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**“Set theoretical concept formation and formalization.  
A concept structural approach to compliance in the  
European Union”**

**– WORK IN PROGRESS, PLEASE DO NOT CITE WITHOUT PERMISSION –**

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## 1. Introduction

This article addresses the question of how a set theoretical understanding of concept structures can link concept formation to formalization and empirical analysis. Drawing on the work of Gary Goertz in *Social Science Concepts*, four approaches of integrating concept structures in research designs are developed. Illustrating a mid-range approach, basic relations between the correctness of compliance in the European Union and the willingness as well as ability to comply are established at the conceptual level. By making use of concept structures, the construction of an analytical framework that can subsequently be applied via set theoretical methods such as Qualitative Comparative Analysis (QCA) is prepared. To achieve this goal, the logic of necessary and sufficient conditions as well as the family resemblance structure are first illustrated in reference to Goertz' 'concept construction and use' within the social sciences. Second, four approaches of different scope to apply concept structures within socio-scientific research designs are developed. Third, an exemplary mid-range approach is explored in more detail, seeking to provide general explanatory pathways for correct compliance in the European Union. For this purpose, several sources of explanatory factors are extracted from 30 years of compliance literature. Based on these sources, general explanatory patterns are subsequently conceptualized as logical conditions expected to account for the outcome 'correct compliance' and its conceptual attributes. Conditions and outcomes are integrated into an analytical framework that can be formalized and applied for different purposes through set theoretical methods. Adopting a set theoretical perspective, the article seeks to link concepts and their construction to empirical analysis through concept structures, ultimately enabling structured and conceptually founded empirical research designs of different scopes.

## 2. Concept structures and set theoretical formalization

Concepts play an important role in the social sciences both as part of theories and to give systematic meaning to the categories used in quantitative and qualitative research. However, their specification and application has not received much attention in the scientific literature so far. A notable exception is Gary Goertz' approach to concept structures, which constitutes a systematic approach to *concept construction and use*, which he introduces in his 2006 book *Social Science Concepts*. As the author points out, it is based on the logic of necessary and sufficient conditions as well as the family resemblance structure. Not only does he clarify how multi-level concept structures can be formalized, but also how concept structures can be understood from a set theoretical perspective. This section will introduce important aspects of Goertz' approach and provide some basic information about set theoretical formalization.

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Quantitative social science is usually grounded in a correlational and factor-analytical understanding, accompanied by the use of statistical methods (see Goertz 2006: 66). It analyses the additive effects of certain *independent* variables on *dependent* variables, i.e. each of the former adds a certain amount to the ‘explanation’ of the latter. Inherently, the relationship between explanatory factors and explainable factors is one of correlation and probability. Essential to this perspective is the assumption of covariance, according to which systematic relationships between changes of independent and dependent variables must exist. More than that, the cause-and-effect principle has to be met, causes must thus occur chronologically before their alleged effects. Lastly and equally valid for set theoretical approaches, no alternative explanations for the relationships under investigation should exist in ideal theory, although this can often only be ensured to a certain extent empirically. Conducting such analyses thus regularly involves the measurement of statistical relationships between the variables, which is either complemented by non-statistical information (for example, the chronological order within the process in question) in order to allow for statements about the underlying causality, or causal presuppositions are incorporated into the statistical analysis (for example, in the case of regression analysis). As a consequence, insights about the underlying causality are not actually discovered or proven through statistical method, i.e. correlation does not imply causation. Instead, causal inferences are theoretically assumed or gained by other means.

In contrast, Goertz’s approach in *Social Science Concepts* is based on a different conception of causality and a different relationship between the *explanans* of a phenomenon on the one hand, and the phenomenon itself on the other, which the author describes as “structural principles for constructing multidimensional and multilevel concepts” (Goertz 2006: 7) in the context of social sciences.<sup>1</sup> According to Goertz, the first principle dates back to Aristotle and employs the structure of necessary and sufficient conditions in order to define concepts: “Each of these necessary conditions is a secondary-level dimension: the structural glue that binds the secondary-level dimensions together to form the basic level is the mathematics of necessary and sufficient conditions” (ibid). A certain conjunctive occurrence of several attributes is considered necessary (and sufficient) to account for the presence of a certain concept, for example  $A*B*C = Y$  (necessary and sufficient condition). This combination of attributes represents a well-defined and complete description of the underlying concept. In this sense, the Aristotelian take on formal logic and its application by Goertz as a structural principle to

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<sup>1</sup> It should be noted that Goertz and Mahoney (2012) also introduce an alternative approach to statistical methodology based on set theory in their book *A Tale of Two Cultures*.

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construct concepts can be described as a *classical category*, precisely because it is exhaustively defined (see Collier and Mahon 1993; Goertz 2006).

Goertz also mentions the family resemblance structure as a second structure principle, which emanates from the work of Wittgenstein and to some extent serves as a counterpart to the first principle. This structure does not contain classical necessary (and sufficient) conditions, but merely requires a resemblance of dimensions to count as “part of the family” (Goertz 2006: 7). Expanding from this less strict way of defining concept, the family resemblance structure can be linked to so called *radial categories*, which are based on the assumption that some attributes may be sufficient to account for the presence of a certain concept, but other possibilities should also be taken into account, for example  $A*B + B*C + A*C \rightarrow Y$  (see Lakoff 1987; Collier and Mahon 1993). In this sense, the underlying concept is not exhaustively or exclusively defined by a specific conjunction of conditions, but instead described within a certain concept without excluding different descriptions in other contexts.

Both construction principles are at least implicitly based on Boolean algebra as the mathematical foundation of formal logic and set theory, which is why they can be formalized accordingly when expanded to in-between concept relationships. One method (among others) suitable for the formalization of logical relationships is QCA. At its core, QCA constitutes a methodological framework for the analysis of *sufficiency relationships*, or, more precisely, so called INUS conditions (insufficient but necessary parts of a condition that is unnecessary but sufficient for the outcome; see Mahoney, Kimball and Koivu 2009: 126). What is usually referred to as ‘a cause’ in colloquial speech in many cases could be described as an INUS condition, because causes are often parts of a conjunction of several necessary attributes that in conjunction form one sufficient cause among others for an outcome. For example, pressing a light switch in a strict sense is not on its own causing the light to turn on, but it is a necessary part of a conjunction of several attributes – conduction material, connection to a power source, a functioning light bulb. Taken together, these necessary attributes form a sufficient condition for the light to turn on. On their own, each can be described as an INUS condition, because several other sufficient conditions (consisting of different necessary parts) for a light bulb to lighten up exist, for example a bicycle headlight operated by a low-power magneto that produces alternating current through friction when the bicycle wheels move at a certain speed.

In contrast, the cause of the First World War could be named as an example from the social sciences. The assassination of Archduke Franz Ferdinand of Austria in Sarajevo might colloquially be referred to as having ‘caused’ the war, yet it can be shown that the underlying causality is quite complex and involves several different causal chains and links that include

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structural, security-related, economic, and cultural attributes among others. These may be necessary and/or sufficient for subsequent causal links, before the chronologically closest necessary and sufficient causes for the outbreak of the war can be identified (see, for example, Goertz and Levy [eds] 2007, in particular Mahoney 2007). Several among these causal attributes and conditions are in fact INUS conditions, i.e. sufficient causes (consisting of insufficient but necessary parts) for their immediate outcome in the causal chain that ultimately ends in a final outcome – the outbreak of the First World War.

In reference to Aristotelian logic, Goertz argues that the logical operator AND generally represents the logic of necessary (and sufficient) conditions, because it links several logically necessary conditions, which in conjunction become sufficient to account for a specific outcome (in the case of one solution). What is not accounted for in this understanding – and arguably goes beyond the Aristotelian take on necessary and sufficient conditions – is that a sufficient condition that links several INUS conditions through the logical operator AND can represent only one among several possible sufficient explanation for the outcome. This alludes to the notion of equifinality, which is where the logical operator OR comes into play. It links several equifinal (i.e. equally valid, but separate) sufficient conditions that each lead to the outcome in question. Goertz points out that the logical operator OR is closer linked to the family resemblance structure, because not a specific combination of necessary (or, more precisely, INUS) conditions, but the mere presence of any  $m$  out of  $n$  conditions is sufficient to explain an outcome (Goertz 2006: 45).<sup>2</sup> Linking the Aristotelian logic of necessary and sufficient conditions to the logical operator AND and the Wittgensteinian family resemblance structure to the logical operator OR seems to be a valid perspective to clarify the complex relationships between formal logic, set theory, Boolean algebra, and structural principles for constructing concepts. Nonetheless, it does not seem to be an inevitable connection to make. The Wittgensteinian idea that any combination of  $m$  out of  $n$  conditions constitutes a sufficient description of a concept is not the *exact* same thing as what the logical operator OR represents within Boolean algebra and formal logic, namely a link between different equifinal combinations of sufficient (combinations of) conditions for an outcome. At its core, OR seems to signify equifinality above anything else, whereas the operator AND seems to signify the conjunctive nature of logical relationships.

Similar to how AND is related to INUS conditions when referring to combinations of several attributes, the operator OR is on a basic level connected to so called SUIN conditions (sufficient but unnecessary parts of a condition that is insufficient but necessary for the

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<sup>2</sup> In set theory, the corresponding links are called ‘intersection’ for AND and ‘union’ for OR.

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outcome), in that it connects several attributes that are on their own sufficient parts of a higher-order condition that is necessary for an outcome (see Mahoney *et al.* 2009: 126). This type of condition does not seem to appear as often in the social sciences as INUS conditions, which are present whenever *sufficiency* is expressed and the statement includes the logical operators AND and OR each at least once (Schneider and Wagemann 2012: 328). In contrast, SUIN conditions are present whenever *necessity* is expressed and the statement contains both AND and OR at least once (*ibid.*: 333). An example for SUIN conditions is the presence of a representative electoral system OR a majoritarian electoral system, two necessary but insufficient parts, which taken together constitute one of several necessary conditions for democracy.

In sum, five basic types of set theoretical relationships can be assumed:

- Sufficient conditions such as  $A \rightarrow Y$ ; for example, democratic dyads (or two countries), which constitute a sufficient condition for peaceful dyads
- Necessary conditions such as  $A \leftarrow Y$ ; for example, non-democratic dyads, which constitute a necessary condition for dyads at war
- Necessary and sufficient conditions such as  $A = Y$ ; for example, a temperature of 100 °C at normal air pressure constitutes a necessary and sufficient condition for the evaporation of water<sup>3</sup>
- INUS conditions such as the individual parts in  $(A*B) + (C*D) \rightarrow Y$ ; for example, a combination of high deficit AND weak unions OR a combination of economic crisis AND conservative government, both of which constitute a sufficient condition for welfare state retrenchment
- SUIN conditions such as the individual parts in  $(A+B) * (C+D) \leftarrow Y$  and expanded to forms such as  $(A+B) * (C+D) \leftarrow Y$ ; for example, resignation OR impeachment of a head of government constitute one necessary condition for government termination.

Set theory relies on various ways to define sets. The traditional mathematical understanding of sets can be linked to Aristotelian propositional logic, which ascribes one of two values to each proposition in a speech act, for example ‘true’ and ‘false’, or ‘0’ and ‘1’. As a consequence, conditions in this understanding will be formalized dichotomously, i.e. the elements of a set are either not at all (0) or completely (1) members of a set. In the case that the subjects of investigation are non-dichotomous conditions, fuzzy logic as an extension of classical logic comes into play. While it maintains the (qualitative) difference-in-kind of crisp sets, it adds a

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<sup>3</sup> It is difficult to provide a true example for a single condition that is both necessary and sufficient within the social sciences, because this type of logical condition constitutes a perfectly deterministic relationship, which cannot be expected to truly exist empirically.

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(quantitative) difference-in-degree between cases that are qualitatively identical to the traditional understanding of sets (Schneider and Wagemann 2012: 27). Fuzzy sets allow for different degrees in membership, i.e. an element no longer has to be fully out of or in a set, but may take on any possible value, for example 0.2 or 0.6 (ibid: 13-14). In fact, they can take on any value between 0 and 1, depending on their valence and including a quasi-continuous calibration<sup>4</sup>. Values below the so called breaking or crossover point (usually 0.5 on a 0-to-1 scale) thus lie more out of the set, while values above lie more in the set. In this sense, fuzzy sets represent a generalization of traditional sets, because the latter can be understood as a special case of the former (see Ragin 2000: 6-14; Schneider and Wagemann 2012: 15). It should be noted that the ‘fuzzy’ in fuzzy sets does not imply a lack of empirical clarity or precision, but is related to “*conceptual boundaries* that are not sharply defined rather than imprecise *empirical measurement*” (ibid: 27; orig. emphasis). Schneider and Wagemann illustrate this conceptual uncertainty by discussing the concept of baldness, where the exact boundary between a bald and a non-bald person is conceptually hard to pinpoint in a precise manner.

Fuzzy sets enable a researcher to express conceptual imprecisions about the state of things, reflecting notions such as ‘a bit’, ‘mostly’, ‘barely’, and so on. As Schneider and Wagemann (2012: 30-31) point out in reference to Altman and Pérez-Liñán (2002: 91) as well as Eliason and Styker (2009), this may lead some to confuse set memberships and (statistical) probabilities. In fact, they are two very different things. Following Schneider and Wagemann and in reference to other works such as Zadeh (1995), probability theory and fuzzy logic are not competing for the same goal, but complementary approaches – as implied by the title of Zadeh’s article. Most importantly, they describe *different types* of uncertainties. The difference between set theoretical and probabilistic approaches can be illustrated as follows:

„Imagine two water glasses, each containing a different liquid, and about which the following is known. Glass A contains a liquid that has a 1 percent probability (0.01) of being poisonous. Glass B, on the other hand, contains a liquid that has a fuzzy-set membership score of 0.01 in the set of poisonous liquids. When forced to choose between the two (and assuming that we do not have suicidal tendencies), which glass is safer to drink?” (Schneider and Wagemann 2012: 31).

The answer to this question is obviously ‘glass B’. A fuzzy set membership of 0.01 in the set of poisonous liquids merely means that the liquid in glass B is nearly fully out of the set of – or virtually not a member of the category called – poisonous liquids. Thus, it only contains a very

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<sup>4</sup> Calibration is basically the stage of operationalization within set theoretical methods, involving a variety of demanding tasks. In particular, a clear and (ideally) theoretically-driven definition of the concepts behind each condition and outcome is essential. Additionally, definitions of what constitutes membership for each degree within a given set, and assigning values to the anchors and the different set membership degrees based on a strong conceptual foundation are necessary steps in the calibration procedure.

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weakly poisonous liquid such as the energy drink invoked by the authors. In contrast, it is unknown what glass A contains. Among 100 glasses, one will be a full member of the set of poisonous liquids and thus fatal for the drinker, while all other glasses will be filled with water. Put differently, drinking glass A will lead to death in one percent of cases, because it belongs to a population of 100 glasses one of which will be fatal. In a worst-case scenario, drinking from glass B might lead to a slight stomach unease, as Schneider and Wagemann explain (ibid). Adding to their illustration, imagine that the ‘probability glasses’ (A) are filled with liquids through two different tubes, one of which transports water from a container, the other is connected to another container filled with a fatal poison. In 99 out of 100 cases, the glasses are filled through the tube connected to the water container. One of the glasses is instead filled through the tube connected to the poison container. In contrast, the ‘set theoretical glasses’ (B) are filled through a single tube only, connected to an energy drink container.

As Schneider and Wagemann (2012: 31) argue, thinking about concepts must be adjusted in order to understand set theoretical methodology in the social sciences, in particular with regard to the underlying case-based approach to analysing phenomena. Cases are understood by way of memberships in pre-defined sets. As noted above, crisp sets can be interpreted as a special case of fuzzy sets, because they only allow for memberships fully out of the set or fully in the set, thus requiring dichotomized concepts. Fuzzy sets, however, are more generalized in comparison and they require defining three qualitative anchors: the full absence of a concept (0), the point of complete indifference or breaking point (0.5), and the full presence of a concept (1). Qualitative increments for different degrees in membership must also be specified, each containing ‘lingual qualifiers’ for the data, i.e. corresponding lingual expressions. Again, it is essential to understand that set memberships are *not* probabilities of belonging to a certain set. Instead, “[t]he uncertainty expressed in fuzzy sets stems from conceptual rather than empirical imprecision, which, in turn, is inherent to most verbally defined concepts – especially those in the social sciences” (ibid). It is precisely because of this reason that research designs in the social sciences can be enriched by following set theoretical approaches that make use of concept structures to construct concepts. Adding to that, many (qualitative) studies often implicitly frame concepts in set theoretical terms and relationships, lending themselves to this perspective on causality and conceptual categories (see Goertz 2006 for numerous examples).

### **3. Concept structural research designs**

There are different possibilities to apply concept structural approaches to actual research projects, two of which Goertz portrays in *Social Science Concepts*. To begin with, existing



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concepts as such or when embedded within theories can simply be revisited using concept structures, if they can be expressed through the Aristotelian logic of necessary and sufficient conditions or the Wittgensteinian family resemblance structure. This may be called the *reconstructive approach* to concept structures. Goertz applies it throughout his book in order to illustrate his approach and give practical examples of the implicit usage of different principles and tools provided by concept structures (see Goertz 2006: Ch. 2 and 9). The reconstructive approach sheds light especially on those socio-scientific studies that are not structured in a clear and stringent way. It can be used to highlight the structures inherent in such studies, improving their clarity and understanding. Finally, revisiting existing work in this manner can contribute to how concepts and theories are developed in future research (see *ibid*: 268).

Goertz uses Skocpol's theory of social revolution at various stages of his book to illustrate his perspective. At what he calls the basic level, this theory assumes that both peasant revolt AND state breakdown are necessary and in conjunction (jointly) sufficient for the outcome 'social revolution' (Goertz 2006: 246, 248). This is the main causal connection within the theory and can be formally written as  $A*B = Y$ .<sup>5</sup> At the so called secondary level (i.e. the level of indicators), Skocpol theorizes that peasant revolt can be produced by either peasant autonomy and solidarity OR landlord vulnerability, each of which constitutes a sufficient (i.e. equifinal) secondary-level cause. State breakdown, on the other hand, is produced by either dominant-class leverage OR agrarian backwardness OR international pressure. Again, the underlying logical relationship is one of equifinality, i.e. each element is considered a sufficient cause for state breakdown (*ibid*: 248-249). These relations can be formally written as  $C+D \rightarrow A$  and  $E+F+G \rightarrow B$ . Finally, Skocpol's theory also includes secondary-level attributes related to the outcome concept 'social revolution'. While the basic level is linked to its indicators causally, the outcome is defined by its secondary-level attributes, i.e. the relationship is 'ontological'. According to this concept, social revolution is fully described by a conjunction of state transformation and class revolts and class transformation. Therefore, these three attributes are all necessary on their own and jointly sufficient to describe what social revolution is. This relation can be formally written as  $Y == H*I*J$ .<sup>6</sup> Taken together, these relationships make up the complete concept structure of Skocpol's theory of social revolution (*Figure 9.1*, *ibid*: 247).

On the other end of the spectrum lies the set theoretical development of new concepts based on sound theoretical considerations as well as Goertz' concept structural tools, combined

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<sup>5</sup> The symbol '\*' stands for the logical operator AND (i.e. a logical conjunction); '=' for a relationship of both necessity and sufficiency between conditions and outcome; '+' for the logical operator OR (i.e. equifinality); '==' for an ontological relationship between conditions and outcome.

<sup>6</sup> Although similar, H, I, and J are not INUS conditions, because their conjunction is necessary and sufficient.

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with an empirical analysis using QCA or other methods based on formal logic. I call this the *comprehensive approach*, because it combines two distinct and independent dimensions: conceptual and explanatory/empirical. It involves constructing a comprehensive set theoretical concept according to the author's guidelines, which is subsequently used as a foundation for the empirical analysis based on set theoretical tools or methods, to which concept structures are 'naturally' linked. Comprehensive in this context does not allude to a 'world system', which would be constructed by a potentially infinite number of conditions and would not lead to empirical research. Rather, the approach accounts for the full spectrum from pre-empirical concept construction to practical analysis via formalized set theoretical analysis. QCA, for example, could be perceived as a method that lends itself to this purpose, because just like Goertz' understanding of concept structures, it is based on formal logic. As cited above, the author encourages this kind of application of concept structures for future research projects, facilitating the argument that many studies within the social sciences lack systematic concept building and thus fail to pay attention to this important aspect of connecting theories and their practical application: "Without valid concepts, our theories have little value." (ibid).

As an example for a comprehensive approach to concept structures, one can counterfactually imagine that Skocpol designed his theory of social revolution based on a set theoretical approach, using concept structures to construct the theoretical framework. Instead of reconstructing his arguments *ex post*, one possible comprehensive approach would entail that the concept structure described above were to be established *a priori* and integrated into the theorising stage. Additionally, conducting an empirical analysis of several cases of social revolutions using QCA or a similar set theoretical method would also be a step necessary within a comprehensive approach. This, of course, implies that the logical conditions on the basic and indicator level would have to be calibrated for the subsequent empirical analysis, and that the case selection would have to be conducted according to set theoretical and concept structural guidelines (see, for example, Goertz 2006; Goertz and Mahoney 2012). The subsequent results would then prove the theory correct or incorrect, possibly leading to a fit of the underlying framework. As comprehensive approaches put set theoretical analysis at the centre of the empirical research design, this means that any additional case studies would result from the set theoretical analysis (via QCA or other similar methods). For instance, contradictory cases from the set theoretical solution terms could be subsequently analysed in more detail to resolve the contradiction and to shed light on such 'outliers'. Ideally, this approach also includes an empirical analysis on the outcome side, either *ex post* by testing a theoretically constructed concept of the outcome in the case of classical outcome concepts, or *a priori* by analysing a

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selection of possible secondary-level attributes in the case of radial outcome concepts.<sup>7</sup> A different type of comprehensive approach could make use of the set theoretical empirical analysis to enable the construction of a concept structure instead of testing an existing concept structural theory. Here, basic causal conditions and indicators would be calibrated, and a QCA or similar set theoretical method would be conducted in order to find the exact nature of the underlying logical relationships between conditions and outcome. This course of action also entails a set theoretical case selection. As in the first comprehensive approach, this type should include an empirical analysis of the outcome concept, either *ex post* or *a priori*.

Beyond these approaches, at least two intermediate ways of applying Goertz' approach may be considered: What can be called the *mid-range approach* also combines the conceptual and explanatory dimensions, but it relies on one dimension only – theoretical or empirical – to construct the underlying concepts, and it comes with a narrower focus within the given research design. It involves a concept structural setup of the analytical framework, guided by either theory or empirics, as well as its empirical realization via QCA as the explanatory component. While the comprehensive approach usually puts the set theoretically constructed concepts and their empirical evaluation at the centre of a research project, mid-range undertakings may have a narrower scope, restricting the concept structural part and its analysis to a specific part of the design. Such approaches deal with causal relationships at the conceptual level as well as causal processes. Empirically, case studies may play an important role in addition to conducting a QCA. The concept structural model presented in this article is an example of a mid-range approach, and it will be addressed in the next section. While no comprehensive theoretical and empirical concepts are developed, an intermediary connection between theoretical and/or conceptual aspects of a research project are linked to a QCA-based empirical analysis through a concept structure. In the case at hand, this is achieved by developing a specific model, which is then used to execute the empirical analysis.

Continuing the counterfactual example of Skocpol's work on social revolutions, a mid-range approach could consist of a more narrow theory-guided construction of the concept 'social revolution', i.e. describing the basic and secondary levels in terms of logical relationships, but without necessarily embedding it in the development of the theoretical argument. For example, the concept structure could be constructed after developing the theoretical argument (or even after conducting case studies to illustrate the theory), followed

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<sup>7</sup> Following Collier and Mahon (1993), classical categories imply the absence of conceptual variance, because they are exhaustive and thus well defined. In contrast, a radial category is not exhaustive, but it allows for various empirical combinations within a given concept. In the case that concept formation is addressed not as a result of an empirical analysis, but as a step towards it, theoretical considerations and not empirical data become the guiding principle for the formation of concepts.

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by an empirical analysis via QCA. This empirical application could in turn be restricted to the main causal relationship, which in the case of Skocpol is PEASANT REVOLT \* STATE BREAKDOWN = SOCIAL REVOLUTION. An additional difference to the comprehensive approach is a more lenient exposure to set theoretical case selection (see Goertz 2006: Ch. 6-8), in part resulting from the smaller scope of set theoretical analysis within the overall research design. While the former puts set theoretical conceptualization and empirical analysis (including case selection) at the centre of the research design, the latter treats concept structures and empirical analysis as a part of a wider design. Mid-range approaches are thus focused on investigating one particular aspect through set theoretical methods, which can subsequently be embedded in various research designs instead of being their main focus. Aside from this rather 'isolated' usage of concept structures, application in the context of mixed or multi method research is also a possibility, for example by complementing statistical methods, qualitative case studies or process tracing techniques.

Finally, a *low-range approach* of applying concept structures involves only the conceptual dimension and consists of structuring empirical research designs through concept structural considerations or illustrations, but without building comprehensive concepts or actually combining them with set theoretical empirical analysis. Realizing that a research design explicitly or implicitly makes use of conditional logic or family resemblance and illustrating it accordingly can contribute to a better understanding of how analytical frameworks assess empirical reality and helps to clarify the 'explanatory logic' upon which an approach is based. This holds true for both the scholars themselves and the audience of their work, because – similar to the reconstructive approach – visualizing logical conjunctions and causal paths that are part of theoretical frameworks can benefit their rigor and structure. The low-range approach is thus aimed at mapping concepts that are vertically and/or horizontally related to each other. Compared to the mid-range perspective, where causal relationships and processes are necessarily assumed, the former deems them sufficient. With regard to the reconstructive and low-range approaches, it should be noted that no empirical analysis via QCA or other set theoretical methods is conducted. This does not mean, however, that concepts from these perspectives somehow lack an empirical perspective. Quite to the contrary, concept construction *can* be (but need not be) based on empirical cases, for example within factor analysis, latent class analysis or QCA at the concept formation level.

For example, concept structures as a tool to help structure qualitative research designs could be used in a case study or process tracing research design. Again counterfactually discussing Skocpol's theory of social revolution, a low-range approach would illustrate the

theoretical framework in concept structural terms without altering the empirical design. Therefore, Skocpol would have followed this approach if he himself had already used the concept structure that Goertz extracted from his work 27 years later, with the aim to clarify all causal and ontological relationships embedded within the theory and the concepts involved. Existing empirical analysis, for example case studies of social revolutions, would be independent from the concept structure insofar as no set theoretical method would be involved. Nonetheless, making one’s concepts and theory as well as the underlying causal and ontological relationships explicit can also improve the subsequent empirical analysis, because references to the logical relations, causality and conceptual attributes can contribute to the clarity of its results and the connections between theoretical, conceptual, and empirical levels.

To sum up, the main substantial difference between the different approaches lies in the introduction of causal analysis. On the one hand, the reconstructive and low-range approaches do not imply a causal analysis of empirical data, but – if at all – a mere illustration of existing expectations about causal relations (low-range) or an *ex post* illustration of causal links (reconstructive). On the other hand, the mid-range and comprehensive approaches imply at least some kind of empirical analysis that either tests existing concepts (mid-range) or constitutes a part of the concept formation process (comprehensive). Therefore, the difference is one of scope: adding an additional structuring layer to a research design versus making set theoretical concept formation a constitutive part of the undertaking. The four approaches and their content with regard to the two dimensions are illustrated in *Table 1*. In the next section, an example of a mid-range approach to using concept structures will be explored in more detail by showing how to construct a set theoretical model of compliance in the European Union.

**Table 1:** Four approaches to applying concept structures

<i>dimension approach</i>	<b>conceptual</b>	<b>empirical</b>
<b>comprehensive</b>	comprehensive concept formation on the basis of concept structure guidelines	explanation by means of empirical methods based on formal logic
<b>mid-range</b>	concept structural analytical framework	explanation by means of empirical methods based on formal logic
<b>low-range</b>	illustration of research designs by means of concept structures	no empirical analysis by means of methods based on formal logic
<b>reconstructive</b>	simple reconstruction of existing concepts by means of concept structures	simple reconstruction of existing results, no independent empirical analysis

*Source:* author’s illustration

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#### 4. A mid-range approach to compliance in the European Union

As stated above, an analytical framework based on Goertz's concept structures will be constructed to analyse compliance in the European Union, illustrating the mid-range approach to set theoretical concept formation. The framework includes several conditions under which 'correct compliance' can be achieved. These conditions are aggregated from within the research literature and, as a consequence, allow for conclusions about the correctness of compliance as well as the deduction of ideal types. Reviewing the literature on EU compliance first allows to identify several sources of influences. Aggregating explanatory factors from each source subsequently leads to certain closely related categories, which in turn make up general and broad explanatory patterns or clusters. These very clusters are conceptually represented as logical conditions within the analytical framework. In this context, it should be noted that the categories prescind from specific operationalizations and indicators used within the scientific literature, i.e. they each contain various factors that fall under the same explanatory mechanism.

##### *Extracting conditions for the correctness of compliance*

The following section features a short overview of the literature on compliance in the European Union as the basis for extracting the most important explanatory patterns. A crucial step towards understanding the complex relationships in this field is to systematically categorize the explanatory factors which have been deemed relevant in the literature. Doing so helps disentangle the intricacies of the phenomenon to a certain extent. In addition to a loose differentiation between different phases of research on compliance in the EU (see, for example, Falkner *et al.* 2005; Mastebroek 2005; Kaeding 2007; Berglund 2009; Treib 2014), the following literature overview also groups factors into two categories, each with three different dimensions. Thus, the extensive and heterogeneous pool of relevant<sup>8</sup> factors is structured through meaningful and discriminating categories, thereby highlighting differences and commonalities between them. In addition, these categories clarify the aggregated explanatory patterns, which are subsequently represented by six conditions within the analytical framework. For this purpose, three different *sources* of factors or factor aggregates are differentiated, i.e. *actor*, *structure*, and *context*. This category accounts for the widely used dichotomy between actor and structure, which is often expressed through the choice for a specific theoretical approach or at least through the type of explanatory factors analysed. Additionally, the specificity of a given process of compliance is accounted for by the context dimension. Literature reviews of EU compliance research often reveal that explanatory factors generally

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<sup>8</sup> A factor is considered relevant when it is part of a positive explanation of compliance in at least one study.

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turn out to be ‘case-dependent’, i.e. their influence depends on the characteristics of the given case. This is explicitly not related to the provisions within European law or to the variance that is related to which member state implements the law. Instead, the context dimension concerns the specificity of a given process, for example the policy field in question, the time period under consideration as well as additional domestic conditions (see, for example, Mastebroek 2005: 1113; Kaeding 2007: 31-32; Haverland, Steunenberg and Van Waarden 2011).

Moreover, several *levels* can be separated, at which each factor is situated and influence is exerted. While it could be argued empirically that the European multi-level system includes even more levels, the following seem to be analytically most relevant to categorize influences on EU compliance: supranational (at the EU level), national, and domestic (regional or local). These levels are related to the origin of an explanatory influence, thus at least one level can be attributed to each factor. Because influences can originate from a specific level, yet take effect on another, some factors will exert a direction of influence that spans more than one level. Finally, it should be mentioned that the classification of individual factors within the categories mentioned above is carried out by applying a particular notation.<sup>9</sup> Following the short literature review, selected factors will be illustrated in tabular form.

Falkner *et al.* (2005), Mastebroek (2005; implicitly), but also Kaeding (2007) and Berglund (2009) differentiate three main phases or waves of a supposed implementation deficit within the EU, while Treib (2014) supplements this division with a fourth phase. Note that although the phases mentioned above roughly focus on different explanations, they overlap with regard to the studies’ publishing dates. Berglund (2009: 14) alludes to an “early day attention for the issue” which came up at the end of the 1980s in connection to far-reaching reforms at the EG level, especially regarding the European single market (see Ciavarini Azzi (ed.) 1985; Siedentopf and Ziller (eds) 1988a, 1988b; Weiler 1991). As Treib (2014: 7) remarks, its success was primarily based on its comprehensive implementation: “The programme involved a raft of legislative measures whose consistent implementation was seen as a precondition for the completion and smooth functioning of a Europe-wide market”. According to Treib, the first studies made use of top-down approaches from implementation research (see, for example, Pressman and Wildavsky 1973; Bardach 1977; Sabatier and Mazmanian 1981). At that time, many explanatory factors were introduced into the debate, mostly administrative or legal in nature (see, for example, From and Stava 1993; Krislov, Ehlermann and Weiler

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<sup>9</sup> The sources of individual factors are abbreviated as ‘1’, and levels as ‘2’. The dimensions are abbreviated as follows: structure as ‘s’, actor as ‘a’, context as ‘c’; supranational as ‘sn’, national as ‘n’, and domestic as ‘d’. If a factor is related to more than one level of the European multi-level structure, the symbol ‘>’ is added to illustrate the shift. If a factor is not specified clearly, all possible values are listed using the symbol ‘/’.

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1986). They were either generally related to the legislative process or more specifically to the transposition of EU law (see Kaeding 2007: 26). Implementation was understood as a rather apolitical issue in this early period (Treib 2014: 7), and characterized as ‘highly variegated’ (Mastenbroek 2005: 1104) as well as ‘eclectic’ (ibid: 1108) as a result of a lack of theorising. The analysis of political factors was, according to Mastenbroek in reference to Puchala (1975: 496), based on an interpretation of compliance as ‘post-decisional politics’. Examples for these types of factors include internal coordination and its problems<sup>10</sup> (see Krislov, Ehlermann and Weiler 1986; Collins and Earnshaw 1992), inter-ministerial conflicts<sup>11</sup>, the political-administrative or legal culture<sup>12</sup> (Collins und Earnshaw 1992) as well as legislative and bureaucratic procedures<sup>13</sup> (Siedentopf and Ziller (eds) 1988a, 1988b; Pridham and Cini 1994). More than that, the European Commission played an important role as one of the central actors at the European level which it exercised within the scope of its monitoring and sanctioning powers<sup>14</sup> (Mendrinou 1996; Peters 1997).

According to Kaeding, Berglund, and Treib, the second phase started in the late 1990s. It is connected to the emergence of neo-institutionalist approaches and subsequently to Europeanization as a field of research (Knodt and Corcaci 2012: Ch. 1, 5; see Ladrech 2009). This was complemented by a stronger theoretical foundation of explanations, which unfortunately led to contradictory results (see Kaeding 2007: 26) and paradoxically counteracted a systematic theory-based explanation of non-compliance with EU law. Within such studies, authors would oftentimes focus on the goodness of fit as the theoretical starting point. Goodness of fit generally refers to the adaptational pressure that member states experience with regard to the adoption of rules from the European level. In addition to the fit of national regulatory structures and procedures<sup>15</sup>, the compatibility of policies<sup>16</sup> also seemed to be of significance (Duina 1997; Duina and Blithe 1999; Green Cowles, Caporaso and Risse 2001; Börzel and Risse 2003). Institutional and administrative obstacles<sup>17</sup> as well as the opposition to European legislation<sup>18</sup> may also add to the prevention of compliance. Lastly, some other explanatory factors such as the amount of liberalization (policy match)<sup>19</sup>, the reform

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<sup>10</sup> 1a2sn/n/is.

<sup>11</sup> 1a2n.

<sup>12</sup> 1a2n.

<sup>13</sup> 1s2n.

<sup>14</sup> 1a2sn>n.

<sup>15</sup> 1s2n>is.

<sup>16</sup> 1k2sn>n.

<sup>17</sup> 1s2n.

<sup>18</sup> 1a2n.

<sup>19</sup> 1s2n.



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capacity (political match)<sup>20</sup> and the accordance of belief systems<sup>21</sup> (Héritier *et al.* 2001) as well as the existence of political legacies<sup>22</sup>, i.e. of legal and administrative traditions (Duina and Blithe 1999), have been put forward. Nevertheless, some studies (Knill and Lenschow 1998; Haverland 2000; Héritier *et al.* 2001; Falkner *et al.* 2005) show that “a good fit is neither a necessary nor a sufficient condition for smooth compliance, and vice versa“ (Mastenbroek 2005: 1109; see Kaeding 2007: 27; antithetic Angelova, Dannwolf and König 2012: 1270). Therefore, the approach seems to be inadequate when taken as a comprehensive theoretical explanation of EU compliance.

Attention has more recently turned more towards political factors or on the “role of domestic politics on the process of implementation” (Kaeding 2007: 28), as Kaeding describes the third phase of compliance research in reference to Mastenbroek (2005). The latter author argues in reference to Mair (2004: 344) and Falkner *et al.* (2005: 329) that “we need to bring domestic politics back in to explain EU compliance” (Mastenbroek 2005: 1110). This suggestion is made against the background of the restricted explanatory power of the misfit concept as well as the pursuit of national actors to change policies and institutions. Contrary to the analysis of political factors in the first phase, theorising especially based on neo-institutional approaches has gained importance at the beginning of the 2000s (*ibid.*). In this phase, actor-related factors such as the number of bureaucrats<sup>23</sup> and the participation of interest groups at the national level<sup>24</sup> (König and Luetgert 2009) and the number of institutional veto points and their timing and correctness<sup>25</sup> (Haverland 2000) as well as the influence of veto players<sup>26</sup> (Dimitrova and Steunenberg 2000; Mbaye 2003; Steunenberg and Rhinard 2005; Kaeding 2007; Steunenberg and Rhinard 2010) are at the centre of compliance research. Additional political factors concern the preferences of national actors<sup>27</sup> (Mastenbroek 2005; Mastenbroek and Kaeding 2006) and coordination with respect to policies<sup>28</sup> and between actors at the EU<sup>29</sup> and national level<sup>30</sup> (Dimitrova and Steunenberg 2000; Giuliani 2004; Steunenberg 2006, 2007; Haverland and Romeijn 2007; Mastenbroek 2007). At the same time, characteristics of the legal

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<sup>20</sup> 1s2n>is.

<sup>21</sup> 1a2sn>n.

<sup>22</sup> 1a2n.

<sup>23</sup> 1k2n.

<sup>24</sup> 1k2n.

<sup>25</sup> 1s2n.

<sup>26</sup> 1s2n.

<sup>27</sup> 1a2n.

<sup>28</sup> 1a2sn/n/is.

<sup>29</sup> 1a2sn.

<sup>30</sup> 1a2n.

acts<sup>31</sup> that must be transposed and the administrative discretion of the member states<sup>32</sup> play an increasing role (Ciavarini Azzi 2000; Mastenbroek 2007; Kaeding 2007). Adding to that, some of the factors that were already considered important in the earlier phases have been examined anew. These are public support for the EU or its institutions<sup>33</sup> respectively and, more specifically, the support for individual European legal acts<sup>34</sup> (confirmed by Gibson and Caldeira 1995, Mbaye 2003, Steunenberg and Rhinard 2005; not confirmed by Lampinen and Uusikylä 1998, Mbaye 2001) can exert a dominant influence on the transposition of directives and ECJ rulings. Likewise, national courts gain importance within the research field, for example in the context of their role with regard to preliminary references<sup>35</sup> (Alter 1998, 2000, 2009; Garrett, Kelemen and Schulz 1998; Obermaier 2008, 2009). Finally, authors also analyse other factors such as the administrative or institutional capacity<sup>36</sup> of transposing states (Burens 2002; Sverdrup 2004; Toshkov 2008), bureaucratic efficiency<sup>37</sup> (Mbaye 2001, 2003; Haverland and Romeijn 2007; Börzel *et al.* 2010) or the country-specific political culture and thus the traditional handling of transposing supra- and international law<sup>38</sup>, respectively (Giuliani 2004; Sverdrup 2004; Falkner *et al.* 2005; Falkner and Treib 2008). *Table 2* shows selected factors of compliance in the European Union and their characteristics with regard to sources and levels.

*Table 2.* Sources and levels of selected explanatory factors for compliance in the EU

<i>Level</i>	<i>Source</i>	<b>Structure</b>	<b>Actor</b>	<b>Context</b>
<b>Supranational</b>		author and type of the directive <sup>39</sup>	intensity of COM monitoring <sup>44</sup>	adaptational requirements <sup>47</sup>
		clarity / specificity of the directive <sup>40</sup>	political controversy of a policy (EU level) <sup>45</sup>	administrative discretion <sup>48</sup>
		complexity / detail of the directive <sup>41</sup>	willingness of the ECJ to be a political player <sup>46</sup>	legislative output (directives / year) <sup>49</sup>

<sup>31</sup> 1a/s/k2sn>n/is.

<sup>32</sup> 1k2n>is.

<sup>33</sup> 1s2is.

<sup>34</sup> 1k2is.

<sup>35</sup> 1a2n.

<sup>36</sup> 1s2n.

<sup>37</sup> 1s2n.

<sup>38</sup> 1s2n.

<sup>39</sup> Mastenbroek 2003; Steunenberg and Rhinard 2005, 2010; Borghetto, Franchino and Giannetti 2006.

<sup>40</sup> Chayes and Handler Chayes 1993; Börzel, Hofmann and Sprungk 2004; Börzel, Hofmann and Panke 2011.

<sup>41</sup> Ciavarini Azzi 2000; Kaeding 2005; Steunenberg and Rhinard 2005, 2010; Panke 2007a.

<sup>44</sup> Mendrinou 1996; Peters 1997; Steunenberg and Rhinard 2005.

<sup>45</sup> Zhelyazkova 2011.

<sup>46</sup> Alter 2009.

<sup>47</sup> Börzel, Hofmann and Panke 2011.

<sup>48</sup> Ciavarini Azzi 2000; Mastenbroek 2007; Kaeding 2007.

<sup>49</sup> Borghetto, Franchino and Giannetti 2006; Kaeding 2005.

	legislative / bureaucratic procedures <sup>42</sup> length of the deadline <sup>43</sup>		
<b>National</b>	administrative capacity <sup>50</sup> bureaucratic efficiency <sup>51</sup> degree of corruption <sup>52</sup> economic power <sup>53</sup> goodness of institutional / structural fit <sup>54</sup> goodness of policy fit <sup>55</sup> government type <sup>56</sup> interest group litigation before national courts <sup>57</sup> legal culture (concreteness of judicial review) <sup>58</sup> legal doctrine (monism vs. dualism) <sup>59</sup> level of corporatism <sup>60</sup>	acceptance of a policy among the elites <sup>64</sup> actors' beliefs <sup>65</sup> actors' preferences <sup>66</sup> actors' socialization <sup>67</sup> coordination between actors <sup>68</sup> experience of administrative units <sup>69</sup> influence of national courts <sup>70</sup> inter-ministerial conflicts <sup>71</sup> inter-party controversies <sup>72</sup> learning processes <sup>73</sup>	financial / economic costs of compliance <sup>77</sup> government change <sup>78</sup> importance of policy area for economy <sup>79</sup> interest group representation <sup>80</sup> issue linkages in the member states <sup>81</sup> legal costs involved in a case <sup>82</sup> number of instruments used for transposition <sup>83</sup> political costs of compliance <sup>84</sup> successful juridical discourses <sup>85</sup>

<sup>42</sup> Siedentopf and Ziller (eds) 1988a, 1988b; Pridham and Cini 1994.

<sup>43</sup> Mastenbroek 2003; Steunenberg and Rhinard 2005; Borghetto, Franchino and Giannetti 2006; Kaeding 2007.

<sup>50</sup> Mbaye 2001; Börzel, Hofmann and Sprungk 2004; Sverdrup 2004; Berglund, Gange and Van Waarden 2006.

<sup>51</sup> Mbaye 2001, 2003; Haverland and Romeijn 2007; Börzel *et al.* 2010.

<sup>52</sup> Mbaye 2001, 2003.

<sup>53</sup> Mbaye 2001; Börzel, Hofmann and Sprungk 2004.

<sup>54</sup> Duina 1997; Duina and Blithe 1999; Börzel and Risse 2003; Mastenbroek 2003; Romeijn 2008.

<sup>55</sup> Duina 1997; Duina and Blithe 1999; Börzel and Risse 2003.

<sup>56</sup> Ciavarini Azzi 2000; Linos 2007.

<sup>57</sup> Slepcevic 2009.

<sup>58</sup> Carrubba and Murrah 2005.

<sup>59</sup> Carrubba and Murrah 2005.

<sup>60</sup> Lampinen and Uusikylä 1998; Mbaye 2001, 2003.

<sup>64</sup> Beach 2005.

<sup>65</sup> Mastenbroek and Kaeding 2006.

<sup>66</sup> Mastenbroek 2005; Mastenbroek and Kaeding 2006; Linos 2007.

<sup>67</sup> Romeijn 2008.

<sup>68</sup> Siedentopf and Ziller (eds) 1988a, 1988b; Pridham and Cini 1994; Dimitrova and Steunenberg 2000; Giuliani 2004; Steunenberg 2006, 2007; Haverland and Romeijn 2007; Mastenbroek 2007.

<sup>69</sup> Steunenberg and Rhinard 2010.

<sup>70</sup> Alter 1998; Obermaier 2008; Slepcevic 2009.

<sup>71</sup> Siedentopf and Ziller (eds) 1988a, 1988b; Pridham and Cini 1994; Mastenbroek 2003.

<sup>72</sup> Falkner *et al.* 2005; König, Luetgert and Mäder 2005; Steunenberg 2006.

<sup>73</sup> Berglund, Gange and Van Waarden 2006.

<sup>77</sup> Conant 2002; Beach 2005.

<sup>78</sup> Steunenberg and Rhinard 2005; Kaeding 2007; Romeijn 2008.

<sup>79</sup> König, Luetgert and Mäder 2005.

<sup>80</sup> König, Luetgert and Mäder 2005.

<sup>81</sup> Falkner *et al.* 2005.

<sup>82</sup> Nyikos 2001.

<sup>83</sup> Mastenbroek 2003; König, Luetgert and Mäder 2005; Borghetto, Franchino and Giannetti 2006.

<sup>84</sup> Conant 2002; Beach 2005.

<sup>85</sup> Panke 2007b.

	number of veto players and points <sup>61</sup> political-administrative / compliance culture <sup>62</sup> state organization <sup>63</sup>	opposition through the backdoor <sup>74</sup> rule of law <sup>75</sup> stance of national courts <sup>76</sup>	type of legal measure used for transposition <sup>86</sup> upcoming elections <sup>87</sup>
<b>Domestic</b>	political awareness among the public <sup>88</sup> public support for EU institutions <sup>89</sup>	interest and mobilization of domestic litigants <sup>90</sup> interest group opposition <sup>91</sup> organization of societal opponents <sup>92</sup>	domestic importance of a policy <sup>93</sup> domestic politicization of the directive <sup>94</sup> public policy support <sup>95</sup> societal shaming / reframing <sup>96</sup>

*Source:* author's illustration

From the literature review, a typology of factors was constructed, categorizing them according to their source (actor, structure, and context) and level (supranational, national, and domestic). On the basis of the 'source' dimension and the pool of factors analysed so far, two general explanatory patterns can be identified and extracted for each source. These patterns are subsequently combined in order to construct the conditions that account for correct compliance in the concept structural framework. Two groups of factors from the literature are considered part of the source 'actor'. First, actors' attitudes and other factors connected to them seem to be of great importance within the literature on EU compliance, because they fundamentally contribute to the very decision whether and how European law is implemented domestically. Favourable preferences of actors (governments and third parties), low domestic political conflict and favourable political priorities of governments are regarded as the main sub-

<sup>61</sup> Dimitrova and Steunenberg 2000; Haverland 2000; Mbaye 2001, 2003; Börzel, Hofmann and Sprungk 2004; Steunenberg and Rhinard 2005, 2010; Kaeding 2007; Romeijn 2008.

<sup>62</sup> Siedentopf and Ziller (eds) 1988a, 1988b; Lampinen and Uusikylä 1998; Giuliani 2004; Sverdrup 2004; Falkner *et al.* 2005; Falkner and Treib 2008.

<sup>63</sup> Ciavarini Azzi 2000; Mastenbroek 2003; Giuliani 2004; Linos 2007.

<sup>74</sup> Falkner *et al.* 2005.

<sup>75</sup> Gibson and Caldeira 1995; Börzel, Hofmann and Sprungk 2004; Sverdrup 2004; Beach 2005.

<sup>76</sup> Garrett, Kelemen and Schulz 1998; Alter 2000, 2009; Obermaier 2009.

<sup>86</sup> Mastenbroek 2003; Borghetto, Franchino and Giannetti 2006; Berglund, Gange and Van Waarden 2006.

<sup>87</sup> Steunenberg and Rhinard 2005; Kaeding 2007; Romeijn 2008.

<sup>88</sup> Carrubba and Murrah 2005.

<sup>89</sup> Lampinen and Uusikylä 1998; Mbaye 2001, 2003; Börzel, Hofmann and Sprungk 2004; Steunenberg and Rhinard 2005.

<sup>90</sup> Alter 2009.

<sup>91</sup> Siedentopf and Ziller (eds) 1988a, 1988b; Panke 2007b.

<sup>92</sup> Panke 2007a.

<sup>93</sup> Börzel, Hofmann and Panke 2011; Kaeding 2007.

<sup>94</sup> Mastenbroek 2003; Steunenberg und Rhinard 2005; Borghetto, Franchino and Giannetti 2006.

<sup>95</sup> Lampinen and Uusikylä 1998; Gibson and Caldeira 1995; Mbaye 2001, 2003; Steunenberg and Rhinard 2005.

<sup>96</sup> Panke 2007a.

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categories – or attributes – of the condition ‘favourable attitudes’ (FAVATT).<sup>97</sup> Second, traditions play a considerable albeit rather general and diffuse role for the handling of EU law. The most obvious aspects of the condition ‘favourable traditions’ (FAVTRA) are favourable administrative, legal and political traditions. Note that high legitimacy of European and national institutions, procedures and actors can be considered part of favourable political traditions.

Two further groups of factors from the compliance literature can be assigned to the source ‘structure’. The third condition, ‘compatible institutions’ (COMINS), contains structural features of the member states and their effects on compliance (compatible state structure). A second element is situated on a more concrete level than the fundamental structure of a country by addressing the specific regulatory structure of a policy area affected within the implementing member state (compatible regulatory structure). A fourth group of influences on compliance addresses questions about the different capacities necessary to comply with EU law, conceptualized as the condition ‘compatible capacities’ (COMCAP). Not only does this include financial or human resources of administrative institutions, but also resources of societal actors and interest groups as well as their ability to mobilize (extensive resources). Moreover, a compatible regulatory style within the policy sector in question is part of this condition, referring to predominantly administrative patterns of acting on compliance issues and ways of interacting with societal or other third party actors as well as their involvement in the process.

Factors that belong to the context dimension comprise the last two conditions of the analytical framework. The fifth condition is called ‘compatible policies’ (COMPOL), and contains elements that relate to the legal act at hand. One element is the influence of specific characteristics of a European legal act on the transposition process (compatible legal act features). Another element is the compatible domestic context of existing policies and practices affected by European legislation. Finally, a last group of factors belong to a pattern that can be called ‘extensive enforcement’ (EXTENF). It occupies a somewhat peculiar position compared to the other conditions, because not only does it cover several potential explanations for the correctness of compliance, but it also constitutes one of the main phases of the overall compliance process, albeit an optional one (Corcaci 2015). Traditional examples of enforcement can be summarized as extensive infringement pressure and aim at the Commission’s possibilities to get member states to comply with EU law. This includes official infringement proceedings, monitoring measures, but also assistance from European institutions – financially or by way of expertise. Beyond EU-level enforcement and unfortunately neglected

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<sup>97</sup> The logical conditions are specifically worded in a set theoretical fashion as they represent sets. Subsequently, set theoretical calibration of the conditions can be done accordingly, for example by asking ‘How full is case X in the set of favourable attitudes (towards the European directive in question)?’.

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within the literature, extensive domestic enforcement alludes to the potentially important aspect of ensuring administrative implementation and practical application of transposed EU law by national enforcement institutions.<sup>98</sup> In the next section, the analytical framework for EU compliance is presented as an example for a mid-range approach to concept construction.

*A set theoretical concept structure for compliance in the EU*

The analytical framework corresponds to Goertz' use of concept structures to a certain extent. However, while the latter aims at illustrating existing research designs (*ex post* use), the former functions as a basis for subsequent empirical analysis (*a priori* use). In *Social Science Concepts*, Goertz builds concept structures to illustrate the implicit structure of existing contributions within the social sciences, thus illustrating their internal one- or multi-level conceptual structure, which functionally corresponds to the logic of necessary and sufficient conditions or the family resemblance structure. At the same time, this means that the concept specification will only be shown *ex post* without testing concept structures empirically. The compliance framework is not the result of an empirical analysis specifically conducted to build a concept, but a model guided by theory and existing empirical knowledge from within the scientific literature, thus serving as the basis for subsequent empirical analysis. Yet, it does not reflect specific research hypotheses, but instead represents a comprehensive (and thus, most complex) set theoretical explanatory path, aiming to review the most important patterns believed to account for correct compliance in the EU. The framework not only includes the empirical explanatory conditions and outcomes, but also an additional conceptual layer.

The conditions extracted from the compliance literature are analytically connected to three different stages of legal transfer, which can be conceptualized as the constituents or – as Goertz understands such concept structural connections – ‘ontological’ elements of the main outcome concept ‘correct compliance’. Certain European legal acts, first and foremost directives, must initially be transposed into national law, leading to ‘correct transposition’ (CORTRA). But compliance also entails the administrative implementation of such acts. ‘Correct administrative implementation’ (CORIMP) in this narrow sense<sup>99</sup> refers to the establishment or modification of administrative institutions and practices. Lastly, practical application of legal acts that have already been transposed and implemented alludes to ‘correct

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<sup>98</sup> A special case of enforcement is accession conditionality in the context of EU enlargement, which states that formal transposition of the *acquis communautaire* constitutes a necessary condition for entering the European Union. Whether conditionality empirically amounts to a necessary condition could be tested via QCA, although several case studies exist on the subject matter (see, for example, Schimmelfennig and Sedelmeier 2005). Because conditionality is not a regular part of EU compliance processes, it will be excluded in the model.

<sup>99</sup> This understanding should not be confused with a more general notion of implementation, which may refer to one or several stages of what is conceptualized as the process of compliance in this article.

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application' (CORAPP). These 'ontological components' of compliance represent different stages in the compliance process, but at the same time also constitute sub-outcomes that can be analysed separately. Any given case of compliance in the EU can, for example, be in a state where the transposition stage has been surpassed (thus being to some degree in the set of correct transposition), while the stages of administrative implementation and application have not yet been reached. In order to reach the point of full inclusion in the set 'correct compliance' (CORCOM), which represents the overall outcome under consideration, all sub-outcomes (i.e. all required stages in the compliance process) must be present.

Based on this argument, a multi-level concept structure can be extracted from the outcomes and their relations. With regard to an *inter-outcome relationship*, the concept of correct compliance and its components constitute a set in which the combined presence of correct transposition, administrative implementation and application forms the point of full inclusion (1.0) in the set, whereas their combined absence forms the point of full exclusion (0.0) in the set. The crossover point (0.5), in this case the stage at which the compliance process has reached a point neither out nor in the set of correct compliance, cannot easily be defined based on theoretical or empirical arguments. The presence of transposition alone is not considered enough to cross this threshold, because formal transposition of European law alone can be devoid of consequences if no matching structures and procedures for its implementation exist. Furthermore, the presence of all three sub-outcomes logically implies full inclusion, because all ontological components of the underlying concept exist. The central question is thus whether the crossover threshold equals the presence of correct administrative implementation or, empirically speaking, if it should require less or more progress towards fully correct compliance. However, this difficulty may not be addressed at the conceptual level, because it only becomes relevant in the set theoretical analysis (i.e. the empirical level). In contrast and with regard to an *intra-outcome relationship*, the outcome and its sub-outcomes can be coded by using a quadrivalent fuzzy set at the empirical level that indicates the correctness of compliance and thus the different degrees of membership in this set. This of course applies to each component of compliance in the same manner. Subsequently, an outcome value of 0.0 indicates that (almost) no compliance (or in the case of its sub-outcomes, transposition, administrative implementation, application) has taken place. This should be understood in a qualitative sense, where the outcome is completely out of the set of correct compliance when it fails to be present. The value 0.33 then indicates widely incorrect compliance, 0.66 refers to moderately incorrect compliance, and 1.0 to (widely) correct compliance.

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In ideal theory, formal transposition constitutes a *necessary condition* for administrative implementation, both of which are in turn a necessary condition for practical application. Empirically, the relationship is more one of *scope conditions*, because formal transposition restricts the way in which administrative implementation takes place (i.e. in a strict analytical understanding, any European directive must first be transposed into national law in order to introduce the administrative structures and procedures needed to apply the law). Likewise, the correctness of compliance during the stage of administrative implementation restricts how transposed EU directives will be applied within the member states. In formal logic, the overall outcome ‘correct compliance’ is therefore fully described if and only if all sub-outcomes are present. Compliance without application is incomplete and partly incorrect (i.e. not fully in the set of correct compliance), and in the absence of implementation and application even more incomplete and even less in the set of correct compliance. Without fulfilling any of the sub-outcomes, no compliance exists (i.e. full exclusion or fully out of the set of correct compliance).

Although this distinction contributes to a clearer analytical understanding of compliance, it prescind from the reality of European law to a certain extent, especially because administrative implementation often can be hard to pinpoint precisely. Insofar as EU legislation will regularly be integrated into existing domestic institutional structures and practices, administrative implementation might become diffuse, both analytically and empirically. Furthermore, member states might apply requirements from directives in practice even before the stages of transposition and administrative implementation have been reached. Administrative implementation and application can thus exist empirically before transposition is achieved, because specific requirements are already met by existing administrative structures and practices. This is of course also possible in the case of direct effect, which has been established as a major legal principle by the European Court of Justice (ECJ). From an empirical perspective, the difficulty to assess administrative implementation is not the only problem in this context. Another viable argument against including correct administrative implementation in the empirical framework is that the conditions ‘compatible institutions’ and ‘compatible capacities’ potentially cover the influence of administrative structures and practices on the input side of the analysis, thus overlapping with certain aspects of the sub-outcome. Causal interdependencies between these conditions and the outcome might result from this close connection. Administrative implementation of transposed European law therefore reproduces the establishment of new institutions or the restructuring of existing ones as well as institutional practices, which in turn are part of the explanatory conditions. This should be avoided from a methodological perspective in order to avoid weakening the validity of the empirical analysis.



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In conclusion, the analytical assumption that the ‘ontological elements’ of compliance are connected with each other in the form of scope conditions cannot be upheld without reservation when facing the empirical reality of European law and its implementation in the member states.

Subsequently, a global ideal type of correct compliance and several local ideal types can be deduced from the presence of different attributes of the concept ‘correct compliance’. In an additional step, these types could be interpreted as a fuzzy set, which would allow for different degrees in the set of each type. Note that they are still constrained by the scope condition relationships mentioned above. Thus, *full compliance* or the global ideal type exists when all three sub-outcomes are present, i.e.  $1 * 1 * 1$  (fully in the set of correct compliance). What Falkner *et al.* (2005) describe as (the world of) ‘law observance’ could be interpreted as an empirical approximation to this ideal type. *Structural compliance*, i.e. extended formal compliance including the establishment of administrative structures and procedures, but without practical application, forms the local type  $1 * 1 * 0$ . Depending on how the crossover threshold is defined in this case, structural compliance could be regarded as more in the set of correct compliance than out. Mere *formal compliance* could be interpreted as corresponding to what Falkner and Treib (2008) describe as (the world of) ‘dead letters’, i.e.  $1 * 0 * 0$ . As argued above, this local type is probably more out of the set of correct compliance than in. Finally the absence of any sub-outcome forms the local type ‘*no compliance*’, i.e.  $0 * 0 * 0$  (fully out of the set of correct compliance). Again, the crossover point in this ideal type set of correct compliance is not easy to define. If it is interpreted in a symmetrical fashion, the set would lie between formal and structural compliance, for example specified by the establishment of administrative structures without the corresponding institutional procedures.

Using these outcome relationships as a basis, the framework can be expanded to include the logical conditions and their assumed connection to the outcomes. At the highest level of abstraction, compliance research posits that correct compliance depends on the willingness and the ability of transposing member states to comply with European legal requirements. Yet, this layer is not suited well for empirical analysis specifically because of its high abstraction. Willingness and ability nonetheless constitute important heuristic aspects of the underlying concept. An essential and ideal-theoretic expectation in this context is that both of these conditions are necessary and in conjunction sufficient to account for correct compliance, which in turn can be understood as a classical category fully theorized by transposition, administrative implementation, and application of EU law. This theoretical expectation is loosely based on the since generally accepted synthesis of the management and enforcement approaches to compliance, both of which are still widely acknowledged today. Whereas the management

approach accentuates the inability to transpose a legal act, the enforcement approach refers to the strategic behaviour of the member states (see, for example, Chayes and Handler Chayes 1993; Tallberg 2002). Thus, the synthesis posits that both the willingness and the ability to transpose, administratively implement and apply rules are considered necessary to achieve correct compliance. Beyond this consideration, it is expected that willingness and ability are in conjunction sufficient to achieve correct compliance. Equally important, it is assumed that no contradiction between the two theoretical approaches exists.

The *theoretical framework*, consisting of the basic causal and secondary conceptual levels discussed so far, can thus be formally written as follows:<sup>100</sup>

WILLINGNESS\*ABILITY → CORRECT COMPLIANCE == TRANSPOSITION ↔  
IMPLEMENTATION ↔ APPLICATION

As has been noted, administrative implementation poses difficulties as an empirical outcome. Because these practical constraints might not be regarded as convincing arguments to alter set calibration, theoretical reasons should ideally also exist to exclude administrative implementation and subsequently setting a different crossover point for the new concept, called ‘correct compliance#’. In accordance with the above suggestion on intra-outcome relationships, it could be argued that this less complex concept of correct compliance includes structures (i.e. the formal components of administrative implementation) as part of legal transposition, and procedures (i.e. the practical components) as part of legal application. Although a loss of information is involved, this understanding does not seem to contradict how the EU compliance literature treats the phenomenon conceptually and empirically. Accounting for these considerations, the *modified theoretical framework* is formally expressed as follows:

WILLINGNESS\*ABILITY → CORRECT COMPLIANCE# == TRANSPOSITION ↔  
APPLICATION

What follows from the conceptualization so far is that the framework does not place the six clustered conditions introduced above at the ‘causal centre’, but interprets them as *non-causal substitutive functions* connected to willingness and ability. This can be explained by understanding the logical conjunction of favourable attitudes, favourable traditions, (certain aspects of) compatible policies, and (certain aspects of) strict enforcement as a substitute for the willingness to comply, while the conjunction of (certain aspects of) compatible policies, (certain aspects of) strict enforcement, compatible institutions, and compatible capacities represents a substitute for the ability to comply. It should be noted that the context-based

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<sup>100</sup> In this context, ‘\*’ indicates the logical operator AND, → causal sufficiency, ‘==’ an ‘ontological’ relationship, and ‘↔’ indicates a non-causal scope condition.

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conditions include elements of both willingness and ability, which is why they appear in both substitutive relationships.<sup>101</sup> According to Goetz' understanding of concept structures, these connections indeed can be understood as non-causal substitutive relations, because willingness and ability constitute the most abstract explanatory conditions and thus the model's causal centre at the conceptual level, i.e. the main causal link to the outcomes.

Within the theoretical framework, the conditions 'favourable attitudes', 'favourable traditions, (partially) 'compatible policies' and (partially) 'extensive enforcement' are jointly sufficient to substitute WILLINGNESS (linked by a logical AND; non-causal relationship between the levels). In contrast, (partially) 'compatible policies', (partially) 'extensive enforcement', 'compatible institutions' and 'compatible capacities' are jointly sufficient to substitute ABILITY (linked by a logical AND; non-causal relationship between the levels). Willingness and ability subsequently constitute necessary conditions which are jointly sufficient for correct transposition, correct implementation and correct application as the sub-outcomes for the overall outcome 'correct compliance' (linked by a logical AND; causal relationship between the levels). In this sense, the main causal link represents a classical category, first because willingness and ability are jointly sufficient for correct compliance. Second, no alternative explanations can logically exist because of the high level of abstraction, i.e. every possible cause for correct compliance is covered by the conditions 'willingness' and 'ability'. This of course changes when a lower level of abstraction is analysed, such as the link between the six conditions and the sub-outcomes. It should also be noted that the relationship *between* the three components of compliance as well as *towards* compliance as the basic level concept is 'ontological' and thus non-causal. Finally, the clusters of individual factors which make up the conditions attributes are located on a third level, characterized by another layer of logical connections and substitutional relationships not shown in the framework.

As noted, the empirical analysis is conducted based on a simpler version of the model that consists of the six conditions and two sub-outcomes, while still reflecting a comprehensive explanation based on the main clusters or patterns from within the EU compliance literature. Within the analytical framework, this path is WILLINGNESS\*ABILITY → CORRECT COMPLIANCE, including all three sub-outcomes. In contrast to how Goertz illustrates concept structures, the model does not represent empirical results other than being based on factors analysed in the literature. It is developed on the basis of theoretical and textual knowledge, so the QCA results can lead to a modification and diversification of configurations in terms of a

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<sup>101</sup> Because the three sources are not analysed empirically, formally assigning aspects to willingness and ability is not required. Nonetheless, such a procedure would necessarily be implemented based on empirical data.

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model fit. More precisely, the empirical analysis reveals dominating explanatory paths based on the cases included in the analysis. Interpretation of these results depends on how they relate to certain theoretical expectations – such as the expected conjunction of conditions that substitute willingness and ability. Subsequently, the solution paths could be used to formulate generalizable hypotheses about how correct compliance can be explained, but also to modify the underlying model. Willingness and ability are also not included in the empirical framework and analysis. As noted above, they primarily entail a heuristic benefit at the conceptual level of the analytical framework by establishing a logical connection between the conditions, compliance and its ontological components.


In sum, the reduced *empirical* framework entails the following explanatory path:

$$\text{FAVATT} * \text{FAVTRA} * \text{COMPOL} * \text{COMINS} * \text{COMCAP} * \text{EXTENF} \rightarrow \text{CORCOM} \\ == \text{CORTRA} \rightsquigarrow \text{CORAPP}$$

Detailed expectations about specific sufficient combinations of conditions are not part of the empirical framework, because its aim is to cover the most influential explanatory patterns. Instead, the path constitutes a comprehensive and most complex explanation by substituting both the willingness and ability to comply correctly with less abstract conditions. Due to how the framework is constructed, empirical results will not actually show the overall path, but rather various equifinal solutions that reflect the data used for the analysis. At least two analytical goals can be achieved based on the analytical framework. First, it allows for statements about the combined value for the quality of transposition and application as two essential components of compliance. By connecting certain logical conjunctions of conditions to the extent that transposition and/or application have been achieved correctly, the explanations for the varying quality of compliance in the EU can subsequently be evaluated. Second, the model leads to fuzzy set combinations of the sub-outcomes, thus allowing for the deduction of ideal types of correct compliance as described above.

## 5. Concluding remarks

This article addressed the question of how a set theoretical understanding of concept structures can link concept formation to formalization and empirical analysis. For this purpose, Gary Goertz' concept structural approach to concept construction and use was introduced alongside the underlying set theoretical relationships. Expanding on this perspective, four approaches of different scope to make use of such concept structures within socio-scientific research designs were developed: a comprehensive, mid-range, low-range, and a reconstructive approach. Illustrating a mid-range perspective, an analytical multi-level framework to analyse the



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correctness of compliance in the European Union and its sub-outcomes was developed. Correct compliance was conceptually described by its three ‘ontological components’ or sub-outcomes – correct transposition, administrative implementation, and application. Understanding these outcomes as fuzzy sets allowed for the deduction of a global ideal type (full compliance) and several local ideal types (no, formal, and structural compliance). Based on a review of 30 years of compliance literature, three main sources of explanatory factors were extracted. Subsequently, six broad explanatory conditions that can be interpreted as general patterns influencing the correctness of compliance were deduced from these sources. By using concept structures, the conditions establish basic relations at the conceptual level between the correctness of EU compliance on the one hand, and the willingness and ability to comply on the other. The conditions and outcomes were integrated into a framework that can subsequently be reduced, formalized and applied via QCA or other set theoretical methods. By linking concepts to empirical analysis through concept structures and set theory, conceptually founded research designs that contribute to a richer understanding of socio-scientific phenomena can be constructed. However, further research is needed to elaborate on the different approaches to applying concept structures, and to clarify the intricate relations between concept structures, set theory, logical formalization as well as different classical and radial research strategies.

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