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# Taking Terminology and Timing Seriously: On Ontological and Epistemological Foundations of Causal-Process Tracing

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## I. Introduction and Overview[1]

In recent years we have seen an explosion of methodological reflections on case study research. These reflections have challenged the co-variational orthodoxy that dominated the literature on case study methodology in Political Science since the 1970s. Alternative understandings of case study methodology have been presented mostly under the heading of "causal process tracing (CPT)". In contributions to the methodological debate (Blatter and Blume 2008a, 2008b) and in our text book (Blatter and Haverland 2012), we try to make the point that we gain a lot when we realize that there are two alternatives to the co-variational template and not just one. Adding "congruence analysis (CON)" to "co-variational analysis (COV)" and "causal-process tracing (CPT)" as a third distinct approach for designing case studies has three major advantages:

- it broadens the available toolkit for drawing causal inferences in small-N research;
- it allows to develop internally coherent research approaches; and
- it leads to more precise definitions of major terms like "causal-process tracing" and "causal mechanisms."

The latter aspect is especially warranted because the terms "causal process tracing" and "causal mechanism" are in danger to become fuzzy catch-all phrases which are invoked by people who do case study research without much methodological rigor (and without any theoretical foundations and/or aspirations). Methodologists who put all alternatives to the co-variational template under the heading of "causal process tracing" are contributing to such a fuzzy understanding of these terms and – probably unwillingly – open up an excuse or escape clause for non-systematic and unreflective case study-research.

As I will demonstrate in this paper, when we embed the method of causal-process tracing in a consistent and full-fledged research design, we do not only get a more clear-cut and precise understanding of the terms "causal-process tracing" and "causal mechanism" but we will also better understand how the method of CPT can be used as a complement to other methods of drawing causal inferences within other research designs or approaches (those other research designs include the COV and CON approaches in small-N studies as well as large-N studies applying statistics or medium-N studies using set theory and Boolean algebra (QCA) as method of data analysis). I will argue that only if we highlight the inductive features of causal-process tracing and if we recognize its distinct epistemological foundations we will realize the full potential that CPT contains for explanatory studies in the Social Sciences.

In our book (Blatter and Haverland 2012) we have laid out an understanding of CPT as a full-fledged and consistent research design that is based on "contingency" and "configurational causation" as ontological presuppositions. Furthermore, our understanding has an affinity to "scientific realism" as an epistemological position that implies that the spatio-temporal continuity and contiguity of social processes serves an important "natural basis" for drawing causal inferences (George and Bennett 2005: 127-49). Researchers who advocate a "scientific realist" epistemological stance emphasize that "causation is a relation in nature, not in logic" (Wendt 1999: 81). And they take terminology seriously because they realize that language is an important and consequential part of the nature/reality of the social world. In consequence, for a consistent and precise understanding of "causal-process tracing" we have to put "timing" or "temporality" into the centre of this method of drawing causal inference.[2] It is important to

[1] I would like to thank Markus Haverland for the fruitful and enjoyable collaboration we have had in writing the book „Designing Case Studies: Explanatory Approaches in Small-N Research" (Palgrave 2012). Furthermore, I would like to thank Samuel Schmid for putting together the list of references.

[2] In order to highlight this stance we bind the two terms "causal" and "process" together by a hyphen. This indicates that we are actually tracing "causal-processes" which implies a multiplicity of observations which provide information about the social development at different points in time. When we refer to usages of

emphasize this, because in recent treatments on causal process tracing, advocates like Andrew Bennett (2008) have introduced some kind of Bayesian updating in characterizing CPT. In strong contrast to his latest specification of causal-process tracing, I want to stress the fact that "process" refers to the object of our investigation and not to any temporal sequences within the research process.[3]
Furthermore, our CPT approach is especially suited to complement another recent innovation that has made great inroads in the methodological toolkit of political scientists: Qualitative Comparative Analysis and its various strands (csQCA and fsQCA). Both, QCA and CPT are based on "configurational thinking" but QCA draws causal inferences on the bases of cross-case comparisons, whereas CPT is a within-case method of causal inference. The difference leads to different strengths and weaknesses: QCA has advantages when it comes to generalization towards populations of similar cases (external validity), but CPT adds valuable insights into the temporal unfolding of causal processes that a QCA cannot provide. To put it in a nutshell (and a metaphor): only CPT is able to transform a list of necessary and sufficient conditions (ingredients) that a QCA study reveals into a full-fledged explanation (recipe) by adding information on when and how the causal conditions (ingredients) have been working together (have to be mixed together) in order to explain (produce) the outcome (meal/cake)!

The paper proceeds as follows: I will start with a generic and multi-dimensional definition of case studies. This definition already points to the three different approaches for designing case studies that are presented in a comparative way in the first main part of the paper. The second main part of the paper provides a more detailed description of core features of the "causal-process tracing" approach like Y-centred research questions, "configurational thinking" and "temporality" as ontological and epistemological foundations, "comprehensive story lines", "smoking guns" and "confessions" as prototypical types of observations that provide the empirical basis for drawing causal inferences, and "possibilistic generalization" as the adequate understanding of the way we draw conclusions beyond the cases under investigation. Based on these fundaments, I can develop and illustrate my main argument in the last part of the paper: our conceptualization of causal-process tracing not only leads to a consistent research design for specific research questions/goals but also helps to get a better understanding of how (much) CPT can complement other methods of drawing causal inference.

## II. A generic and multi-dimensional definition of case studies

There is little general consensus on what case studies are. In the literature, we find a broad spectrum of definitions and descriptions of case studies. Due to space restrictions, I cannot provide the overview here (but see Blatter, Janning, and Wagemann 2007: 123-4, Blatter and Haverland 2012: 18-9; Gerring (2007: 17 and 2008) provides slightly different overviews). Although the existing definitions are appropriate for some types of case study research, all of them are too specific to serve as a generic definition, and most of them do not capture what we see as the core feature of case study research (our fourth aspect in the following list).

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this term in the literature that are not in correspondence to our understanding, we apply the term without a hyphen (causal process tracing).

[3] Bayesian reasoning plays an important role in sophisticated case study designs, but it makes much more sense within a congruence analysis approach. Within such an approach, an expanded application of Bayesian reasoning helps us to identify "crucial cases" (Blatter 2012).

In consequence, we (Blatter and Haverland 2012) define case studies as a non-experimental research design that differs from large-N studies through the following four characteristics:

1. a small number of cases;
2. a large number of empirical observations per case;
3. a huge diversity of empirical observations for each case; and
4. an intensive and iterative reflection on the relationship between concrete empirical observations and abstract theoretical concepts.

The first element of our definition represents a categorical decision; we do not make a fundamental distinction between the study of a single case and the study of a few cases because the core characteristics are the same for all small-N studies. The small number of cases makes it easier for researchers to select cases that have no clear-cut boundaries but have to be delineated and specified on the basis of abstract theoretical concepts (for example, policy reforms or international regimes). Therefore, case studies are ideal for investigating new, complex or abstract phenomena.

In each of the three approaches to case study research that we advance in our book, one of the other three elements of our definition is predominant. The co-variational approach in case study research approximates in many ways statistical analysis, but there exists one major difference between the comparative method in small-N studies and correlation analysis in large-N studies: the number of observations that researchers take into account to arrive at the score for each variable and each case is much higher in case study research. For the second approach, causal-process tracing, the variety of diverse observations is even more important. A large set of diverse observations is necessary to produce 'comprehensive story lines', 'smoking guns' and 'confessions', which form the empirical basis for drawing causal inferences.

Probably the most important feature of case studies is the fact that limiting the research to one or a few cases allows the researcher to invest time and intellectual energy in reflecting on the relationship between empirical observations and the abstract concepts that form the core elements of hypotheses, theories and mechanism-based explanations. Many strengths and advantages of case study research result from this fact. For example, theories in which difficult-to-observe cognitive aspects of individual actors play a central role can be included with much higher levels of validity in comparison to large-N studies. Furthermore, internal validity is enhanced because case study researchers can more easily employ context-specific indicators for theoretical concepts. Finally, case study researchers can take into account a broader set of theories and more abstract theories when analyzing and interpreting cases. In our third and last approach to case study research, 'congruence analysis', these features take centre stage and lead to a specific research design.

Although it makes sense to distinguish the three different approaches in order to provide internally consistent ideal-types, it is important to realize that all approaches share the characteristics of the generic definition—albeit with a different emphasis.

## III. Three Types of Case Study Design

In the following, I want to provide a short comparative overview of our three explanatory approaches to small-N research. This overview (see table 1) reveals how the three approaches differ in terms of their main research goals and their focus; in respect to how to proceed with the selection of cases (and theories); in how data is generated and analysed, and in respect to the understanding and direction of generalization (Blatter and Haverland 2012: 23-32).

**Table 1: Three explanatory approaches in case study research**

| | **Co-Variational Analysis (COV)** | **Causal-Process Tracing (CPT)** | **Congruence Analysis (CON)** |
|---|---|---|---|
| Research questions and research goals | **Does variable X make a difference?**<br>Testing whether different values of X lead to different outcomes | **What makes the outcome (Y) possible?**<br>Revealing the temporal interplay among conditions or mechanisms that lead to specific outcomes | **Which explanatory approach provides more/new insights?**<br>Comparing the descriptive and explanatory merits of different theories |
| Focus | **Independent variables** as:<br>- factors of influence<br>- factors that have an autonomous influence | **Causal configurations** as:<br>sequential and situational combinations of causal conditions or social mechanisms | **Comprehensive theories**<br>that compete with and/or complement each other |
| Selection of cases and theories | Select **multiple cases** according to:<br>- strong **differences** in respect to the independent **variable of interest**, AND<br>- high **similarity** in respect to **control variables**<br><br>Selection of a plurality of **'comparable' cases** | Select one or more cases according to:<br>- their **accessibility**, AND<br>- the practical or theoretical relevance of the **outcome**<br><br>Selection of one or more cases **sequentially:**<br>1. 'positive' case(s)<br>2. 'possible' case(s) | Select **multiple *theories*** according to:<br>- their place in the scientific discourse, AND<br>- the researcher's theoretical aspiration<br>Selection of one or more *cases* according to the ex-ante **'likeliness' of cases** in respect to the selected theories |
| Data generation | **Observations:**<br>Information corresponding to the indicators specified for the variables<br><br>**Resulting data:**<br>Scores of each variable for all cases | **Observations:**<br>- Information on the temporal unfolding of the process;<br>- information on spatial-temporal proximity between causes and consequences;<br>- information on perceptions and motivations of actors<br>**Resulting data:**<br>- Causal chains + conjunctions<br>- Smoking guns; - Confessions | **Observations:**<br>Information corresponding to the expectations (propositions, hypotheses, predictions) deduced from theories<br><br>**Resulting data:**<br>A set of confirmations and/or contradictions for each theory |
| Data analysis = drawing causal inferences for the cases under investigation | **Necessary content of data:**<br>Co-variation among scores of the dependent variable (Y) and scores of the independent variable of interest (X)<br>**Conclusion:**<br>X has a causal effect on Y<br><br>**Further necessary conditions for conclusions:**<br>No theoretically plausible co-variation among scores of the dependent variable and scores of other independent (control) variables | **Necessary content of data:**<br>- Comprehensive story line<br>- Smoking guns<br>- Confessions<br><br>**Conclusion:**<br>Identification of configurations of conditions and/or mechanisms that are necessary and together sufficient for the outcome<br>**Further necessary tools for drawing conclusions:**<br>Counterfactuals AND/OR Theoretical concepts of mechanisms and process dynamics | **Necessary content of data:**<br>Differences among the theories in respect to the level of congruence between expectations and observations<br>**Conclusion:**<br>- Relative importance of selected theories<br>- Comprehensive explanation through a combin. of theories<br>**Further possible conditions for drawing conclusions:**<br>Ex-ante expectation about the 'likeliness' that the case is congruent with the expectations derived from different theories |
| Generalization = drawing conclusions beyond the cases under investigation | **Statistical generalization**<br>Drawing conclusions about the causal effect of X on Y from the selected cases to a population of cases that are similar in respect to all control variables | **Possibilistic generalization**<br>Drawing conclusions from the identified causal configuration(s) and mechanisms for an outcome to the set of potential configurations and/or to the set of proven causal configurations and mechanisms | **Theoretical generalization**<br>Drawing conclusions from the explanatory power of theories in more or less 'crucial' cases to the relevance of theories in the scientific discourse |

*Research goals and research questions*

The co-variational (COV) approach to case study research typically aims to investigate whether a specific factor makes a difference. For example: Does government reorganization reduce public spending? As this kind of research is interested in the effect of a specific causal factor, or independent variable, this research can be labelled X-centred research. But the focus on 'independent variables' has a further, deeper meaning because the COV approach assumes that the causal factors function independently of each other; this approach is based on the ontological assumption that each factor has autonomous causal power.

The causal-process tracing (CPT) approach, instead, start with an interest in a specific (kind of) outcome. The investigator asks what factors lead to a concrete outcome or which preconditions are necessary and sufficient in order to make a specific kind of outcome possible. For example: Which conditions lead to social revolutions? Because the researcher is interested in the (various) causes of an effect rather than in the effect of a specific cause (independent variable), this approach can be called Y-centred research. For an Y-centred research project it makes sense to start with the ontological assumption that a plurality of factors work together to produce the outcome of interest. Such a holistic ontological starting point leads to the search for configurations of causal conditions or social mechanisms and it tries to reveal the details of the "causal pathways" that lead to the outcome of interest.

Other case studies are conducted primarily with the aim of contributing to the theoretical debate in a discipline or field of research. Typical research questions read as follows: Is Liberal Intergouvernmentalism the best explanation for European Integration? Such research questions recognize that paradigms and theories have an important function in the process of knowledge generation because they provide the anchor points for research programs and structure the scientific discourse. In the congruence analysis approach (CON), theories are not reduced to single independent variables (as in the COV approach) but are treated as comprehensive explanatory frameworks that are specified through a set of constitutive and causal propositions. Case studies are used to elucidate and to compare the explanatory merits of competing or complementary theories.

*Case and theory selection*

For the COV approach, case selection is crucial to demonstrate that it was indeed variation in X and not another factor that caused the effect (variation in Y). In other words, case selection is crucial to making valid causal inferences. A plurality of cases is selected according to the experimental template. This means that the cases must express strong differences with respect to the main independent variable of interest, and they must be as similar as possible with regard to variables associated with other potential explanations. This design is described using the term "most similar system design" (Pzeworski and Teune 1970) or, alternatively, a term that emphasizes the underlying logic, the "method of difference" (Mill 1875); this design also corresponds to the "comparable cases" approach of Lijphart (1975).

Since a convincing CPT approach depends on the ability to provide quite comprehensive storylines on the temporal unfolding of the causal process, to provide a dense descriptions of critical moments, and on opportunities to gain deep insights into the perceptions and motivations of important actors, the accessibility of a case is the primary precondition for investigation, so that this precondition is also the primer criterion for case-selection. Causal-process tracing is a within-case analytical technique; therefore, we need not select more than one case, although we do have the option to do so. In the ideal typical form of the CPT approach, those cases are selected that show a strong "positive" result with respect to the

outcome of interest. In a second step, further 'possible' cases can be selected to test the relevance of specific factors that have been identified as necessary for the outcome in the first study (see Mahoney and Goertz 2004).

Within the CON approach, the selection of theories has to be done more explicitly than in the other approaches. Ideally, this step precedes the selection of cases. We advocate selecting more than one theory and avoiding the ex-ante integration of those theories in a synthetic explanatory approach. The researcher should consider a plurality of theories and should reflect on the status of these theories in the scientific discourse. This allows for selecting potentially 'crucial cases': cases which are 'most-likely" to show high levels of congruence with the expectations deduced from the dominant theory in the scientific discourse and "least-likely" to conform to alternative theories. The ex-ante likeliness of a case in respect to be conform to theoretical expectations, in turn, depends on some prior knowledge about specific features of the case like context or antecedent conditions.

*Data generation and data analysis*

While it is a defining characteristic of all case study approaches that a large number of (diverse) empirical observations are collected per case and that there is an intensive reflection on the relationship between concrete empirical observations and abstract theoretical concepts, there are strong differences in the ways in which observations are transformed into data and in the ways the data are analysed to draw causal inferences. Despite these differences, all case study approaches share one feature: in case study research, it is the first step, data generation, that is most crucial; case study researchers invest much more time and intellectual energy in this first step in comparison to the time and energy they invest into the second step of data analysis, and the cogency of case studies depends almost fully on this first step (whereas in large-N studies the result is often evaluated on the basis of the technical skills applied in statistical data-analysis).

In table 1, we present the processes of data generation and data analysis separately to present clearly the functional equivalents in each approach. Whereas for the rather deductive approaches COV and CON, this neat separation represents the way we conduct case studies (or at least, it corresponds to the way we present the findings), this is not the case with the rather inductive CPT approach, in which the separation of data generation from data analysis is less clear-cut.[4]

In the COV approach, indicators that scholars have selected for operationalizing variables into observable entities define which empirical information is seen as relevant and which information must be collected for each case. The relevant empirical information is used to determine the scores for each of the variables; therefore, we call the corresponding information 'variable-scoring observations'. Researchers invest significantly in making sure that each score is valid, and they typically employ a large number of empirical observations for this task. As a result, a crucial step in this research approach is the process of transforming the information that we find 'out there' in the social world into scores for individual variables. Compared with large-N studies, the COV approach makes it much easier to apply indicators in a context-sensitive way, which means that nominally different states of the social world

[4] The term "rather" indicates in its first usage that in small-N studies deductive approaches in reality are never as deductive as large-N studies where the operationalization has to be finished before we start to search for information. "Rather" in the second part of the sentence points to the fact that CPT is an inductive approach only in comparison to the other approaches. As we will see, the method of CPT can be applied in more inductive research designs and more deductive ones.

(for example, number of parties in a parliament) can be treated as functionally equivalent (for example, for the concept of 'competition'), and nominally equal states can be scored differently. Data analysis takes place in a second distinct step after we have transferred all scores of all cases for all variables into a rectangular data sheet. Through visual inspection, we discover whether there is co-variation among the scores of the dependent variable of interest (Y) and the scores of the independent variable (X). If so, we can conclude that X has a causal effect on Y. A necessary condition for this inference is that there exists no other theoretically plausible co-variation among scores of other independent variables and the dependent variable.

In the ideal-typical CPT approach, the search for relevant empirical information proceeds in a much more inductive fashion. The researcher has to search for all kinds of information about the temporal unfolding of the causal-process that allows her to present a comprehensive story line with a sequence of causal steps. For decisive situations and phases of transformation, the researcher searches for information that gives her a more detailed picture of the 'scene' and a denser description of the temporal unfolding of events during these critical times. Finally, she has to dig deeper and collect information about the perceptions and motivations of major actors. The data generation process in the CPT approach is not only more inductive in comparison to the COV approach, but the separation between data generation and data analysis is also less clear-cut. Nevertheless, the functional equivalents to scores for the variables in the COV approach are 'comprehensive story lines', 'smoking guns', and 'confessions'. From the comprehensive story lines, the scholars extract 'causal chains' and 'causal conjunctions'; detailed descriptions of critical situations lead to strong evidence for a dense connection between a cause and an effect (corresponding to the observation of a 'smoking gun'), and 'confessions' provide deep insights into the perceptions and motivations of major actors. These kinds of condensed empirical information have to be combined with counterfactual thought experiments and/or with theoretical reflection on the working of causal mechanisms and process dynamics in order to identify those configurations of conditions and/or mechanisms that are individually necessary and jointly sufficient for making the outcome possible.

In the CON approach, the sort of information required is delineated by expectations (propositions, hypotheses and predictions) deduced from the theories that have been selected and specified ex-ante. This is to some extent similar to the COV approach. Nevertheless, in this approach, the information is not transformed into variable scores but is used to determine whether the formulated expectations are confirmed or contradicted. As a result, the investigator obtains a set of confirmations and/or contradictions for each of the theories. As a second analytical step, he uses the differences among the theories with respect to the level of congruence between expectations and observations either for drawing conclusions about the relative importance of the selected theories in explaining the case(s) or for combining the theories into a comprehensive explanation.

*Generalization*

Conclusions beyond the cases under investigation are usually discussed under the heading of 'generalization' – we follow this practice, although one of the main messages of our book is that 'generalization' means something quite different within the three case study approaches.

Drawing conclusions within the COV approach is similar to the understanding of generalization in large-N studies; we therefore call it 'statistical generalization'. The

researcher draws conclusions from the selected and investigated cases to a wider population of cases.
It is important to realize that the CPT approach does not strive for this kind of generalization but for something that we call 'possibilistic generalization'. The findings of a CPT case study lead to knowledge about the causal configurations (combinations of causal conditions or social mechanisms) that make specific outcomes possible. The configurations of conditions and/or mechanisms that the researcher identifies as necessary and sufficient for an outcome within the cases under investigation are used to elucidate the set of 'potential' configurations (all logically possible combinations of the identified conditions and mechanisms) and/or the set of 'proven' causal configurations. The first set is helpful for developing 'typological theories' inductively; the second set includes all those configurations that have been shown to lead to the outcome of interest.
Within the CON approach, the researcher uses the insights gained in the case study for the debate on the relevance of theoretical approaches in the broader scientific discourse. The impact that the case study might have on this theoretical discourse depends on how 'crucial' the selected case is for the theories that 'populate' the scientific discourse.

## IV. The Causal-Process Tracing Approach

In most small-N studies, the tracing of causal processes plays an important role. Very often, causal-process tracing is used as a complementary method to co-variational analysis. Tracing the process that leads from a causal factor to an outcome makes it possible to enhance the internal validity of a causal claim that "X matters" (Gerring 2007: 173-84). This 'added value' is especially warranted when the compared cases are not as similar as they should be or when the co-variational analysis is indeterminate. I will come back to the combination of COV and CPT in the final part of the paper.
However, in this part, I would like to delineate the main features of causal-process tracing as a distinct approach to case study research. It will become clear that the CPT approach has affinities to specific research questions. Those questions, in turn, imply different ways to select cases in comparison with the COV approach, and they imply other directions when we draw conclusions beyond the investigated cases. Furthermore, the CPT approach begins with other ontological presuppositions than the COV approach, the epistemological basis for drawing causal inferences is very different, and the CPT approach has its own terminology. Identifying CPT merely as an addendum to COV seriously underestimates the potential of this approach and, probably even more importantly, misrepresents the major goals and fundaments of this approach.
Recognizing the distinct features of CPT does not inhibit the combination of the causal-process tracing methods with other methods of causal analysis. On the contrary, it provides us with deeper insights why CPT is indeed a valuable complement to other more deductive methods of drawing causal inferences applied in small-N, medium-N and large-N studies and leads to helpful advices how to combine the diverse methods in multi-method designs.

### *The basic characteristics of CPT: Y-centred, configurational thinking and timing*

The first approximation in specifying the distinct research goals of the CPT approach is to argue that it is much less X-centred compared to the COV approach. This means that the researcher is interested in the many causes of a specific outcome (Y) and not so much in the

effects of a specific cause (X). "How come?" or "How was this (Y) possible?" are the prototypical questions of this explanatory approach, not "Does it (X) matter?" or "Does it (X) make a difference?" Nevertheless, in contrast to historians, for social scientists, most often the research goal is not to explain a single social event. Instead, social scientists want to identify and explain more general and/or more abstract aspects of the social world, without losing sight of the diversity in outcomes and preconditions. As a consequence, they apply CPT to the search for conditions that lead to a specific type of outcome, or they use CPT to more closely understand the 'mechanisms' that actually link causes to outcomes. The prototypical questions for these tasks are: "Which conditions make this kind of outcome possible?" and "Which underlying mechanisms effectively make the cause creating the outcome?"

What unites all of these goals and prototypical questions is the fact that the search for solutions and answers is based on "configurational thinking" (Ragin 2008: 109-46). In contrast to the COV approach, which focuses on the effects of individual causes (independent variables), approaches based on configurational thinking start with the following assumptions:

- almost all social outcomes are the results of a combination of causal factors;
- there are divergent pathways to similar social outcomes (equifinality); and
- the effects of the same causal factor can be different in different contexts and combinations (causal heterogeneity).

Configurational thinking dramatically impacts the way scholars perform comparative analysis. The set-theoretic logics and techniques that Charles Ragin and his followers developed to draw systematic causal inferences from the study of a medium number of cases have complemented the research designs and techniques that study a small number of comparable cases on the basis of co-variational thinking (Ragin 2000, 2008). QCA and the COV case study approach differ with respect to the number of cases they investigate and the initial assumption regarding whether causal factors function autonomously or in combination. Nevertheless, both draw causal inferences on the basis of cross-case comparisons. In contrast, the CPT approach applies configurational thinking as a method of within-case analysis.

Configurational thinking, especially the assumption that explanations should begin with the assumption that a plurality of causal factors work together to create an outcome, is the first basic characteristic of the causal-process tracing approach. The second basic feature is that CPT as a technique of drawing causal inference takes advantage of the fact that causality plays out in time and space. We take seriously the term 'process' and include only those methodological concepts and techniques under the heading of causal-process tracing that draw on the fact that causality plays out in time and space. As a consequence, we will stress the importance of observations that allow for determining the temporal order by which the causal process unfolds ('comprehensive story lines'), the empirical observations that provide certainty and density with respect to the pathway leading from cause to effect ('smoking guns'), and empirical information that allows us to specify the underlying mechanisms that link causes and effects ('confessions'). These kinds of empirical information are not compiled into scores or values of variables and transferred into rectangular datasets that contain values for all variables and cases (as in the COV approach). They do not have to be standardized to draw a logical conclusion through cross-case comparisons, but they contribute to causal inference on the basis of temporal order, spatiotemporal density and analytic depth. On the basis of these kinds of 'causal-process observations', we draw conclusions on the status and role of causal conditions in the process of producing the outcome (not only necessity versus sufficiency but also which factor has been a 'precondition' for other factors in causal chains). The result of a study that is based on CPT is a full-fledged 'recipe' for making an outcome of

interest possible. In contrast to cross-case techniques (QCA), CPT reveals not only the necessary and sufficient ingredients but also when and how the ingredients have to be brought together to create the outcome of interest. Not only those who cook for themselves will immediately recognize what a difference this kind of knowledge makes for drawing practical conclusions from empirical studies!

### *Ontological and epistemological affinities and major methodological concepts*

Although – or maybe because of the fact that – there has been a lively methodological debate about the causal-process tracing approach, there exists no consensus with respect to the major concepts of this approach. The term 'causal mechanism' is an especially highly contested concept (for an overview, see, for example, Falleti and Lynch 2009; Gerring 2008; Mahoney 2003). In the following, I provide specific definitions of the most important methodological terms and concepts. We arrived at our definitions by taking into account two principles. First, the definitions have "resonance" within the scientific debate *and* they are similar to the use of the term in colloquial language (Gerring 2001: 52). Second, each concept is defined considering other methodological concepts within case study methodology and especially within the CPT approach. In other words, the CPT methodology is the most important systemic context for specifying the meaning of a methodological concept.[5]

I begin with reflections on 'contingency' as a notion from the philosophy of science that contains the major ontological and epistemological foundations for the CPT approach. Next, we define two major terms – necessary conditions and sufficient conditions – as linguistic and logical foundations of 'configurational thinking'. Furthermore, I reflect on the difference between 'additive causality' and 'interactive causality' and introduce the terms 'causal chains' and 'causal conjunctions' as important distinctions for an analytical approach in which timing and temporal sequences play important roles in drawing causal inference. Subsequently, I specify our theory-oriented understanding of 'causal mechanism' as a configuration of three kinds of social mechanisms: situational mechanisms, action-formation mechanisms and transformational mechanisms. Finally, I discuss the term 'context', which is often invoked in the methodological debate on causal mechanisms, and argue that it does not make sense to see 'context' or 'context-sensitivity' as something specific for mechanism-based explanations. Instead, the ability to take into account much contextual information for the analysis of each case is a basic feature of all small-N approaches.

#### *Contingency*

'Contingency' is a key term used by proponents of causal-process tracing to point to their basic assumption that the effects of causal conditions and the workings of causal mechanisms are dependent on other factors and mechanisms and that CPT is especially suited to reveal these (inter)dependencies and configurations. Sandra Mitchell (2002: 183-7) provides an overview of different understandings and sources of contingency, based on insights gained from examining how biologists address causal complexity and generalization. First, she clarifies that "contingency comes in degrees so that the difference between generalizations in biology and in physics is not one of a lawless and lawful science, but rather a difference in the degree the causal dependencies described depend on prior conditions" (ibid. 180).

[5] This represents a very different approach in comparison to Gerring's (2008) attempt to extract a "minimal core definition" of the term "causal mechanism" through an inductive analysis of the usages of the terms within the literature. As a consequence, we arrive at a different definition.

According to Mitchell , four main sources and forms of contingency can be differentiated:

- space-time contingency,
- evolutionary contingency,
- multi-component contingency, and
- multi-level contingency.

These forms of contingency correspond to the major epistemological and methodological concepts of the CPT approach, as will become clear in the following sections and chapters. First, the assumption that causality plays out differently depending on the spatial and temporal setting provides the ontological fundament for one of the central epistemological features of the CPT approach: causal inferences are drawn on the basis of temporal and spatial contiguity. In contrast to this first type of contingency, which focuses on the current structural environment (in crucial moments) as the source of conditionalizing factors, the second type of contingency locates these conditions in the past. Evolutionary contingency is considered in CPT methodology through the reflections on 'causal chains' and 'process dynamics'. Multi-component contingency points to the insight that the interaction of multiple causal factors is often not based on simple rules such as additivity. Instead, the interaction between multiple causal factors alters the very functioning of one or more of these factors. The interaction can dampen or amplify the causal power of individual factors and potentially even nullify their effects or reverse their causal direction (Mitchell 2002: 186). The ontological assumption of multi-component contingency forms the basis for the search for causal combinations or configurations, which is an important characteristic of the CPT approach. Finally, multi-level contingency refers to the fact that the operation and effects of causes on a lower level of analysis depend on their embeddedness in material, ideational or institutional structures on a higher level of analysis. This form of contingency provides the basis for our understanding of causal and social mechanisms and for the assumptions that a full-fledged mechanism-based explanation is based on a multi-level model that includes structural conditions and actors as well as situational mechanisms, action-formation mechanisms and transformational mechanisms (see below).

*Necessary and sufficient conditions*

Similar to Qualitative Comparative Analysis (Ragin 2000), causal-process tracing is an analytical approach based on "configurational thinking" (Ragin 2008). In consequence, in both approaches, it is most adequate to consider causes or causal factors as (potential) causal conditions and to focus our analysis on the question of which causal conditions and/or causal configurations are 'necessary' and/or 'sufficient' for the outcome of interest. The following definitions have been introduced for these terms:

*Necessary condition:* A causal factor (X) is a necessary condition if the outcome (Y) is occurring only if X exists. Nevertheless, Y does not always have to occur if X exists. In other words, Y is not possible without X, but X does not always lead to Y.

*Sufficient condition:* A causal factor (X) is a sufficient condition if the outcome (Y) always occurs when X exists. Nevertheless, Y can also occur when X does not exist. In other words, X always leads to Y, but Y is also possible without X.

The main difference in the way we conceptualize causation in the COV approach is the fact that we do not assume that X is a necessary AND sufficient condition for the outcome, but rather we begin with the assumption that a plurality of causal conditions is necessary to be jointly sufficient for producing the outcome.

In contrast to cross-case analysis (QCA), CPT is always searching for causal conditions that are individually necessary and, in combination with other causal conditions, sufficient for the outcome. This means that we have to strictly distinguish between the status of a causal condition or configuration within a specific case and the status of a causal condition or configuration in a larger population of cases. We might have been able to provide strong evidence (through causal-process tracing) that a causal factor was necessary for producing the outcome in a specific case, but it might very well be that this factor is not necessary in another case. Recognizing and accepting this fact has a major influence on the way we draw further conclusions beyond the investigated case(s).

*Additive and interactive causal configurations*

Beginning with the assumption that a plurality of causal conditions is necessary to be jointly sufficient to create a specific outcome does not yet imply a specific assumption regarding how the causal conditions work together. To obtain a more precise understanding of what we are searching for when we examine 'causal configurations', we can differentiate between:

- the additive effect of a configuration of causal factors, and
- the interaction effect of a configuration of causal factors.

In the first meaning of 'configuration', it is assumed that each causal factor has a specific amount of causal power. In a specific situation, more than one causal factor is necessary to overcome a certain threshold to produce the causal effect. Nevertheless, in principle, it would also be possible to reach the effect if one causal factor were to have a stronger expression or a larger amount of causal power (in correlational terminology: if the factor were to reach a higher score on a scale that measures the existence and strength of a causal variable). In contrast, the second meaning of 'combination' suggests that the causal power of each individual causal factor depends on the existence (or on a specific strength) of the other causal factor and that each of the causal factors is a necessary condition for the causal effect. One single causal factor can be very strong. Nevertheless, it would never be able to cause the outcome alone. An additive understanding of causal factors assumes that each factor is, in principle, substitutable for the other factor, whereas the notion of causal interaction implies that each causal factor is a necessary condition and, together, they are sufficient for the outcome.

*Causal conjunctions and causal chains*

Combining configurational thinking with the other core feature of CPT – the importance that timing and temporal sequences play in inferring causality – leads us to another important distinction. We can differentiate between the following two types of causal configurations:

- A 'causal conjunction' is a causal configuration in which multiple causal conditions work together (in additive or interactive ways) at a specific point of time or over a short period of time to produce the outcome of interest. In other words, the causal conditions work together in a specific situation.
- A 'causal chain' is a causal configuration in which specific causal conditions form the necessary and sufficient preconditions for triggering other necessary and sufficient causal conditions or configurations at a later point in time, and this causal chain leads at the end of the process to the outcome of interest. In other words, the causal conditions work together in a specific sequence. Causal chains imply an interactive configuration because each factor in a causal chain is non-substitutable. Furthermore, the 'interaction' is asymmetric because each precondition influences the next factor in a causal chain but the

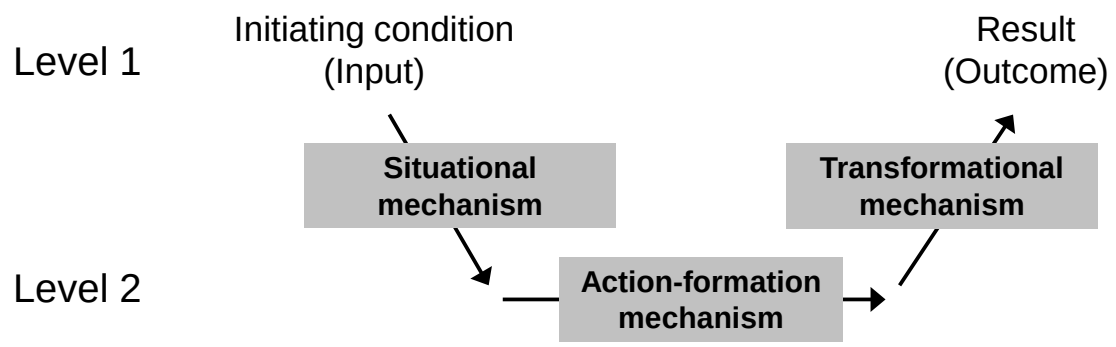
reverse is not true (otherwise the causal chain turns into a causal spiral, something that we address in a section on 'process dynamics', Blatter and Haverland 2012: 121-3).

One of the main advantages of CPT in comparison to the cross-case techniques based on configurational thinking (QCA) is the fact that CPT is able to clearly identify in which temporal order the elements of a causal configuration concatenate to produce the outcome.

*Social and causal mechanisms*

I propose to use the term 'causal mechanism' to refer to those causal configurations that link generic social mechanisms in a multi-level model of causation. In accordance with theory-oriented adherents of a mechanism-based Social Science (e.g. Elster 1998; Esser 1993, 1999-2001; Hedstroem and Swedberg 1998: 22; Hedstroem and Ylikoski 2010), I view causal mechanisms as configurational entities combining three different types of social mechanisms: 'situational mechanisms', 'action-formation mechanisms', and 'transformational mechanisms' (Figure 1).

Figure 1: Different types of social mechanisms that form together a causal mechanism




The action-formation mechanisms are based on theoretical micro-foundations, general assumptions about the behavior of individuals. Rational Choice Theory has developed the most sophisticated specifications of the action-formation mechanism, but there are additional theories that provide micro-foundations, such as Symbolic Interactionism (Goffman 1959), the Theory of Communicative Action (Habermas 1981a, 1981b) and others (Turner 2003 [1974]). The situational and transformational mechanisms link different levels of analysis. In the Social Sciences, there already exists a broad range of analytical models that include a coherent set of social mechanisms, for example, models of strategic interaction within Game Theory or models of diffusion and models of network effects (Esser 2002: 140).

Such clearly delineated definition has the following advantages and consequences:

- It is the only consistent way to distinguish the term 'mechanism' from other kinds or conceptualizations of causal factors (variables or conditions). A mechanism is neither an intervening variable nor a necessary or sufficient condition on the same level of analysis. If we trace those kinds of causal factors, we do not need an extra term. In order to avoid ambiguity (two terms for the same thing), we should talk about causal mechanisms only when we mean something different than variables or causal conditions.
- Introducing the term 'mechanism' highlights the ambition of the researcher to integrate empirical analysis with basic social theory. Viewed from the perspective of empirical research, mechanism-based explanations are more closely linked to basic social theory

than variable- or condition-based explanations, which have a stronger affinity to applied research interests. From the perspective of social theory, using the term 'mechanism' implies an affinity for actor-cantered explanations and micro-foundations (not necessarily a commitment to a strong version of methodological individualism; see Hedstroem and Ylikoski 2010: 59-60).

- Defining causal mechanisms as a multi-level configuration of generic social mechanisms points to the fact that mechanism-based explanations stimulate the combination of case study research with abstract modelling and experimental research.

*Summary*

Table 2 provides an overview and summary of the main concepts that are relevant for applying configurational thinking in a causal-process tracing approach.

Table 2: Types of causal configurations

| Different types according to **mutual substitutability** | **Configuration based on additive causality:** Substitutable Causal Conditions | **Configuration based on interactive causality:** Non-Substitutable Causal Conditions |
|---|---|---|
| Different types according to **temporal order** | **Causal conjunction:** Situational Combination of Causal Conditions | **Causal chain:** Sequential Combination of Causal Conditions |
| Different types according to **theoretical ambition** | **Causal combination:** A Configuration of (All Kinds of) Causal Conditions | **Causal mechanism:** Multi-Level Model of Causation based on the Configuration of Three Types of Social Mechanisms |

The divergent types of causal configurations in each column have a strong affinity for each other, but there exists no one-to-one connection. Causal chains and causal mechanisms imply an interactive understanding of causality. Causal combinations of individually necessary and jointly sufficient conditions, in contrast, can be based on additive or interactive causality and can contain causal conjunctions and causal chains.

*Appendix: Contexts*

Some scholars perceive context to be the necessary complement to causal mechanisms within Social Science explanations. Falleti and Lynch (2009: 1152), for example, define context "as the relevant aspects of a setting (analytical, temporal, spatial or institutional) in which a set of initial conditions leads (probabilistically) to an outcome of a defined scope and meaning via a specified causal mechanism or set of causal mechanisms". From our point of view, we should clearly differentiate between those factors of influence that we are primarily interested in (because of theoretical or practical reasons) and additional features of a case that help us to reach a more thorough understanding of a case and lead, in consequence, to an adequate interpretation of empirical information and a more valid classification of causal factors and outcomes. Whereas the former are potential causal conditions, the latter form the context for causal conditions, causal mechanisms and outcomes. For example, if a specific institutional setting has been identified as being of crucial importance for the implementation of a new

policy paradigm, we should not call this a "contextual factor"; instead, it is a necessary condition within a causal configuration that (perhaps, in combination with other conditions) has been shown to be sufficient for the outcome. For the major factors of interest, the terminology of necessary and sufficient conditions, together with the principles of configurational thinking, allows for a much more precise description of the status and function of causal factors than the term "context".
Furthermore, if we avoid to use the "context" when we mean another condition that is necessary in order to make a condition sufficient it is possible to use the term "context" in a specific and, therefore, more precise way. Within a COV approach, contextual information allows us to select indicators and to assign scores on the measurement scale in a much more differentiated and reflective way, in comparison to large-N studies, where the indicators are uniform and the assignment of scores is usually conducted in a rather mechanical way. In other words, contextual information enhances the internal and conceptual validity of our measurement. Within a CPT approach, contextual information is important for providing comprehensive story lines, especially for gauging the certainty and reliability of the most important pieces of empirical evidence: 'smoking guns' and 'confessions' (see below). Within a CON approach, context information fulfils a similar function insofar as it can be employed to thoroughly reflect on the congruence between concrete observations and abstract propositions.

### *Causal-process observations: Storylines, smoking guns, and confessions*

Three types of causal-process observations build the empirical basis for a thorough reflection on the question of whether certain causes or causal configurations should be viewed as necessary and sufficient conditions for the outcome in the case under investigation.

#### *Comprehensive Story Lines*

The narratives, or storylines, that provide an overview of the overall process that has led to the outcome of interest have two functions:

- They describe the most important structural causal conditions that potentially have an influence on the outcome and the development of these factors over time.
- They identify the most important steps that have led to the outcome. In other words, the overall process is sectioned into different sequences that are separated by decisive situations and phases of transformation. The latter are rather short periods of time that have the characteristics of 'critical (con)junctions' – their outcome strongly affects the further path of a causal process (for example, Pierson 2000b: 87-9, 2004).

Tracing the development of potentially relevant structural causal conditions and outcomes over time is an important step in the CPT approach. First, it allows for identifying 'turning points' and 'phases of transformation' for these conditions and outcomes. This, in turn, is the empirical basis of two additional steps:

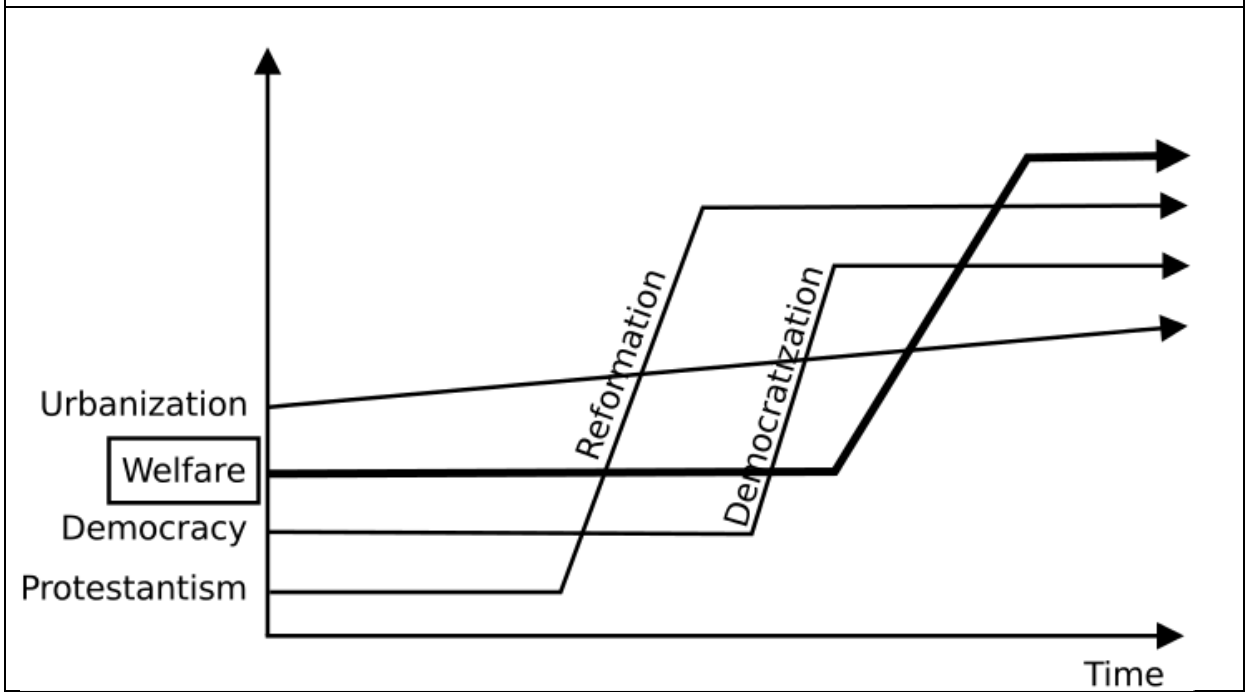
- The temporal proximity and succession of turning points and phases of transformation of different conditions can be used as evidence for or against the claim that there are causal connections between these conditions.
- Turning points and phases of transformation can be viewed as 'critical moments', for which it makes sense to dig deeper into the empirical process to reveal the workings of causal conditions and mechanisms in detail.

This can be illustrated with a fictitious example, as presented in Figure 2. Let us assume that we are interested in the preconditions that make a strong increase in welfare possible. Let us further assume that we found three main theories for the explanation of rapid socio-economic growth in the literature: a socio-economic approach that focuses on urbanization; a culturalist approach that views the 'capitalist spirit' stimulated by the reformation/protestantism as the crucial trigger, and a political-institutionalist approach that assumes that (the transformation towards) democracy is a precondition for socio-economic welfare expansion.

To trace the preconditions for rapid growth, we examine countries that experienced slow increases of welfare in earlier years and a dramatic increase in welfare in later years. In other words, we choose a 'positive case'. Some might argue that we have selected two cases according to the research design of a diachronic comparison. Nevertheless, that is not an accurate interpretation because the case is selected based on the value of the dependent variable and not based on the value of the independent variable of interest (as would be the case within an COV approach). Furthermore, we do not attempt to control all independent variables, only the one of interest. Finally, as will become clear shortly, tracing the development of causal conditions and outcomes over time within a CPT approach follows a different logic, uses different terminology and leads to different suggestions to focus on during the analysis.

Figure 2 reveals the empirical results of our attempts to trace the developments of the outcome of interest (welfare) and the three potential causal conditions over time. Please note that the presented results do not represent the state of the art in this field of research but are instead presented for purposes of illustrating the different ways to draw causal inferences within a COV and within a CPT approach.

Figure 2: Development of potential causal conditions for increasing welfare over time




In Figure 2, we can identify 'turning points' and 'periods of transformations' for the outcome of interest (welfare) and for two of the three potential causal conditions. These turning points are moments in which the pace or the direction of developments change and can be used to

differentiate social processes in different sequences. First and foremost, we can identify a close temporal contiguity between the period when the process of democratization occurred and the beginning of the phase of strong growth rates. This serves as important (but not sufficient) initial empirical evidence for the theoretical assumption that it is, indeed, the process of democratization that triggers a higher rate of socio-economic growth. There is no such temporal contiguity between the process of religious reformation and the turn towards higher growth rates. This serves as important (but not sufficient) empirical evidence that a new religious spirit did not trigger higher growth rates, at least not directly, because the empirical results allow for the possibility that reformation has triggered democratization, which, in turn, led to stronger increases in welfare. In fact, the presented empirical results of the long-term developments serve as initial empirical evidence for such a causal chain (see below). The fact that we find a steady process of urbanization without any turning points serves as initial evidence that this potential causal factor has not had a direct influence on accelerating growth rates. Furthermore, this is only one piece of evidence, and it is as of yet unclear whether or not urbanization played any role in the overall process towards stronger increases in welfare.

In principle, the empirical information that is presented in Figure 2 can be analyzed and interpreted in co-variational terms as well as in the configurational terminology of causal-process tracing. Within co-variational thinking, we use the terms that are depicted on the left-hand side of the graphic as variables and interpret the lines as scores on a scale that measures the value of these variables. We must transform the information into 'variable-scoring observations' to draw logical conclusions within a diachronic comparative case study design. The main challenge is identifying how to sequentialize the overall process into different cases. If the overall process is broken down into two cases, one covering the first half of the process, and the other one covering the second half of the process, and the values of the variables are measured in the middle of each time period, the researcher cannot draw any decisive conclusion because the dependent variable (welfare) is 'overdetermined' because two independent variables show corresponding co-variation: Democracy and Protestantism. Only if we break down the process into three cases, one before the reformation occurred, one for the following period until the turn towards higher growth rates set in, and one for the period following the growth rate increase, can we discriminate between Democracy and Protestantism as causes for higher growth rates. This example shows how strongly the co-variational results drawn from a diachronic comparison are dependent on how we slice the overall process into case-pieces.

Within a CPT approach, we do not refer to dependent and independent variables and do not focus on the co-variation of these variables. Instead, we use the terminology of 'causal conditions' and focus on the temporal contiguity and temporal order of 'turning points' and 'phases of transition' in the development of these conditions. The different way of thinking is also evident due to the fact that we use terms that refer to processes and not terms that point to concepts for which different values or levels can be measured, for example, 'democratization' instead of 'level of democracy'. The underlying assumption is that the transformational process of democratization has triggered causal mechanisms that stimulated socio-economic growth (for example, the 'creative destruction' that individuals experience during the transformation towards democracy stimulates similar innovative activities within the economic realm). A co-variational analysis would be more consistent with a different link between democracy and welfare. Here, the assumption would be that only when democracy became a stable form of political regime did it serve as a condition for increasing socio-

economic welfare (for example, because the rule of law as an important dimension of a modern liberal democracy is a necessary condition for capitalists to invest). Within a CPT approach, the main challenge for the researcher is to find further empirical evidence that provides certitude that democratization has indeed triggered the higher growth rates. For this, he would attempt to more closely examine the period of time when the process of democratization occurred and when the growth rates accelerated. Furthermore, he would attempt to find empirical evidence for (and against) the different causal mechanisms invoked by the slightly different causal conditions 'democratization' and 'stable democracy'.

*Smoking guns*

We use the term 'smoking gun' (or 'smoking-gun observation') for an observations that presents a central piece of evidence within a cluster of observations, which together provide a high level of certainty for a causal inference. We take terminology seriously; in consequence we use this term slightly different in comparison to others who write on causal-process tracing (e.g. Bennett 2010).

First, a smoking gun is an observation and not a test. A smoking-gun observation is connected to other observations, and together, the full cluster of observations can be used inductively to make strong causal claims. A smoking-gun observation receives its strength for making causal inferences by its dense temporal and spatial connection to other empirical observations. We do not need any ex-ante expectation about a suspect and a motive in order to draw inferential conclusions from a smoking gun observation. Of course, a smoking gun observation can be used to verify an ex-ante derived expectation. Nevertheless, as I will show in the last part of this paper, only if we recognize the "naturalist" foundation of smoking gun observations and its affinity to "critical realism", we are able to realize the full epistemological potential of the causal-process tracing method.

Clearly, the metaphor highlights the fact that a gun is an especially important piece of evidence, if we observe it when it is still smoking following its use with a significant consequence. In other words, the metaphor refers to temporal contiguity between the observation and the activity that caused the death of a person. The metaphor also reminds us that one observation alone, not even a smoking gun in the hands of a suspect, is never sufficient for creating a strong piece of evidence. This core observation must be complemented by further observations that provide further evidence for the causal claim on the basis of temporal and spatial contiguity. The observation of a smoking gun is only a strong piece of evidence if we have observations that provide certainty that the killed person has died or has been fatally wounded a few seconds prior. We need to complement the observation that serves as an indicator for the existence of a cause with at least one more observation that serves as evidence for the existence of the consequence or the effect. These two observations must be connected by temporal contiguity. In other words, the gun in the hands of a suspect is only a strong piece of evidence if we have at least two observations that provide certainty that two things occurred at the same time or in a short period of time:[6] smoke as an indicator that the gun has been fired a moment before and indications that give us a high level of certainty that the person has died because of the bullet that hit him at this moment. If the person who has been shot did not move when he was shot, a necessary piece

[6] Of course, each causal-process has its own implication about the time span between the cause and the effect. A short time span corresponds to "shooting", whereas some kinds of "poisoning" might imply a longer time span between observations which indicate the existence of a cause and observations which indicate an effect.

of evidence would be that the autopsy would clarify that the person actually died during or after the moment when we observed the smoking gun. We have to make sure that the person did not die before to be able to claim that the shooting was not only sufficient but also necessary for the death of the person.
Spatial contiguity is another requirement for a smoking-gun observation becoming a strong empirical basis for making causal inferences. If we observe a smoking gun in Phoenix, Arizona, and have strong evidence that a person died in Amsterdam at the same time, we do not have a smoking-gun observation, despite the temporal contiguity. To make a smoking gun a decisive piece of evidence, we need additional observations, for example, evidence that shows that the suspect and the killed person were present in the same place at the same time and that the gun was directed at the person who died. Of course, in the Social Sciences, we need a broad understanding of 'spatial contiguity' that extends beyond a narrow geographic definition and includes notions such as 'social contiguity' (joint membership in a community), close ties or intensive communication within a social network (something that appears as 'proximity' in social network analysis). Independently from our conceptualization of 'spatial contiguity', an observation arrives closer to the status of being a 'smoking-gun observation' the more we find further evidence that allows us to literally trace the 'pathway' between a cause and an effect.
Finally, the term smoking-gun observation has clear affinities for actor-centered elements of an explanation. In most cases, our major interest is in identifying the person who has shot the victim. To shed light on the causal processes that have occurred at 'critical moments', we attempt to determine how individual or corporative actors behaved, why they acted as they did and what the consequences of their actions and interactions were. In consequence, the capabilities and behaviour of actors usually take center stage in smoking-gun observations. They complement the focus on structural factors that dominate within the bigger picture that we draw when we scrutinize the comprehensive storylines.

*Confessions*

Smoking-gun observations usually do not reveal the motivations of the actors. But a judge or a jury would find it very difficult to convict a suspect who has no motive for the deed, even if many pieces of evidence point to a suspect.
There are two ways to complement a) the macro-structural features of a causal process that we establish in the comprehensive storylines and b) the smoking-gun observations, which document actions, interactions and consequences at critical moments on a meso-level with c) explanatory features on the micro-level (motives of actors that specify the "action-formation mechanism"):

- We can infer the motives by combining the empirical information on structural factors (for example, the 'objective' interest constellation) and the empirical information on the actions of the involved actors with a behavioural theory that provides a consistent conceptualization of an action-formation mechanism.
- We can attempt to find 'confessions', explicit statements of actors in which they reveal why they acted the way they did. These statements can contain information about all elements of a full-fledged mechanism-based explanation: information about how the actor perceived the situation (for example, the 'subjective interest constellation', his individual dominant frame or problem definition), indications about driving motivations (maximizing power, security, or wealth, following established norms, or receiving attention, for example), and reflections about the anticipated consequences of specific

actions. The latter depend not only on the perceived situations – such as interest constellations – but also on the perceived transformational mechanisms, for example, voting rules or likeliness of diffusion processes.

Please note that 'confessions' are important pieces of evidence, but as in judicial trials, we should not take them at face value without critical reflection. We should carefully examine the contexts in which actors provide information about their perceptions, motivations and anticipations. For example, when actors are interviewed, processes of ex-post rationalization often occur: actors justify their decisions by arguing that they pursued a specific goal, but in reality, the behaviour was much less reflective and strategically oriented, or it was driven by other goals. On the other hand, statements that actors make within the social or political process often serve strategic purposes: they attempt to send signals to other actors to enhance their bargaining power or to strengthen their legitimacy. We should be aware of typical biases with respect to motivations when we interpret statements of actors in specific contexts.

Nevertheless, confessions as traces of causal mechanisms that provide insight into the perceptions, motivations and anticipations of major actors are important complements to smoking guns because they reduce a problem of drawing causal inferences on the basis of temporal succession. Actors can anticipate certain developments or actions and react to these anticipated developments in advance. This undermines the logic of drawing causal inference on the basis of temporal succession because the 'cause' lies ahead of the 'consequence'. Nevertheless, in principle, the problem can easily be solved because the 'real' sequence is as follows: a) stimulus, which triggered the anticipation, b) action in accordance with the anticipation, c) adjustment to or avoidance of the anticipated situation. The real challenge lies at the empirical level, especially when the anticipated situation did not occur because of earlier adjustments.

Ideally, a full-fledged explanation based on CPT should include all three kinds of empirical evidence: comprehensive storylines that provide the 'big picture' by tracing the historical development of structural factors; smoking-gun observations, which create certainty with respect to the dense link between a cause and an effect; and confessions, which reveal the perceptions, motivations and anticipations of important actors. These types of causal-process observations are the main foundations for drawing causal inferences within a CPT approach. In our book we show that they become more convincing when we connect the causal-process observations to formal logic and social theory (Blatter and Haverland 2012: 119-23). Due to space restrictions, I cannot elaborate on this within this paper. Instead, I would like to use the remaining space for scrutinizing briefly an example and for highlighting another important aspect of the CPT approach – its specific understanding of generalization.

### *Example: Henry Brady's Data Set Observations versus Causal-Process Tracing Observations (2004)*

I use a famous case study in order to demonstrate that "timing" plays a dominant role in CPT and that an explanation that is (implicitly) based on a multi-level model of causal mechanisms is especially convincing in its causal inferences. Henry Brady introduced his analysis of the 2000 U.S. presidential election in order to show that CPT can provide more convincing estimations of the electoral consequences of the fact that the TV networks prematurely declared Al Gore the presidential winner in Florida than statistical analysis based on data set observations (he showed that the Bush might have lost between 28 and 224 votes and not 10000 as the statistical analysis implied). We, instead, use this example primarily in order to

show that methodologists like John Gerring with a strong affinity to co-variational thinking do not really recognize the value and epistemological foundation of causal-process tracing. Gerring (2007: 177) argues: "Brady's conclusion did not rest on a formal research design but rather on isolated observations […] combined with deductive inferences". As we will see, Brady's observations are anything but "isolated observations."

Since the short case study is well known, I will skip the presentation of the study and its results and focus immediately on the aspects that are interesting in our context. First, I restate Brady's arguments in terms of necessary and sufficient conditions; then, I have a closer look at the empirical information and the temporal and theoretical foundations that form the basis for drawing causal inferences.

Brady argues that only those people in the Florida Panhandle who were planning to vote during the last ten minutes could have been influenced by the TV stations. In other words, having the right to vote in the Panhandle counties, having not voted until the last ten minutes and having the intension to vote are necessary conditions for being influenced by the call of the election. Yet, these conditions are not yet sufficient for actually being influenced. Being exposed to the media and being open to external influence are further necessary conditions for determining the call of the election to be effective. All five conditions must have been fulfilled to be sufficient to determine that the voting behaviour of individuals was affected.

Now, we turn to the ways in which Brady combined (implicitly) empirical information with temporal laws and mechanisms to make convincing calculations on the number of people who were actually swayed by the premature call of the election.

The first and most important step in Brady's line of argumentation is based on the assumption that those who had already voted could not have been influenced by the media reports. The conclusion is convincing because this assumption is based on the natural law of temporal succession. It is not merely improbable but rather impossible that the media influenced their voting behaviour. Brady adds information about the overall voting process (the 'big picture' or 'comprehensive story') to draw a first important conclusion: only 4,200 people could have been influenced. In other words, a cluster of empirical information on the overall process and the laws of temporal succession are necessary and together sufficient bases for drawing strong causal inferences.

The second step in Brady's argumentation is convincing because the empirical information is not 'isolated', but rather his information addresses precisely the necessary steps within a multi-level model of causation. The various pieces of information are gaining explanatory power because they specify the social mechanisms that work together to make the media influence effective: the average media exposure rate can be interpreted as the relevant specification of a situational mechanism; the information about the average percentage of people who are swayed by the media call of the election does the same for the action-formation mechanism, and the assumption that the distribution between Bush and Gore voters is the same among those who voted in the last ten minutes as among those who had previously voted might be viewed as the relevant specification of the relevant transformation mechanism.

### *Possibilistic Generalization*

It is important to realize that causal-process tracing as a consistent research approach does not strive for 'statistical generalization'. Correlational and co-variational analysis aims at drawing conclusions from a sample of cases to the wider population of cases that are similar with

respect to the independent (and control) variables. The goal is to answer questions such as "Does X make a difference?" (COV-oriented case studies) or "How strong is the difference that X makes?" (statistical analysis in large-N studies) not only for the cases under study but also for the entire population of cases from which the selected cases are drawn. It is misleading to assume that a CPT approach has the same goals and is merely exchanging 'causal factors/variables' for 'causal configurations' or 'causal mechanisms'. Instead, the goals and directions of generalization are entirely different: the goal is to specify the set of causal configurations (based on a combination of necessary conditions or on a combination of different types of social mechanisms) that make specific outcomes 'possible'. The term 'possible' has two meanings in this context:

1. It can denote the set of 'potential' causal configurations, based on all logically possible combinations of causal factors, or the set of 'potential' causal mechanisms, based on all logically possible combinations of situational, action-formation and transformational mechanisms. Together with theoretical reasoning, CPT helps to identify the set of relevant factors and the repertoire of social mechanisms that build the foundations for these sets of potential causal configurations. In other words, CPT can be used as an inductive element in the process of generating the "property space" for typological theories (George and Bennett 2005: 240-51). The main advantage of having such a set of potential causal configurations is to guide the selection of cases for further in depth-studies based on CPT, or it can be the starting point for a medium-N study using the QCA technique (ibid. 251-3; Leuffen 2007). Furthermore, CPT can contribute to the development of basic Social Science through the identification of new social mechanisms, which in turn makes the conceptualization of new multi-level models of explanation possible.
2. It can point to the set of 'proven' causal configurations (combinations of causal conditions or social mechanisms). This set is usually much smaller than the set of 'potential' causal configurations and contains those combinations of causal conditions or social mechanisms that have actually been confirmed in empirical studies as being effective for producing an outcome.

The ratio between the set of proven causal configurations and the set of potential causal configurations is an indicator of an important aspect of causal diversity: equifinality! The higher the ratio, the more we can conclude that there are quite different pathways or causal configurations that lead to the outcome of interest.

Each small-N study based on CPT can potentially enlarge these sets of possible causal configurations. For diversity-oriented social scientists, the discovery of new pathways and recipes that lead to certain results is, indeed, what they are striving for.

Nevertheless, these scrutinized ways of generalization tend to increase the complexity of causal explanations, and this tendency has to be checked by practical or theoretical considerations to focus the research on those causal conditions and causal mechanisms that are at the heart of scientific controversies or those that lead to useful practical advice. Whereas those research projects that begin with a non-integrated set of potential causal conditions have clear affinities to applied research and lead to middle-range theories for specific fields of research (George and Bennett 2005: 263-85), the causal mechanism-centered approach is usually used in scientific research programs and scientific discourses geared toward more generic explanatory models. In our book, we describe examples of both kinds of "possibilistic" generalizations (Blatter and Haverland 2012: 135-40). Due to space restrictions, I have to limit myself to the kind of generalization that is geared towards the set of possible social and causal mechanisms and to one example.

*Example: Drawing conclusions for the set of possible causal mechanisms*

As argued before, a meaningful mechanism-based explanation is based on a causal model that combines a social mechanism at a lower level of analysis with social mechanisms that link this lower level of analysis with the level of analysis at which the causal conditions and outcomes reside. With reference to Peter Hedstroem and Richard Swedberg (1998: 22), we differentiated three generic causal mechanisms: "situational mechanisms", "action-formation mechanisms" and "transformational mechanisms". In consequence, the most consistent means of generalizing within a mechanism-centered CPT approach is to draw conclusions from the findings of the case study either a) to the set of social mechanisms or b) to the set of causal mechanisms (multi-level models of causation) that are recognized within the Social Sciences. We find the first form of generalization in Nina Tannenwald's book on The Nuclear Taboo and the second form of generalization in Frank Schimmelfennig's book on the Eastern enlargement of the North Atlantic Treaty Organization (NATO) and the EU.[7]
Frank Schimmelfennig's conclusions (2003) represent the best practices with respect to how we can draw generalizing conclusions from causal-process tracing to the set of multi-level models of causation. He argues that his study indicates that those combinations of specific situational mechanisms and action-formation mechanisms which dominate the literature in IR are not the only possible ones and offers a new possible combination of these mechanisms. The dominant combinations in IR are a *materialist* construction of the factors that shape the preference formation with a *rationalist* theory of action-formation, on the one hand, and a *culturalist* approach to interest formation and a *sociological* theory of action-formation, on the other hand. Schimmelfennig points to Jeffrey W. Legro (1996), who has challenged this exclusive combination and argued for a combination of a culturalist approach to preference formation and a rationalist account for explaining the (inter)action of the state actors. In his study on Eastern enlargement, Schimmelfennig found the following combinations of situational and action-formation mechanisms: the first step of state interest formation occurred in accordance with a rationalist/materialist approach to preference formation, followed by the second step of international interaction, which is in line with a social constructivist conceptualization of action-formation. Implicitly, the decision-making rule of unanimity forms the third causal mechanism for the full-fledged explanation (Schimmelfennig 2003: 281-7). In other words, Schimmelfennig draws conclusions from his case study to the set of multi-level models of causation that should be accepted as possible causal mechanisms in IR.

***Preliminary summary***

In this part of the paper, I showed what it means to understand causal-process tracing as a full-fledged and coherent research design: It is a research approach that is interested in revealing the many and complex causes of an effect and not the effects of a specific cause – in other words: a CPT approach is Y-centred and has an affinity to ontologies and theories that are characterized by contingency and configurational thinking. In respect to epistemology, a CPT approach has strong affinities to "scientific realism" and draws heavily on the fact that

[7] Tannenwald and Schimmelfennig are also addressing the question of whether their findings can be generalized toward similar cases, actors and fields. Tannenwald (2007: 374-83) does this in a qualitative manner, whereas Schimmelfennig (2003: 112-51) adds a large-N event-history analysis to his small-N study. Both kinds of generalization rely on further empirical information, whereas possibilistic generalization requires information about the state of the art in the field of research or in the theoretical and paradigmatic discourse.

causality plays out in time and space; in other words: (spatio-)temporal continuity and contiguity play a major role in the way we try to provide empirical evidence for causal claims. Finally, within a CPT approach, the most important direction of generalization is not towards a population of similar cases but towards the sets of possible causal configurations and causal mechanisms. Such an understanding of CPT as a full-fledged research design with distinct goals and directions of generalization is important to overcome the idea that CPT is just an addition to cross-case analytical methods. Nevertheless, in the final part of the paper I want to argue that even if we understand CPT as a complement to other methods, only an understanding of CPT that is based on a scientific realist epistemology and highlights its "realist" foundations for drawing causal inferences allows us to realize the full potential of this methods for explanatory research projects in the social sciences.

## V. Epistemological preconditions for making CPT a powerful complement to deductive methods

In contrast to the preceding part of the paper, causal-process tracing is often understood in a more limited sense as a specific technique of drawing causal inference on the basis of "causal-process observations", observations which are not aggregated and analysed as data-set observations (e.g. Seawright and Collier 2010: 318, Collier 2011: 823). In the terminology of concept formation (Sartori 1984, Goertz 2006), this means that we reduce the "intension" (the number of defining/necessary characteristics) of this methodological concept in order to widen its "extension" (the range of empirical phenomena that are captured by this concept; in our case: methodological applications of CPT).

In the following section of the paper, I show that such a "thin" understanding of causal-process tracing allows to implant it as a technique of drawing causal inferences into research designs that have other goals as well as different ontological and epistemological affinities in comparison to the CPT approach. As a "thin" methodological concept, CPT can be embedded within or added to deductive research approaches like variable-centred co-variational (small-N) and correlational (large-N) approaches or the theory-centred congruence analysis approach. Nevertheless, we realize the full potential of CPT only when we acknowledge that an inductive understanding of CPT and a "scientific realist" foundation of causal-process observations allows to make causal inferences that go beyond those that we can make with these deductive approaches.

*How causal-process tracing can complement cross-case comparative methods*

Most advocates of co-variational approaches to case studies and correlation-based statistical analysis see "causal process tracing" as a technique that is used to strengthen or to test[8] the internal validity of causal claims that are primarily based on co-variational or correlational

[8] Whereas methodologist clearly prefer that causal-process tracing is applied after a COV-based case study or a statistical analysis has established a regular association between a cause (X) and an effect (Y), the reality in case study research is much more characterized by the fact that the researcher use causal-process observations as additional munitions in order to bolster their claim that it was indeed X and not Z or W that has caused Y. Testing implies a sequential application of co-variational methods and the method of causal-process tracing and such a "combined" research design demands that the results of a study using the first method are used to design the second study applying CPT. That is usually not the case when CPT is used to strengthen the findings of the co-variational analysis; here both methods are often "mixed up." In our book we clearly prefer "combining methods" in a sequential manner over "mixing methods" (Blatter and Haverland 2012: 205-35).

evidence (e.g. Gerring 2007).[9] In recent times, when multi-method research has become the buzz-word for most methodologists, we have seen many attempts to describe how CPT should be applied to complement co-variational or configurational cross-case methods. The advice how to select cases for CPT after a large-N statistical study or a medium-N set-theoretical study is getting more and more sophisticated (e.g. Gerring 2007, Rohlfing and Schneider 2011, Rohlfing 2012).

What is missing in all these methodological treatments is a reflection on the epistemological foundation of CPT. Implicitly or explicitly, most methodologist who provide advice how to complement co-variational analysis by "tracing processes" imply that the latter method proceeds in a similar deductive fashion as the former. This means that not only a co-variational hypothesis about the relationship between a cause (independent variable, X) and an effect (dependent variable, Y) is deduced from prior knowledge or from abstract theories but that the same is done for causal pathways or for underlying causal mechanisms which lead from X to Y. Whereas the co-variational method is used to find out whether there is a "concomitant variation" (Mill) between X and Y, "process tracing" is used to test if the expected causal pathway was actually taken or the causal mechanism was actually at work. If prior knowledge or theories point to a plurality of possible pathways/mechanisms that could lead from X to Y, causal process tracing is applied in order to find out which pathway was taken or which underlying mechanisms was at work. Furthermore, such an approach implies that CPT can be applied for the same research goals than co-variational approaches (to find out, whether X makes a difference and whether pathway/mechanism M or pathway/mechanism P is effectively responsible for the difference) and that we strive for generalizing the findings towards a population of similar cases (to the population of cases that shows a strong co-variational relationship between X and Y). All this makes sense as long as we assume as "thin" understanding of CPT and as long as we are selecting "typical cases" – cases which lie "on the regression line" (Lieberman 2005: 444) – in order to find out whether the deduced assumptions about causal pathways or causal mechanisms actually hold.

Nevertheless, if we select "deviant cases" or "outliers" in order to find out why the expected effect has not taken place in these cases, we have to leave the epistemological realm of critical rationalism and its reliance on deductive inference and formal logic. Scholars who are confined to this epistemological stance focus solely on case selection and do not really provide much advice in respect to how to make a convincing claim that a specific causal factor Q and not another causal factor Z has been the "omitted variable" or the "scope condition" that has to be added in order to explain the deviance or in order to modify the original hypothesis.

The crucial insight is that the new variables, conditions or mechanisms that we "discover" by studying deviant cases are by definition not formulated and specified ex ante. Therefore, the causal inference cannot be made by pointing to the congruence between ex-ante expectation and empirical observation (and neither by the formal logics of co-variation). The claim that one specific causal factor and not another is responsible for the deviance must be based on an

[9] The same is true for methodologist who propose to complement Qualitative Comparative Analysis with CPT (Rihoux and de Meur 2009). I will focus here primarily on the role of CPT within co-variational methods, but the insights are very similar when we think about how CPT complements the cross-case comparative and set-theoretical methods which correspond to configurational thinking (csQCA and fsQCA).

inductive epistemology.[10] The "scientific realist" approach to CPT that we propose includes methodological advice how to bolster the claim that the causal factor Q is necessary and (together with the other conditions that we had taken into account before) sufficient for explaining the deviant outcome. "Smoking gun-observations" and "confessions" provide denser and deeper insights than data-set observations. The causal claim that we infer from these causal-process observations is based on the "realist" or "naturalist" foundations of spatio-temporal contiguity and continuity and/or on our ability to combine the empirical insights that we gained on various levels of analysis into a theoretically coherent multi-level model of explanation (causal mechanisms as we have defined this term, see the Brady example presented before).

*How causal-process tracing can complement a congruence analysis*

We gain the same insights when we look at the ways in which CPT can complement the CON approach. Congruence analysis is based on a "thick" understanding of the term "theory" as an abstract and general perspective towards the social world and not on the "thin" understanding of theories as hypothetical statements about the causal relationship between variables. Nevertheless, the CON approach proceeds in a similar deductive fashion as the COV approach to case studies or other co-variational or configurational methods which rely on cross-case comparisons.

Before I get to the main point, it is important to highlight the fact that many descriptions of "causal process tracing" that we find in the literature resemble much more our congruence analysis approach than our causal-process tracing approach. That is especially the case since many proponents of "process tracing" describe this method as a strongly deductive endeavour in which we develop competing explanatory claims before we enter the empirical field and try to confirm and disconfirm those deduced claims (e.g. Bennett 2010, Collier 2011). Furthermore, the central epistemological fundament of the CPT approach – (spatio)temporal continuity and contiguity – is becoming less and less important as core characteristic of "process tracing" in recent treatments.[11] George and Bennett (2005: e.g. 140) had put strong emphasis on "spatial contiguity and temporal succession" when they describe CPT as a search for causal mechanisms. Other scholars, in contrast, treat these "natural" or "realist" epistemological foundations not anymore as core elements of this approach. For example, when Brady, Collier, and Seawright (2006) illustrate "causal process tracing" they provide examples from Political Science in which timing plays a major role in the explanatory endeavour. Nevertheless, that is not the case with their examples outside of Political Science (ibid. 360-5). Not in one of the latter examples is the temporal unfolding of a causal process crucially important for drawing causal inferences. But those examples strongly resemble the methodological approach that we call "congruence analysis."

Please note that I do not question the usefulness of deductive approaches in which empirical evidence is used in order to judge the constitutive and causal claims that are deduced ex-ante from different (competing or complementary) theoretical approaches. On the contrary, we

[10] Methodologists who are strongly committed to critical rationalism and co-variational thinking argue that the discovered causal factor has only the status of a "hypothetical cause" and that it has to be tested by a further study. Such a perspective clearly devaluates the epistemic power of causal-process tracing.

[11] The same is true for Peter Hall's description of „systematic process analysis" (Hall 2006). Although "process" figures prominently in the title of his approach, he puts no emphasis on temporality in his description.

have developed a full-fledged research approach – the congruence analysis approach (CON) – that is based on this feature. Nevertheless, we should take terminology seriously and therefore, we should not label a method of drawing causal inference with the term "process" when temporality plays not necessarily a role in the method.

Putting deductive approaches under the much more adequate notion of "congruence analysis" has another advantage: it allows us to recognize the unique epistemological potential of causal-process tracing. This can be shown best when we compare the ways in which Bennett (2008, 2010) and Collier (2011) describe their deductive take on causal-process tracing with our description of the "congruence analysis proper" (Blatter and Haverland 2012: 188-91).

With reference to Van Evera (1997: 31-2) Bennett (2008, 2010) and Collier (2011) develop four kinds of tests as core features of their understanding of "causal process tracing": "hoop tests", "smoking gun tests", "straw in the wind tests" and "doubly decisive tests." In his 2008 article, Bennett keeps his wordings close to Van Evera and labels the two dimensions on which the distinction between the four tests relies "certainty" and "uniqueness:" "Unique predictions are those accounted for only by one of the theories under consideration, while certain predictions are those that must be unequivocally and inexorably true if an explanation is true" (Bennett 2008: 706). In 2010, he uses the more precise (and more fashionable) terminology of "necessity" and "sufficiency" in order to characterize the four kinds of tests: "Hoop tests" provide a necessary but not sufficient criterion for accepting an explanation; "smoking gun tests" refer to a sufficient but not necessary criterion for confirmation; "straw in the wind tests" provide some hints but neither a necessary nor sufficient criterion for establishing or rejecting a hypothesis; and finally "double decisive tests" are based on evidence that is a necessary and sufficient condition for accepting a hypothesis (Bennett 2010: 210-11).

These tests are certainly helpful hints for reflecting on the relevance of specific kinds of evidence for confirming or disconfirming theories. Furthermore, the terminology of necessity and sufficiency is a step forward in terminological adequacy since the term "certainty" is very ambiguous. But for the goal in this paper, I can use the term "certainty" to point to the major difference between our understanding of causal-process tracing and the one advocated by Bennett and Collier. In our understanding "smoking gun observations" provide decisive empirical evidence for the connection between a cause and an effect. In other words, it allows us to be certain and confident that the cause has been sufficient (maybe in combination with other factors) for producing the effect (in the case of investigation – no implication is drawn for further cases). This conclusion is based on a dense cluster of empirical evidence. The conclusion, that the cause is sufficient for the effect can be drawn in a deductive as well as in an inductive fashion. That is not the case with the understanding of "certainty" that Van Evera introduced and how Bennett and Collier describe "smoking gun tests." Their understanding is limited to a deductive approach. At this place, the "scientific realist" fundament becomes apparent. It allows for a much broader spectrum of methods to draw causal inference than the logical positivism on which Bennett and Collier draw and it is a nice illustration of what it means when we assume that "causation is a relation in nature and not in logic" (Wendt 1999: 81).

Their purely deductive and therefore limited approach gets even more apparent when we contrast it to the typology that we developed in order to systematize the kind of conclusions that we can draw from comparing empirical evidence with theory-deduced expectations (constitutive propositions and causal hypotheses) (Blatter and Haverland 2012: 188-91).

A congruence analysis that is most consistent with the notion of a "three-cornered fight" (Hall 2006) begins the analysis with an empirical observation and simultaneously reflects on its congruence with theory A and theory B. Given that both comparisons can lead to three possible results, the combination can produce nine potential conclusions for each observation (see table 3).

Table 3: Ways of drawing conclusions in the congruence analysis proper

| | Observation(s) in line with expectations deduced from theory B | Observation(s) in contradiction to expectations deduced from theory B | Observation(s) beyond the expectations deduced from theory B |
|---|---|---|---|
| Observation(s) in line with expectations deduced from theory A | Conclusion A: Connections to other observations necessary for discriminatory evidence | Conclusion B: Strong evidence for preferring A to B | Conclusion C: Evidence underscores explanatory power of A |
| Observation(s) in contradiction to expectations deduced from theory A | Conclusion D: Strong evidence for preferring B to A | Conclusion E: Strong evidence for the need for other theories | Conclusion F: Evidence undermines explanatory power of A |
| Observation(s) beyond the expectations deduced from theory A | Conclusion G: Evidence underscores explanatory power of B | Conclusion H: Evidence undermines explanatory power of B | Conclusion I: Evidence for the need of expanded or other theories |

There a two main differences between our table 3 and the table that Bennett provides in order to systematically present the four tests described above (Bennett 2010: 210):

- Our table starts with empirical observations and develops types of possible conclusion in a "bottom up" fashion whereas Bennett develops the tests in a "top-down" fashion. The difference in practise might not be very big since the process of doing case study research is characterized by strong iteration (much stronger than in large-N or medium-N studies). Nevertheless, the two ways and the wordings (e.g. hypothesis versus theory and the much stronger wordings in respect to falsification/verification that Bennett uses) indicate different epistemological affinities: Bennett's approach is much more positivist than ours, which explains the next and more important difference.
- In contrast to Bennett we take into account that causal-process tracing is able to reveal the decisive influence of a causal factor that has not been deduced ex-ante in a deductive fashion. In other words, only in our approach we take systematically into account that there might be observations which cannot be connected to our theories (as confirming or disconfirming evidence) but that we see as very important for explaining the outcome in the case under investigation (the cell in the last column and the last row of table 3). The only epistemological foundation for drawing such a conclusion is "critical realism" and it's natural foundations that we have laid out in our treatment of CPT. If we find a smoking gun observation and the corresponding confession we can draw strong causal inferences, even if we cannot link these observations to one of the theories that we have seen as relevant for the field of research before.

Please note that I strongly advocate to connect those new empirical finding to abstract theories. In principle we could present the findings of our causal process tracing endeavour as we would have included those theories from the beginning. Than it would seem as we would have followed the deductive approach that we laid out as "congruence analysis" and that is in line with Bennett's and Collier's description of CPT. Nevertheless, a sequential approach in which we do a congruence analysis on the basis of all established theories first, followed by separate and inductive causal-process tracing approach is not only more transparent, it leads us also to a much more explicit reflection on the standing of various theories in the scientific discourse. This, in turn, is a precondition for drawing reflective conclusions beyond the case(s) under investigation (see the example that I provide as a model for complementing a CON approach with a CPT approach; Blatter and Haverland 2012: 219-23).

Let me end with a remark on metaphors. They have an important role in guiding scholars in their approach to social science research. Advocates of CPT have argued that case study researchers should think like detectives (and not so much like statisticians) and have introduced Sherlock Holmes as a role model (e.g. Collier 2011). I think that this role model is misleading. Instead we should take state attorneys (prosecutors) as our role models when we think about the necessary conditions for drawing convincing conclusions from causal-process observations. What is the difference between the work of detectives (in fictions!) and the work of attorneys in court? For detectives it might be indeed a smart way to proceed in accordance to the "method of elimination" that characterizes the plots of the Sherlock Holmes stories. According to Collier the method of elimination is in line with the following reasoning of Sherlock Holmes: "when you have eliminated the impossible, whatever remains, however improbable, must be the truth…" (Collier 2011: 827-8). A state attorney who would build his pleading in front of a jury or judge on this rational would certainly be out of job very soon. You (hopefully!) cannot convince a jury/judge to convict a potential murder on the basis that you have proven that all other suspects are not guilty! In the process of searching for a murder the "method of elimination" is certainly a good guiding principle of police officers and detectives in order to focus their investigation. But when it comes to proving that a specific suspect has really been the murder, we need the kind of observations that we have described as the empirical fundaments for CPT: smoking-guns and confessions.

## VI. Summary and conclusion

Overall, in this paper I tried to make the case for a diversified understanding of case study research. The main goal of the paper has been to show what it means when we distinguish between a causal-process tracing approach and a congruence analysis approach as two distinct alternatives to the traditional co-variational approach. First, it allows to develop comprehensive and internally coherent research designs and makes us more aware of the different goals that we try to achieve when doing case study research. Furthermore, a more narrow and precise understanding of causal-process tracing leads to a better understanding how CPT can complement other more deductive methods of drawing causal inference. Those who think that case studies are not mere preludes or addendums to medium-N and large-N studies will certainly value the insights that causal-process tracing draws on ontological presuppositions and epistemological foundations which make this qualitative method not only necessary (see Goertz and Mahoney forthcoming) but also sufficient for drawing causal inferences for the cases under investigation and for drawing further conclusions for the sets of possible causal pathways and mechanisms.

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