p. 11-12). Accordingly, whether a variable is assessed deep or shallow depends on the question whether a causal mechanism (a remote factor) *or* another contextualizing variable (a deep factor) is needed in order to explain a certain outcome. After all, Kitschelt’s objective was to find comprehensive causal explanations that take into account historical contexts as well as close conditions.

Internality and Externality

What is more, we can make distinctions of variables according to their origin in the system or in actions of the involved actors. This seems adequate if we want to analyse whether certain outcomes are effects of systems, i.e. contexts (external) or of actions (internal). This distinction clearly resembles a pattern of explanation that distinguishes between internal and external factors as decisive for a certain result. Internal and external explanatory factors are rather perceived as rivalling variables here. We could instance the investigation of electoral success of parties or other political groups, decisions of politicians etc. It seems to me that this procedure proves to be useful whenever we are interested in singular events. I have amended Kitschelt’s thoughts (Kitschelt 1999, p. 22) by applying them to this distinction as well: “Singular events, such as the breakdown of a particular political regime, are always underdetermined by structural conditions and causal mechanisms that spell out how actors employ such conditions. Timing, sequence, and the vagaries of social interaction shape unique processes and events no causally deep theory can capture.” Thus the distinction of variables according to deep (i.e. temporally stable) and shallow (vice versa) ones does not seem to be excessively fruitful because it doesn’t comprise the logic of functioning of unique events thoroughly. The distinction according to the model just explained seems more adequate therefore as it gives answers to the questions “Who initiated what?” and “Who answered to this initiation with what choice?”

In a nutshell: There is more than one distinctive criterion for factors that can be applied in Schneider’s and Wagemann’s two-step approach: The introduced dimensions (causal depth

and internality/externality) represent frequently and often implicitly made distinctive criteria for conditions in the use of two-level theories in social science (cf. Fritzsche 2010; Kitschelt 1999; 2003; Linz and Stepan 1996; Lipset and Rokkan 1967; Mannewitz 2010; Steglich 2010). That, however, is not to say that the application of other criteria could not be useful for social science, too – such as the dimensions introduced by Schneider and Wagemann applied each alone.

Another strength of the two-step approach is that it bears the chance to institutionalize the analysis of interactions of the two factor levels. In a qualitative study this is achieved by in-depth-analysis and case interpretation. According to the distinctive criteria of conditions these may be manifold of course. No matter which distinction strategy we chose it should be part of every QCA using such a two-step module to state the kinds of *causal interaction effects* the paths may contain – i.e. for example endogeneity and interaction effects. I do not want to illustrate the various effects since this has been already done in another place (cf. Kitschelt 1999; 2003; Mahoney and Goertz 2005). These effects between the two spheres neither say anything about relative importance, trivialness or relevance of a factor or a term, as Gary Goertz introduced (Goertz 2006). Nor do these links make statements about contextualization, diminishment or logical impossibilities, as Mahoney, Kimball and Koivu presented (Mahoney, Kimball, and Koivu 2009). However, the two-step approach offers an adequate instrument to connect two-level theories with these latter measures which make statements about set-theoretic relationships in courses of events.

To sum it up: The module is in fact flexible in matters of distinctive criteria. This in turn could make its use fruitful for the analysis of various social phenomena which ask for different distinctive criteria of conditions in order to grasp the causation effects thoroughly. For instance the macro-qualitative two-step analysis of worldwide democratization of autocracies in the 20$^{th}$ century might deserve other distinctive criteria (e.g. causal depth) as the enquiry of crisis strategies of mayors in India (e.g. internality/externality) does. The methodical implementation of research-appropriate distinction criteria must thus be seen as a strength of the module. What is important though is that we apply only *one* distinctive criterion, that we justify it and that we report the interaction effects between conditions of different levels one causal path contains.

## 2) THE TWO-STEP APPROACH AND THE STUDY OF NECESSARY CONDITIONS

Schneider and Wagemann (Schneider and Wagemann 2007, p. 262) admit that the application of their approach to the study of necessary conditions is not possible at the current status of research. It is quite evident that there is no methodological reason to push

for an adaptation of the module for the analysis of necessary conditions because simplifying assumptions on logical remainders do not play a role in the investigation of necessary conditions.

What speaks for the application of the two-step module (no matter which distinctive criterion we chose for conditions) to the enquiry of necessary conditions is that "it offers a practical solution to the general need to contextualize causal statements and thus to formulate middle-range theories" and to explicit the "(often implicit) structure of many social scientific hypotheses" in the area of necessary conditions (Schneider and Wagemann 2006, pp. 775-776). Facing the importance of and the increased interest in hypotheses of necessity (cf. Braumoeller and Goertz 2000; Goertz and Starr 2003) it should be self-evident to grant this area of social sciences these advantages. Another merit of the two-step approach that speaks for its use not only in the analysis of sufficient but also of necessary conditions is the prevention of tautological statements and the integration auf causal mechanisms (cf. Kitschelt 1999; 2003):

1) Tautological statements occur by the use of explanations that work exclusively with proximate variables because that bears the risk of mixing up the explanans and the explanandum as both are spatiotemporally very close to each other, or in terms of QCA: condition and outcome cannot be separated thoroughly anymore, extremely shallow explanations are the result. A good example is the explanation of democratization with the help of a state's economic prosperity because both variables often occur at the same time. That in turn makes it hard to find out what might be the prerequisite for what. It would be a good idea to imply remote factors to explain democratization more thoroughly probably. Moreover this shallow factor cannot explain why there are states that democratize without being economic prosperous (e.g. Timor-Leste) or states that exhibit economic prosperity without democratizing at the same time (e.g. Saudi Arabia).

2) Explanations that make use only of deep factors in turn provide for causal depth but miss the essential link (i.e. the causal mechanism) between them and the outcome in question. Let me resort to the abovementioned example of democratization again: It seems to be dissatisfactory only to imply remote conditions, such as the variable "cultural area", into analysis: How could you explain that states of the same cultural area democratize whereas others do not without the use of proximate factors?

In applying the two-step approach to the study of necessary conditions the above mentioned advantages benefit a study. What is more, we can find out 1) whether there are necessary conditions at all, 2) which causal level they are settled at, 3) what there interrelation is to other necessary or even sufficient conditions (endogeneity/interaction for example), 4) which one (and thus which factor level) is more important (cf. Goertz 2006), and 5) whether this condition contextualizes or diminishes another causal relationship (Mahoney,

Kimball, and Koivu 2009). Moreover, all these ideas apply to the study of necessary conditions alone and of necessary and sufficient conditions together. In short: The application of the two-step approach to the study of necessary conditions quarries a bunch of more information compared to a one-step analysis even though there is no *methodological* need to apply this module. Furthermore it systematizes the relations between necessary conditions alone as well as between necessary and sufficient conditions. I therefore argue to establish the two-step approach as the standard QCA module in the study of sufficient *and* necessary conditions.

But how is it implemented in the research process? Actually you carry out an ordinary one-step analysis of necessary conditions. The important things are to come afterwards: If there are any conditions that fulfil the requirements to be necessary for the outcome you classify them according to the distinctive criterion you have made up before (which, by the way, are the same for sufficient conditions, of course). If there is more than one necessary condition and one temporally succeeds the other you have to find out what their interrelation is (Does one condition evolve from the other or does it interact with it?). Basing on the measures of consistency and coverage you can now find out which one (and thus which factor level) is more trivial or more important for the outcome respectively (cf. Goertz 2006). Finally you can tell whether one necessary condition contextualizes or diminishes the other one (cf. Mahoney, Kimball, and Koivu 2009). Moreover after the enquiry of sufficient conditions you can examine the relation between the necessary and the sufficient conditions according to the same pattern as you just did with necessary conditions.

Let me instance Browning's study of the causes of early democracy in historical Europe (Downing 1992). The author states that the prior Roman Empire was a necessary cause both for medieval constitutionalism and early democracy. Medieval constitutionalism in turn was explained to be necessary for early democracy as well.

Figure 3) Necessary causes for early democracy in Europe according to Browning

prior Roman Empire à medieval constitutionalism
prior Roman Empire à early democracy
medieval constitutionalism à early democracy

Source: own compilation.

Thus there are two necessary causes for the outcome "early democracy in Europe": the prior Roman Empire and medieval constitutionalism. When causes are delineated according to their causal depth in relation to the outcome "early democracy", the factor "prior Roman

empire" must be seen as a causal deep condition whereas "medieval constitutionalism" is a shallow one. Now it would be time to assess the causal interrelation between the two factors necessary for early democracy in Europe: Either medieval constitutionalism follows from prior Roman Empire since it is endogenous to it or it is simply affected by it (interaction effect). It would probably be to extensive to explain here what seems most plausible since it is not my aim to contribute to the explanation of early democracy in Europe. I'd rather make methodical contributions. Thus the next step is to assess trivialness and importance. It follows from Browning's statements that medieval constitutionalism is more important for early democracy than the prior Roman Empire because the set of cases that display medieval constitutionalism more closely overlaps the set of democratic regimes than the set of cases with the factor "prior Roman Empire" does (cf. Goertz 2006, p. 100-103). Or in other words: medieval constitutionalism occurs less often than the factor "prior Roman Empire" so it is more important for early democracy in Europe. Thus, though European countries experienced the Roman Empire much earlier, this factor is not as important for early democratization in this region as medieval constitutionalism which, of course, occurred much later. All in all, both conditions seem to be quite important (i.e. non-trivial) since – plainly speaking – they do not contain that many cases where early democratization was *not* present, too. Since the set of cases with medieval constitutionalism also contains the cases with the factor "prior Roman Empire" the latter is also necessary for the first one. The Roman-Empire-experience thus contextualizes the relation of medieval constitutionalism and early democracy in Europe (cf. Mahoney, Kimball, and Koivu 2009, p. 134-138). What I cannot achieve here is to show the enquiry of relations between both necessary conditions and sufficient ones. This, however, would be the next step in analysis. This short presentation should have made clear that the use of the two-step approach in the analysis of necessary conditions has brought about much more information than a one-step analysis and thus has systematized the analysis. Therefore it supports the two-step approach's idea to formulate middle-range theories – even in the area of necessity. All in all it seems that its gains justify the little additional expenditure.

## 3) THE NOTION OF THE CONTEXT AFTER STEP ONE

There is another point about the two-step approach I want to illuminate: In their article (Schneider and Wagemann 2006, p. 761, 771) and in Schneider's monograph (Schneider 2009, p. 67) the authors speak of "outcome-enabling", "fostering" or "enhancing contexts" after step one. In my eyes that cries for clarification: All these attributes imply different theoretical statements about contexts and their effects. Whereas "enabling" in this regard

should mean that a certain outcome is exclusively possible because of the existence of the context in dispute (German: “ermöglichend”), what in turn seems to imply declarations about matters of necessity, “foster” and “enhance” (German: “fördern”) appear to come closer to a discussion about the contexts of an outcome since they make an outcome more likely. However, they do not warrant its occurrence.

Anyway, the decision on how to label the elicited contexts – and therefore to make it traceable for users – is up to two pivotal factors: 1) What kind of conditions do we examine? 2) How good are they at explaining the outcome?

When we investigate necessary conditions the notion of an outcome-enabling condition X seems justified since it is always present whenever the outcome Y occurs. This is due to the fact that necessary contexts are not underspecified, i.e. they don´t need other conditions to lead to the outcome. Or in other words: If X is absent, Y will be absent, too. Actually this applies to all necessary conditions irrespective of their remoteness/deepness/externality. Moreover, the qualification of a necessary condition increases by the use of higher consistency thresholds and is fully entitled when the conditions’ necessity is fully consistent. Otherwise in a few cases the outcome might also occur when the auspicious condition is absent. This will be indicated by consistency values lower than 1.

The research of sufficiency requires other labels of contexts though. They should be named “outcome-enhancing” because their existence does not guarantee the outcome. The model after step one is still underspecified. Whenever the contexts occur the outcome becomes *likely* as well, i.e. the contexts enhance the outcome but they don´t cause it alone. What leads to the outcome is the connection of the contexts and proximate conditions. Since proximate conditions raise consistency of the terms they close the gap between the “enhancing”-momentum of the terms of step one and really sufficient terms after step two.

To sum it up: When we talk of necessary contexts, we should conceive them as being outcome-enabling. When we talk of sufficient contexts, we should grasp them as being outcome-enhancing.

Moreover, it seems imaginable to introduce qualitative benchmarks for different notions of the context: As already mentioned there is a link between the consistency of a sufficient condition and its entitlement to be sufficient. The word “enhancing” in outcome-enhancing contexts indicates the connection of low consistency values with these values’ logical origin, i.e. the incomplete causal statement that deserves specification and thus improvement by the introduction of additional factors.[4] We are not looking for outcome-enhancing terms but really sufficient ones. That is why try to improve the outcome-enhancing character of terms to become really sufficient.

---

[44] That’s why the attribute “outcome-enhancing” only applies to contexts, but not to proximate/shallow/internal factors.

I will not venture a definite proposition here but it seems intuitive that the higher the consistency of the contexts the more justified it seems to speak of really outcome enhancing contexts which come very close to being sufficient alone – thus the higher the consistency of a context and the less the raise of consistency after step two the more enhancing (and sufficient) the context seems and the less important the proximate/shallow/internal factors seem.

Let me cite the following fictitious scenario for clarification: Scientist X has found two contextual conditions in step one of the analysis of CoD: Membership in the Western cultural zone (consistency: 0.7) and high socioeconomic development (consistency: 0.97). She could announce to have found two CoD-enhancing conditions. That is to say: These separate contexts are favourable to CoD. Both contexts therefore seem to be pretty good predictors of the outcome. However, the consistency values different from 1 indicate that in order to improve the causal statements further proximate conditions might be needed; conditions whose existence improves the initial model where it has shortcomings. These could be the factors “lack of occupational forces in recent time” or “elite consensus”.

But that’s not all we can read from these information: Since high socioeconomic development reveals higher consistency than membership in the Western cultural zone does, the first seems to enhance CoD much stronger. There is maybe one single case that speaks against this statement and that requires an individual explanation. Anyhow in almost all cases that display the condition the outcome occurs as well. Consequently it seems that the latter condition is somehow more sufficient than the first one. Both of them do not guarantee democratic consolidation. However, high socioeconomic seems to be a better guaranty for CoD than membership in the Western cultural zone is. I have already indicated that I do not dare a verbal qualification for varying consistent, sufficient conditions – it should be up to each investigator. The transparent causal interpretation of contexts referring to their consistency, however, would increase the information content of causal statements tremendously.

## 4) THE APPLICATION TO MVQCA AND CSQCA WITHIN TOSMANA

The two-step approach was exclusively intended for the use of fsQCA. Thus the only studies that make use of it are pure fsQCA studies, as well (e.g.Schneider 2009; Steglich 2010). I want to show how the module can be used for mvQCA and how it can be implemented in TOSMANA. By doing so I introduce a way to use the module for a csQCA within TOSMANA as well, of course.

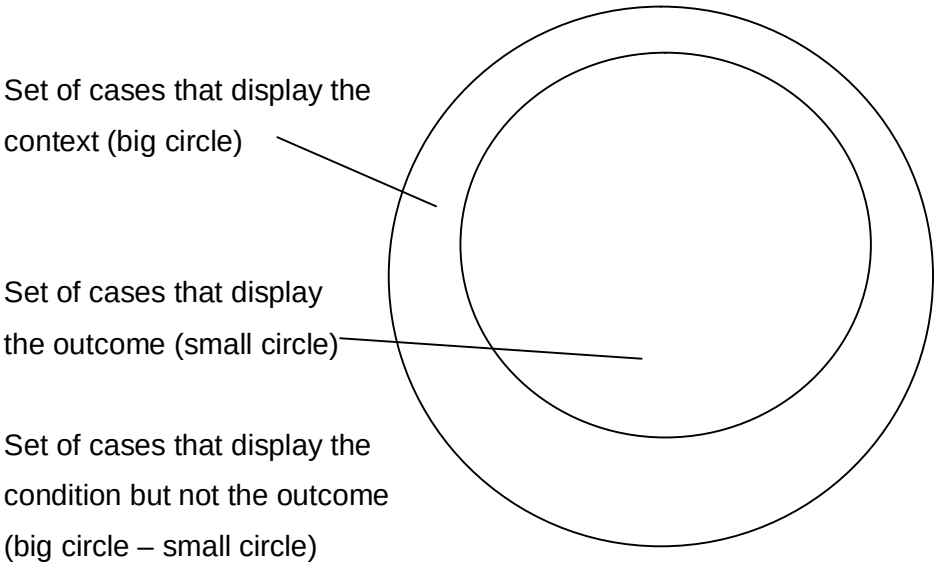
A two-level analysis (cf. Mahoney and Goertz 2005; Mahoney, Kimball, and Koivu 2009) can in principle be used in every social scientific study. The use of the two-step module, however, demands some modifications of the analysis process when applied to mvQCA.

The choice of conditions as well as the distinction of conditions according to one specified criterion is done as in the fsQCA two-step module. It's only the construction of QCA scales that differs, of course.

Step one: In step one remote/proximate/external (or other kinds) of conditions are in the main focus – as with the fsQCA two-step module. Thus we aim at eliciting outcome-enhancing contexts, i.e. configurations of conditions that share two features: First, they have the identical causal relation to the outcome (i.e. they are all remote/deep/external etc.) and, second, when combined they cannot predict the outcome to 100 per cent, that is the consistency values of the configurations are below 1.

How can we find out such contexts? We elicit them by allowing for contradictory cases while conducting the contextual-conditions-analysis (cf. Figure 2).

**Figure 2. Contradictory cases**




Source: Own compilation.

This means that configurations are admitted to the minimization process that do lead to the outcome and in some cases they do not (big circle in figure 2). Or in other words: All configurations will in sum be found for all cases where the outcome is present; however they are present in some cases where the outcome did not occur, too (area of the big circle – area

of the small circle in figure 2). However, this is in line with the strategy presented by Schneider and Wagemann because the causal explanations comprise a high number of cases (high coverage) *and* need further specification (low consistency). As with the fsQCA module logical remainders should be included into the analysis in order to gain parsimonious, undercomplex solutions. If there are few, unoccured combinations we can – basing on previous work and substantial theoretical knowledge – set them to 0 or 1 in the truth table. This *can* be done, but it need not. In every case it reduces the potential number of assumptions on logical remainders. All other logical remainders are included into the minimization process.

As with the fsQCA two-step module varying consistency values in step one indicate different degrees of quality: The more consistent a contextual configuration is, the less cases exist that exhibit the context but not the outcome and the stronger this context enhances the outcome.

Step two: The second step's job is to raise consistency, i.e. to solve the contradictory cases of the contextual terms and thus to specify the solutions (i.e. finding the conditions that have to be added to the contexts in order to get the small circle in figure 2). Hence in this step several mvQCAs have to be conducted: one for each subpopulation that is represented by one configuration:

1) So first of all, we have to create one data set for each contextual configuration.
2) Subsequently one mvQCA is conducted for each context and with all proximate/shallow/internal factors. However, the respective contexts are excluded from the second analysis step. We need not include them because they can be interpreted as perfect trivial, necessary and sufficient conditions *within* one data set. For the whole data set they are just sufficient conditions, of course. NB: The respective contexts have to be added to the QCA-formulas of the second step.
3) Here, again basing on previous work and substantial theoretical knowledge unoccured configurations can be set to 0 or 1. Other logical remainders should be set to 0. Of course, contradictories are excluded from minimization. The formula for the calculation of possible configurations is:

$$n=f_{1;k1} * f_{2;k1} * ...* f_{i;k1} + f_{1;k2} * f_{2;k2} * ... * f_{i;k2}$$

where n is the number of unique configurations and f the number of categories of one condition. Index i is the number of conditions in one step. K indicates the number of the step of analysis. We need not multiply the second factor with the number of contexts since the latter ones are not included in this analysis step. We can imagine this step as conducting several QCAs just with different case sets. From this perspective it is the combination of the

two-step approach with mvQCA that gets a grip on limited diversity and not the module alone since the formula is Schneider's and Wagemann's original formula modified for multinomial conditions. This follows from the fact that in mvQCA context conditions can be omitted in the second step, they work as a sort of grouping variables; this is, however, impossible in fsQCA since the contexts are needed in order to calculate the final terms. Nevertheless, in every case the module gets a grip on the number of assumptions on logical remainders, not logical remainders alone, because the first ones are allowed for only in the first step.

Let me give an example: Let´s say we examine whether the conditions A, B, C, D, E, F, G, and H are sufficient for the outcome Y. Let's furthermore say that A, B, C, and D are deep explanatory factors whereas E, F, G, and H are shallow ones and that A, C and G are trichotomous and all the others are dichotomous. Step one: The first-step mvQCA with the inclusion of contradictories and of logical remainders shows up three sufficient contexts: context 1: A(3)*B(1); context 2: C(2) and context 3: A(2)*D(1).[5] Whereas coverage of all three contexts should be very high, consistency is very low. Therefore, we have to conduct three analyses in step two: one for each subpopulation that is subsumed under one context. However, in this step only the conditions E, F, G, and H are included. If, for example, 12 cases are subsumed under context 1, we have to create a data set with these twelve cases first. Then we must analyse them with the help of the four shallow conditions. This process has to be done another two times – one for every other context. Let´s now say, that the shallow configurations for the context-1-group are E(1) and G(2), for context 2 it's E(0)*F(0) and for context 3 it's F(1)*G(3) + E(1)*F(1). Thus the final formula is:

A(3)*B(1)*E(1) + C(2)*E(0)F(0) + A(2)*D(1)*[(F(1)(G3) + E(1)*F(1)] à Y

According to the information above the number of possible configurations is 3 * 2 * 3 * 2 + 2 * 2 * 3 * 2 = 36 + 36 = 72 – compared to 864 configurations in a one-step QCA just a few. The number of logical remainders, of course, should be even lower since they are included into reduction only in step one. If there are configurations that have not occurred but which we can code basing on theoretical knowledge, there should even be less assumptions on logical remainders.

Values of coverage and consistency cannot be calculated by TOSMANA. Thus, it has to be done manually by the researcher. It must be recommended that these values are calculated both after step one and after step two. NB: Especially the calculation after step two must be based on all cases, not only the subpopulations.

[5] The number behind each letter indicates different categories. For dichotomous factors 1 indicates presence, 0 indicates absence. For multinomial conditions different numbers only indicate different characteristics.

## CONCLUSION

The objective of this article was to improve the chances of two-level analyses in QCA by enhancing Carsten Schneider's and Claudius Wagemann's methodologically promising two-step approach. This was partly achieved by clarifying the analytical merits of the two-level analysis implemented by this module: From this perspective the formula for calculating the numbers of possible configurations was corrected. Moreover, I have shown why the approach gets a grip on the numbers of assumptions on logical remainders anyhow.

What is more, I introduced some other distinction criteria for conditions: namely according to the externality of factors and their causal depth (corresponding to Kitschelt), next to the dimensions Schneider and Wagemann have introduced. This broadens the spectrum of potential studies that could make varying analytical use of the module while at the same time profiting from its methodological merit of reducing the number of assumptions on logical remainders in QCA. In other words: Other classification criteria made the two-step approach more flexible to various research interests. In this part I encouraged the reader to decide on his own whether he opts in favour of the established or one of the introduced classifications, particularly with regard to his research interest. I hope that I could clarify why and how the analysis of necessary conditions can be achieved with the help of the two-step approach. In addition I tried to contribute to the comprehension of the contexts of step one. That is to say the analysis of sufficient contexts elicits outcome-enhancing conditions, not outcome-enabling ones. It seems that the more consistent such contexts are, the less should their effect be called "enhancing" instead of sufficient, though. Finally, I argued for the application of the two-step module in various QCA techniques, i.e. especially in mvQCA and csQCA, technically implemented in TOSMANA. This broadens the number of potential studies that could use the two-step module once more.

I want to point out that all suggestions made in this article should be seen as mere propositions whose aim is to improve QCA as a research tool in general and the two-step approach in particular. I regard it as an outermost fruitful method that exhibits great potential for social science. Anyhow, it could profit from a lively and open discussion – as all methodical considerations. I am convinced that this article will not be the last word on the subject.

## References


Braumoeller, Bear F., and Gary Goertz. 2000. "The Methodology of Necessary Conditions." *American Journal of Political Science* 44 (4):844–58. http://www.jstor.org/stable/2669285?cookieSet=1.

Cronqvist, Lasse. "Introduction to Multi-Value Qualitative Comparative Analysis." http://www.tosmana.net/resources/introduction_to_mvqca.pdf.

——. 2007. *Konfigurationelle Analyse mit Multi-Value QCA als Methode der Vergleichenden Politikwissenschaft mit einem Fallbeispiel aus der Vergleichenden Parteienforschung. (Erfolg Grüner Parteien in den achtziger Jahren).* http://archiv.ub.uni-marburg.de/diss/z2007/0620/pdf/cronqvist.pdf (January 12, 2010).

——. 2011. *Tosmana - Tool for Small-N Analysis. Version 1.3.2.Trier.* http://www.tosmana.net/.

Downing, Brian. 1992. *The military revolution and political change:. Origins of democracy and autocracy in early modern Europe*. Priceton, NJ: Princeton University Press.

Fritzsche, Erik. 2010. *Explaining Parliamentary Party Unity. QCA as a Research Tool for Comparative Legislative Studies*. Dresden.

Goertz, Gary. 2006. "Assessing the Trivialness, Relevance, and Relative Importance of Necessary or Sufficient Conditions in Social Science." *Studies in Comparative International Development* 41:88–109.

Goertz, Gary, and Harvey Starr. 2003. *Necessary conditions. Theory, methodology, and applications*. Lanham, Md.: Rowman & Littlefield.

Kitschelt, Herbert. "Accounting for Outcomes of Post-Communist Regime Change: Causal Depth or Shallowness in Rival Explanations?". https://netfiles.uiuc.edu/fesnic/fspub/1_Kitschelt_1999_Mechanisms.pdf (January 18, 2010).

——. 2003. "Accounting for Postcommunist Regime Diversity: What Counts as a Good Cause?" In *Capitalism and Democracy in Central and Eastern Europe. Assessing the Legacy of Communist Rule,* eds. Grzegorz Ekiert, and Stephen E. Hanson. Cambridge (UK)  New York: Cambridge University Press, 49–86.

Linz, Juan, and Alfred Stepan. 1996. *Problems of Democratic Transition and Consolidation. Southern Europe, South America, and Post-communist Europe*. Baltimore, Md.: Johns Hopkins Univ. Press.

Lipset, Seymour Martin, and Stein Rokkan, eds. 1967. *Party Systems and Voter Alignments: Cross-National Perspectives*. New York.

Mahoney, James, and Gary Goertz. 2005. "Two-Level Theories and Fuzzy-Set Analysis." *Sociological Methods and Research* 33 (4):497–538.

Mahoney, James, Erin Kimball, and Kendra L. Koivu. 2009. "The Logic of Historical Explanation in the Social Sciences." *Comparative Political Studies* 43 (1):114–46.

Mannewitz, Tom. 2010. "Alte Bekannte im neuen System:. Gründe für die Aufstiege und Niedergänge der mittelosteuropäischen Postkommunisten seit 1990." *Zeitschrift für Vergleichende Politikwissenschaft* 4 (2):261–93.

Patzelt, Werner J. 1997. "Der RAGIN-Ansatz. Eine Einführung samt weiterführenden Ideen." Dresden.

Ragin, Charles C. 1987. *The Comparative Method. Moving beyond qualitative and quantative strategies*. Berkeley: Univ. of California Press.

——. 2000. *Fuzzy-set Social Science*. Chicago: Univ. of Chicago Press.

——. 2006a. "Set Relations in Social Research: Evaluating Their Consistency and Coverage." *Political Analysis* 14 (3):291–310.

——. 2006b. *User's Guide to Fuzzy-Set/Qualitative Comparative Analysis.* http://www.fsqca.com.

——. 2008. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago.

Ragin, Charles C., and Sonnett, John. "Between Complexity and Parsimony: Limited Diversity, Counterfactual Cases, and Comparative Analysis." http://www.compasss.org/pages/resources/wpfull.html (January 04, 2011).

Rihoux, Benoît, and Charles C. Ragin, eds. 2008. *Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques*. Thousand Oaks: Sage.

Schneider, Carsten Q. 2009. *The consolidation of democracy. Comparing Europe and Latin America*. Milton Park, Abingdon, Oxon: New York.

Schneider, Carsten Q., and Claudius Wagemann. 2003. *Improving Inference with a Two-step Approach: Theory and Limited Diversity in fs/QCA.* EUI Working Papers. 2003/7. European University Institute. San Domenico di Fiesole.

——. 2006. "Reducing Complexity in Qualitative Comparative Analysis (QCA): Remote and Proximate Factors and the Consolidation of Democracy." *European Journal of Political Research* 45 (5):751–86.

——. 2007. *Qualitative Comparative Analysis (QCA) und Fuzzy Sets. Ein Lehrbuch für Anwender und jene, die es werden wollen*. Opladen: Budrich.

Steglich, Henrik. 2010. *Rechtsaußenparteien in Deutschland. Bedingungen ihres Erfolgs und Scheiterns*. Göttingen: Vandenhoeck & Ruprecht.

Vink, M. and O. van Vliet (2009). "Not quite crisp, not yet fuzzy? Assessing the potentials and pitfalls of multi-value QCA.“ *Field Methods*, 21(3) 265-289.