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Co-Variation and Causal Process Tracing Revisited: Clarifying New Directions for Causal Inference and Generalization in Case Study Methodology

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Alexander George and Andrew Bennett's *Case Studies and Theory Development in the Social Sciences* (2005) and John Gerring's *Case Study Research: Principles and Practices* (2007) are among the best examples of the dramatic increase in methodological reflection that we have witnessing in recent years in case study research. In our elaboration, we will concentrate on what we perceive as problems and weaknesses of the two books. It is important to stress our conviction that both have contributed tremendously to the improvement of the understanding of case study research (not only for the development of the typology which we will present below) and deserve a central place in every case study methodology course (which they actually have in the courses we teach). The review itself is set up in a manner that reflects our own work on doing (comparative) case study research. We first sketch our own typology of styles of case study research, and then discuss the two books with reference to this typology.

We believe that it makes sense to differentiate between three styles of case study research. We labeled the three styles according to their main technique to generate "inference" from concrete empirical observations to abstract explanatory propositions for the *cases under study*: The first style is accounting for *co-variance* among independent and dependent variables. The second one is *tracing processes* that are used in order to identify causal mechanisms on a lower level of analysis, or in order to identify causal configurations based on complex interactions and/or necessary context factors. Process tracing involves stressing the temporal unfolding of causality, and it is based on a holistic ontology in which the basic unit of analysis is not an individual variable, but a multi-level model or a configuration of densely linked causal factors. The third style is intensively reflecting on the (non) *congruence* between a broad range of concrete expectations, which can be deduced from coherent abstract concepts (theories) and empirical findings. The latter is based on an understanding of theory as an interpretative framework (without the radical constructivist assumption that theory fully determines our empirical findings). The relevance of theoretical frameworks can be tested empirically by checking how many coherent meanings they can generate for understanding and explaining specific cases.

The three styles are not exclusive categories. Especially the last style has areas where it overlaps with the first two. Nevertheless, they vary strongly in the emphasis on what the necessary preconditions are to draw valid conclusion for the cases under study (see Table 1).

The differences are even more pronounced if we consider the understanding and direction of *generalization*–understood as drawing conclusions *beyond the cases under study*–which logically corresponds to the three techniques of drawing inferences (see Table 2). The co-variance style strives for "statistical generalization" (Yin 2003: 10): drawing conclusions from the findings of cases studied about the average contribution of a causal variable in explaining an outcome within a wider population of similar cases. The findings from process tracing are not used to draw conclusions for a population of cases but for a set of potential causal configurations or for multi-level causal models. The function of case studies here is mainly to show exactly whether and how a specific configuration of causal factors (potentially including context factors) or whether and how a causal mechanism leads to a specific outcome. Additional case studies would not strive to prove that this causal configuration also works within other cases, but they would try to find out whether other combinations of causal factors can also lead to the same or a similar outcome. We followed George and Bennett's labeling and called it "contingent generalization." We call the logic of gen-

Table 1: Different Ways to Draw Inferences

Inference	Description	Preconditions
Co-Variation	**Concrete Observations**: Co-variation (over time or space) among indicators of the dependent variable (Y) and indicators of an independent variable (X) **Abstract Conclusions**: X has a causal effect on Y	1. Control of other variables 2. Theoretically deduced hypothesis for causal direction
Causal Process Tracing	**Concrete Observations**: Temporal unfolding of actions and events, traces of "motivations" (or other lower-level mechanisms), evidence of (complex) interactions between causal factors, and/or information about restricting/catalyzing contexts, and detailed features of a specific outcome **Abstract Conclusions**: Actual working of a causal mechanism/ actual interaction between the elements of a causal configuration	1. "Smoking-gun" observations 2. A full "storyline" with "density and "depth" and a fine-grained picture of events within their contexts
Congruence Analysis	**Concrete Observations**: (Mis)matches between empirical findings and concrete expectations deduced from core elements of theories: e.g., central actors and structures, traces of motivational foundation of (inter)action, specific features of X and Y, co-variance among indicators of X and Y **Abstract Conclusions**: Relevance/relative strength of theories to explain/understand the case(s)	1. Plurality of full-fledged and coherent theories from which concrete expectations can be deduced 2. Plurality and diversity of available observations

eralization which corresponds to the congruence analysis "*abstraction*." Here, our emphasis is not on drawing conclusions from the "specific" (co-variation within the studied cases) to the "universal" (covering lawlike proposition for a specified population), but from the reality of "concretes" (observations) to the relevance of "abstracts" (concepts, theories and paradigms). The orientation is not horizontal (as in the co-variational approach), but towards "the vertical organization of knowledge" (Sartori 1984: 44). The various understandings and directions of generalization lead to different preconditions and consequences for case and/or theory selection (see Table 2; further elaborations can be found in Blatter and Blume 2008).

Based on this brief sketch of our typology specifying three styles of case study methodology, we now turn to the two books which have already become the authoritative sources for doing and teaching case studies in Political Science and beyond.

Although it is the more recent book, we turn first to John Gerring's *Case Study Research: Principles and Practices* because it is much easier to categorize, describe and evaluate. It represents a highly sophisticated and impressively clear-cut and consistent co-variational approach to case study research. Gerring develops his definitions and suggestions for making inferences within case study research on the basis of an "experimental template." The logical structure of the book and the stringent line of argumentation make it easily accessible and lead to systematic definitions, discussions of major issues and recommendations. We would like to point to what we see as an inconsistency within this book and provide a first argument for why we think that most case study researchers might not whole-heartedly embrace Gerring's co-variational style (a second one is given at the end of the review).

The insight which we can draw from the largest and most impressive chapter in the book, the one on case selection (co-authored by Jason Seawright), is somewhat contradictory to other parts of the book in respect to the relevance of cross-case comparison in the case study proper. Gerring and Seawright base their chapter on case selection on the assumption that the selected cases in case study research represent samples of the overall population of cases. From this background they discuss the following nine case study types: typical, diverse, extreme, deviant, influential, crucial, pathway, most-similar, and most-different. Selecting cases on the basis of prior statistical analysis is clearly preferred. This goes so far that in discussing the selection of most-similar cases, the authors ignore prior literature on "most similar systems designs" (Przeworski and Teune 1970), which does not correspond to this approach because the logic of case selection is not based on the prior location of the cases within a population. In giving the term "most-similar" an entirely new twist, Gerring and Seawright devote most of their attention to statistical "matching" techniques to select those pairs of cases which are "most-similar" within the population.

At the end, however, it is not clear how much of the causal inference drawn from the in-depth analysis of the two cases–which were selected on the basis of these matching techniques–is based on cross-case comparison or on within-case analysis.[1] If the causal inferences drawn for the cases under study rely only on within-case analysis, cross-case compari-

Table 2: Different Understandings and Directions of Generalization

Understanding	Direction of Generalization	Preconditions and Consequences for Case/Theory Selection
Statistical Generalization	Drawing conclusions about the strength of a causal variable from specific cases to the wider population	1. Specification and justification of the boundary of the wider population of similar cases 2. Selecting cases according to their statistical location within the wider population (e.g., typical, diverse)
Contingent Generalization	Drawing conclusions from identified causal configuration (with evidence for the links and interactions between causal factors) to the wider set of potentially possible configurations OR Drawing conclusions from traces of causal mechanisms for the accuracy and consistency of multi-level causal models	1. Specification and justification of the wider set of potential causal configurations 2. Selecting cases according to their preliminary classification into theoretically interesting types of causal configurations OR 1. Specification and justification of multi-level models with generic causal mechanisms 2. Selecting cases according to "accessibility" and "familiarity" in order to get as close as possible to the unobservable causal mechanisms
Abstraction	Drawing conclusions from adequacy for the empirical case(s) to the relavance/relative strength of theories within the broader scientific discourse	1. Specification and justification of the range of theories which are applied 2. Selecting cases according to their "likeliness" for the dominant theory

son within the case study proper ceases to play a substantial role within the co-variational template. This is due to the fact that the authors dismiss the most-different cases technique and that all other techniques are geared to select only *one* case. In consequence, Gerring and Seawright in fact challenge an assumption that has become (implicitly or explicitly) commonsensical, especially in comparative politics: the assumption that analyzing and comparing a few cases in-depth is better than analyzing one case. This leaves us with the following puzzle: If we want to generalize towards a population and if–given this goal–the cross-case comparison must include (a representative sample of) the entire population, how does this correspond to the position presented in the book that "spatial comparison" (comparison of patterns of co-variation among a few cases) is a major element of generating internal validity? The part on "spatial comparison" is the shortest section within Chapter 6 (pp. 165-6). Whether a matter of accident or not, we take the fact as support for our following conclusion.

For us, the core message from Gerring's book (and this corresponds to George and Bennett as well)[2] is the insight that the comparison of a few (from two until about six) cases does not provide much leverage for drawing causal inferences. Instead, the combination of a large-N-study and in-depth analysis within single cases, which are selected on the basis of this large-N-study, is much more productive. Accordingly, the strength of Gerring's book lies less in providing helpful advice for doing case studies proper but more in his profound discussion on how to embed case studies in large-N-studies.[3]

Overall, we predict that Gerring's book will be received by case study researchers with some skepticism. Conceptually, the co-variational style represents what Peter Hall (2006: 26) aptly described as "the statistical method writ small" and practically, it confines case studies to a secondary place: beyond theory development, case studies are only seen as conducive for gaining causal inference in combination with, and after, large-N studies. The combination of large-N and small-N studies might well be a fruitful endeavor, although there are some first cautious voices (e.g., Rohlfing 2008). But there is the danger that we miss the real qualities of case studies and do not develop the adequate methodological advice if we conceive case study research only within the confines of co-variational analysis.

In comparison to Gerring's book, Alexander George and Andrew Bennett's *Case Studies and Theory Development in the Social Sciences* is much broader in its understanding of what case studies are, and it puts a strong emphasis on causal process tracing as the heart of the case study endeavor. The richness of the book in terms of conceptual breadth and philosophical depth comes with a price, though. First, the structure of the book is surprising: Advice on how to do case studies is given before basic foundations (scientific realism as epistemological base and the goal to generate policy-relevant theory) and techniques (controlled comparison, congruence method,

and process tracing) are fully spelled out. Second, their openness to different styles and techniques makes the line of argument and the practical advice less stringent and clear-cut in comparison to Gerring. We would like to emphasize three points: First, it is important to realize that by embedding within-case analysis into "typological theorizing," George and Bennett also advocate a specific kind of multi-method approach, one which can be made even more productive if we combine it with (fs)QCA. Second, we think that in order to get a more precise understanding of what the goals of process tracing are, we would need to differentiate more clearly between causal mechanisms and causal configurations. Finally, we argue that the congruence method which has been introduced by George and Bennett holds more potential if we take it seriously as a technique of "causal interpretation."

In a similar way, as Gerring argues for the selection of cases in accordance with their location in a larger population, George and Bennett (2005: 255-57) describe the selection of cases according to their (assumed) location in a preliminary set of possible causal configurations. They call such a set of causal configurations a "typological theory." George and Bennett first present an inductive approach of using the insights of process tracing within a few cases as a foundation for creating typological theories. Detailed descriptive analysis and process tracing within a few cases can help scholars to arrive at a differentiated typology of the dependent variable and/or to different combinations of causal factors which lead to specific outcomes. These findings can be used to create building blocks of a typological theory (pp. 241-43). Nevertheless, the subsequent elaboration on the deductive use of typological theories–illustrated by the extended example of Andrew Bennett's work (pp. 255-60)–show that in-depth case studies are especially valuable for their testing and refinement. In this deductive style, case studies are conducted after theoretical knowledge has been used to create a set of possible causal configurations and first empirical investigations have provided preliminary evidence for the location of specific cases in this set.

We believe that in order to understand more clearly what we are searching for when we are tracing causal processes, we should clearly and conceptually differentiate between causal configurations and causal mechanisms. The term causal configuration should be used if we start from the assumption that there exist intense links and/or complex interactions between various factors in the production process of an outcome (Ragin 2000: 64-119). Individual elements of a causal configuration are conceptualized on the same level of analysis. Such an ontological starting point has a strong affinity and can easily be integrated with the methodological reflections on necessary and sufficient conditions and set-theoretical logic (see Goertz and Starr 2003; Ragin 2008). In consequence, the concept of causal configuration includes at least the three following ideas: First, interaction effects, in the sense that causal factors do not simply add up together to reach the causal power to produce an outcome, but that their co-existence modifies (e.g., accelerates) their individual causal power. Second, specific causal factors (sometimes misleadingly called causal mechanisms) work only within specific contexts.[4] A third idea is the relevance of causal chains (Goertz and Levy 2007: 23-29). Note that the latter two ideas translate "dense links" into the asymmetrically deterministic concepts of sufficient and necessary conditions, whereas the first does not.

In their chapter on typological theorizing, George and Bennett see process-tracing as an instrument to identify the interaction effects between the elements of a causal configuration (pp. 244-55). Surprisingly, George and Bennett do not connect their "typological theories" closer to the work of Charles Ragin, although the ontological assumptions are the same (configurational causality and the importance of equifinality). (fs)QCA, however, could complement the purely theory-driven creation and reduction of the "property spaces" of typologies. In a first empirical step, the co-existence of specific values of variables can be identified and could provide preliminary evidence of the relevance of specific causal configurations based on a more superficial study of a middle-range number of cases. Functionally, (fs)QCA is an addition to the purely theoretical creation and reduction of the set of possible causal configurations. In-depth case studies would still be necessary to verify empirically whether and how two or more co-existing independent factors interact for the production of a specific outcome.

George and Bennett define "causal mechanisms" explicitly "as ultimately unobservable physical, social, or psychological processes through which agents with causal capacities operate, but only in specific contexts or conditions, to transfer energy, information, or matter to other entities" (p. 137). This definition reflects the attempts of the authors to be compatible with very different theoretical orientations (expressed in the enumerations like "physical, social, or psychological" and "energy, information, or matter"). Nevertheless, it clearly signals a preference for micro-level theories (because of the term "agents"). Furthermore, and much more problematic from our point of view, it stresses that contextual factors act as necessary conditions for the actual working of causal mechanisms. Bennett sheds more light on his understanding of causal mechanisms in a later contribution and provides two quite different characteristics of causal mechanisms by comparing an explanation by reference to a law with an explanation by reference to a mechanism: First, mechanisms work in a more specified context, a narrower scope, than laws. Second, "explanations via law more readily admit 'as if' assumptions about processes or mechanisms, whereas mechanism-based explanations admit to being subject to refutation if it can be demonstrated, often at a lower level of analysis or finer degree of detail, that the posited mechanism was not in operation" (Bennett 2006: 47). Unfortunately, this conflates again the difference between causal configurations and causal mechanisms, and is still undetermined ("often") in respect to what we see as the core of causal mechanisms–the need to go on to a lower level of analysis for tracing these mechanisms.

We believe we get to a more exclusionary and therefore more precise definition of causal mechanisms if we do not confound them with causal configurations, and stress one core aspect: In order to trace causal mechanisms, we have to

include lower levels of analysis in comparison to the level of analysis on which we measure inputs and outcomes of a causal process. Good co-variational work sheds light on the "black box" between the independent and the dependent variable by deducing and explicating (formal) models which logically connect the involved variables in such a way that we can infer from "dataset observations" whether the theoretical mechanisms at the heart of the model were working or not. The most sophisticated of these models are based on the combination of "situational mechanisms," "action-formation mechanisms," and "transformational mechanisms" (Hedström and Swedberg 1998: 22). The second type of these mechanisms is based on behavioral micro-foundations (not necessarily the ones of rational choice theory); the first and the third types represent mechanisms linking different levels of analysis. For us, the fundamental difference between a co-variational approach and a process-tracing approach is that the latter attempts to find traces of these mechanisms below the original level of analysis. Usually, this means to search for information about the perceptions and motivations of actors. Such a search for empirical traces of mechanisms beyond "dataset observations" is especially warranted if the models and mechanisms are not fully deterministic (e.g., Elster 1998).

Such a differentiation between causal configurations and causal mechanisms allows us to separate two goals of causal process tracing: revealing the complex interactions and deterministic dependencies which produce "dense" links among causal factors, and taking a "deep"[5] look into the "machinery" of causal connections on a lower level of analysis.[6] We would like to stress that a process-tracing approach is looking for evidence about the working of causal configurations and causal mechanisms over time–in contrast to (fs)QCA, for example. If we take the definition of terms seriously, we should use "process tracing" or "process observations" only when the observations are documenting temporal unfolding of actions and events. This is often overlooked by those who want to press all alternatives to the co-variational template under the heading of "process tracing." The term "process" refers to the object of the observation and not to the process through which the scholar tries to arrive at valid conclusions (through some kind of Bayesian updating, for example).

This leads us to our third and final point on George and Bennett's book. Since the goal of this essay is to review two eminent books, and not to present our own take on case study methodology, we cannot fully lay out our understanding of what we call "congruence analysis" (Blatter and Blume 2008). The labeling and development of this type were triggered by George and Bennett's chapter on the "congruence method": "[T]he method of controlled comparison requires the investigator to find two similar cases in every respect but one. Since this requirement is difficult to meet, an alternative approach is often needed–one that does not attempt…to achieve the functional equivalent of an experiment. The alternative we propose is the within-case method of causal interpretation, which may include congruence, process-tracing, or both…" (2005: 181). Unfortunately, in the following, they restrict their congruence method to an endeavor for assessing the ability of a theory "to explain or predict the outcome in a particular case" (2005: 181), and they never take up again the term "causal interpretation." In line with Peter Hall (2006), we think that a theory is more than a hypothesis and that we are able to deduce more predictions (expectations) from a good theory than just the outcome. Beyond Hall, we pretend that the "thickness" of case-studies (the plurality and diversity of observations, plus the intensity of interpretative reflections of the relationship between concrete observations and abstract concepts) makes it not only possible to reduce the "degrees of freedom" problem, but allows for discussion of the relevance of more diverse and/or more abstract theories in respect to their contribution to the understanding/explanation of the case(s) under study (Blatter and Blume 2008). The findings within the case(s) under investigation, in turn, can be used as evidence in a broader spectrum of theoretical discourses. "Thick" case studies are therefore very conducive for drawing conclusions towards the "broader" theoretical discourse. The first element of our definition of "thickness" makes case studies also the best research design for getting "deeper" insight into the social world and to move the border "between the observable world and the unobservable ontological level where causal mechanisms reside" (George and Bennett 2005: 143). If we strive for generalizations towards the "wider" population of similar cases, then case studies will have to play a secondary role and we run into the "commonsensical…extensity/intensity trade-off" (Gerring 2007: 48).

The philosophical depth and conceptual richness of George and Bennett's book has been a great inspiration for the discipline's and our thinking about case study research. John Gerring's book shows convincingly that a rather narrow but focused perspective is a precondition for clear, consistent, and therefore practically helpful advice for actually doing case-study research. There is still a lot to do for those who believe that it is necessary and possible to come up with similar clear-cut advice for those kinds of case study research going beyond the co-variational template.

Notes

[1] The same applies to their discussion of "diverse cases" (98-99).

[2] Bennett (2006: 46) stresses that "one goal of our book was to correct for earlier qualitative literature's overemphasis on comparative methods relative to within-case methods of analysis." And when Bennett acknowledges the value of comparative methods, he stresses the combination of within-case analysis and cross-case analysis in "typological theorizing" which is something quite different from the classic comparative (small-N) method.

[3] The short chapter on "causal process tracing" and the separate chapter on "single-outcome studies" at the very end of the book only moderately mitigate such an impression and rather contribute to it.

[4] Logically, such a context factor (sometimes also referred to as scope condition) is nothing other than a necessary condition.

[5] Our understanding of "depth" has nothing to do with what George and Bennett (2005: 185-86) call "causal depth." George and Bennett understand it to be an earlier factor in a causal chain, a factor which has more causal depth than the later. In line with Goertz and Levy (2007: 29), we think it is more adequate to call such an earlier factor "fundamental" (but only within a sufficient-condition causal chain).

[6] Neither causal configurations nor causal mechanisms are referring to explanations which take more factors (variables) into account. Adding additional (autonomous) variables reduces the scope for generalization, but it is not based on the assumption that there exists a dense or deep link between causal factors. Therefore, notions like "finer degree of detail" (Bennett 2006: 47) or "intervening variables" (Seawright and Collier 2004: 277) are more confusing than helpful if one wants to get a clearer understanding of causal mechanisms.

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Reflection on the Methods of Political Science on Both Sides of the Atlantic

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For its Ninth Congress in Toulouse (5–7 September 2007), the French Political Science Association (AFSP) invited the American Political Science Association (APSA) to hold a joint "tableronde"[1] comparing methods on both sides of the Atlantic. It took the form of three consecutive panels, devoted to qualitative and qualitative approaches, to the dimension of time, and to contextual and inference problems. During three days, 18 papers were presented, over 60 participants attended, and contrasting ways to validate theories and models were discussed at length, illustrated by concrete research examples. The objective here is less to sum up all that was said than to outline the main differences and convergences of our methodologies.

The Quali-Quanti Debate

It is a fact that in France quantitative approaches are less developed than in the States, where even qualitativists have received a basic foundation in statistics and know how to read an equation, a regression line, and a factor analysis. In France one tends to give more importance to the historical and philosophical positioning of a problem, training in statistical methods is offered by fewer institutions, rational choice models are not popular (Billordo 2005b; Billordo and Dumitru 2006), and quantitative analysis forms a small minority of the articles published in the main reviews (one third of all articles published in *French Political Science Review* between 1970 and 2004, according to Billordo 2005a). The borders between quali and quanti approaches was the issue addressed by the first panel. Where the Americans tended to see sees distinct epistemologies, different conceptions of causality, "two cultures" (Mahoney and Goertz 2006), the French on the contrary insisted on the necessity to go beyond this opposition, questioning what basically differentiates the two approaches. Is it the fact of counting, opposing those who count to those who give account–in French "ceux qui comptent" vs. "ceux qui racontent"? Is it a problem of arithmatic, mathematics, statistics? Is it the number of cases studied, small or big–n? Are survey research and comprehensive interviews, case- and variable-oriented approaches so antagonistic? Where should one put the QCA (Qualitative Comparative Approach) developed by Charles Ragin, based on Boolean logics, which does not actually count but puts a phenomenon into an equation according to the presence or absence of certain elements and the way they combine?

On the whole, the divide between qualitative and quantitative methods seems far more institutionalized in the States, where it is embodied in distinct academic departments and recruitment procedures, and is represented by two different

Clarifying New Directions for Causal Inference and Generalization in Case Study Methodology, Qualitative Methods 6, Spring: Blatter, J. and Blume, T. (2008b) In Search of Co-variance, Causal Mechanisms or Congruence? Towards a Plural Understanding of Case Studies, Swiss Political Science Review 14: Campbell, D. T. (2003) Foreword, in R. K. Yin, Case Study Research: Design and Methods, Thousand Oaks, CA: Sage, ix-xi.Â Freindreis, J. P. (1983) Explanation of Variation and Detection of Covariation.Â Methodology in Social Psychology Logics of inquiry How to carry out scientific research given our understanding of the nature of knowledge. Philosophy of Science clarifies why experimental, scientific. More information. The Set of Candidate Models. Case-study research has been defined by Yin as an in-depth investigation of (contemporary) phenomena in a real-life context, particularly equipped to answer how and why questions (2009: pp. 8â€“18). Yin and other authors of case studies offer various analytical strategies for studying one of a few cases in depth, ranging from theoretically informed pattern matching (Yin, 2009) to strongly inductive approaches (Stake, 1995). This chapter deals with one specific approach: Causal-Process Tracing (CPT).Â Furthermore, its aim is to reveal the sequential and situational interplay between causal conditions and mechanisms in order to show in detail how these causal factors generate the outcome of interest. Keywords. Introduction: Causal Inference as a Comparison of Potential Outcomes. Causal inference refers to an intellectual discipline that considers the assumptions, study designs, and estimation strategies that allow researchers to draw causal conclusions based on data. As detailed below, the term â€˜causal conclusionâ€™ used here refers to a conclusion regarding the effect of a causal variable (often referred to as the â€˜treatmentâ€™ under a broad conception of the word) on some outcome(s) of interest.