SYMPOSIUM

process tracing in the development and validation of theoretical explanations: the example of environmental policy-making in the EU

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Abstract
This article recalls a distinction between research designs that focus on either the 'causes of effects' or the 'effects of causes' and compares it to a related but not identical distinction between the aims of developing and testing theoretical explanations. Using a study on environmental policy-making in the European Union as an example, the roles of process tracing and cross-case analysis in different combinations of these categories are highlighted.

Keywords process tracing; causal perspectives; environmental policy; joint-decision trap

It is often maintained that process tracing has been practised all along, even before the very term has been invented. But still, some methodological prescriptions suggest that it has at least not always been applied as scrupulously and consciously as it should (e.g. Hall, in this issue). This research note examines the role of process tracing in a research example. In particular, it asks, how process tracing might work in the development and validation of explanations for the environmental policy output of the European Union (EU). It has two parts. In the first part, I recall a distinction between research designs that inquire into the 'causes of effects' and those that investigate the 'effects of causes', and briefly query the role of process tracing in both design types for the building and evaluation of theoretical explanations. The second part situates

my own ongoing work on decision-making in EU environmental policy within this realm and explains how, and to what end, it draws on process tracing.

CAUSES-OF-EFFECTS AND EFFECTS-OF-CAUSES RESEARCH DESIGNS

Most studies in political science tend to focus on either of the two sides of the causal relation: cause or effect. Research designs that try to account, as comprehensively as necessary, for the *causes* of specific outcomes have been termed 'causes-of-effects approaches' (Mahoney and Goertz, 2006), 'backward-looking' (Scharpf, 1997, chapter 1) or 'outcome-centric' (George and Bennett, 1997), while those that examine the presence or size of *effects* have been called 'effects-of-causes approaches', 'forward-looking' or 'factor-centric' (see also Ganghof, 2005).[1] Causes-of-effects case studies often examine cases with extreme values on the outcome variable relative to a given population, cases with outcomes that deviate from prevalent theoretical expectations or other cases of intrinsic interest. Unlike effects-of-causes case studies, causes-of-effects studies do not try to isolate the effect(s) of the independent variable(s) of interest by 'controlling for' other variables through the careful selection of similar cases. Instead, they rely more heavily on within-case analysis and process tracing than on cross-case comparison. Effects-of-causes case studies, by contrast, use process tracing *in addition* to verifying the predicted covariance of cause and effect, in order to increase the confidence in a theoretical explanation by inquiring into the nature of the causal process.

'... [process tracing] has ... not always been applied as scrupulously and consciously as it should...'

TESTING AND DEVELOPING THEORETICAL EXPLANATIONS

Effects-of-causes research is not identical with the testing of theoretical explanations, and causes-of-effects designs do not necessarily aim at developing explanations. As George and Bennett (1997) observe, 'process induction proceeds mostly backward from effects to possible causes, though it could also involve forward tracing from a long list of potential causes that have not yet been formalised as theories or widely tested in other cases'. Therefore one may relate both categories in the following way (Table 1):

(1) Case studies that focus on the effects of causes and aim at testing explanations try to isolate the specific effect(s) of (a) variable(s) of interest through careful case-selection

Table 1: Causal perspectives and research orientations

Research orientation	Causal perspective	
	Effects-of-causes	Causes-of-effects
Explanation testing	(1)	(2)
Explanation developing	(4)	(3)

(e.g. by way of Mill's methods (1973)). Process tracing is employed in this context to search for evidence of the theoretically posited intervening phenomena that should link cause and effect. In general, the larger burden of the causal argument will be borne by the logic of cross-case analysis. Process tracing will then be optional. It comes into play only as a provider of additional leverage or as a tool to examine the underlying causal mechanism. But if different theories, while making the same predictions about the effect of the factor(s) of interest, yield different process hypotheses, process tracing is not optional but necessary in order to discriminate among them (Hall, 2008: 310; Van Evera, 1997: 64).

(2) Causes-of-effects, explanation-testing case studies evaluate one or several hypotheses about the causes that brought the event or phenomenon under study about. Since these events are often rather specific, and the causal chains that explain them are complex (e.g. the origins of a social revolution or a financial crisis), these studies usually do not try to draw inferences from a sample to a universe, but try to evaluate the internal validity of the competing accounts for the study phenomenon (Dür, 2007: 184). These competing accounts will often differ in the importance they assign to specific causal mechanisms or crucial events and are therefore apt to be tested by process tracing. The timing and sequence of events may often provide hints about their causation, as do the subjective reports of witnesses and participants. In effects-of-causes, explanation-testing designs (type 1), process tracing can but need not necessarily be employed in addition to cross-case comparison, while in causes-of-effects designs it is often indispensable and usually advertised as a way to cope with problems of overdetermination and causal complexity (Bennett and George, 2005: 255), although this view has met scepticism (Rohlfing, in this issue).

(3) Often, causes-of-effects case studies have the purpose of developing explanations for the specific event, phenomenon or variation on the dependent variable that is of interest to the researcher; especially when there are no theories available that would account for the outcome. By definition, this is true for example of 'deviant' cases. Sometimes, causes-of-effects, explanation-developing case studies constitute a first step of building case-specific explanations first, and trying to infer the scope conditions of their generalisability later (Ganghof (2005)), and see the next section). Process tracing is used here in an exploratory manner. But this cannot mean that it is completely a-theoretical or 'inductive'. If a deviant case is explored, 'hunches' about possible causal pathways can be generated by querying the substantive theory from which the study case deviates for its implicit working assumptions. Or otherwise, they can be inferred with somewhat greater creative effort from 'framework theories' (Scharpf, 1997: 29–34), which provide a set of fundamental concepts for the analysis of public policy.

(4) When a researcher asks for the effect(s) of an independent variable, for example in order to assess the utility of a specific policy instrument, or when she inquires into the antecedent conditions of any variance in its effectiveness, her research is interested in the effects of causes and explanation developing. Again, she will likely employ techniques of

cross-case analysis first. For example, she might explore cases that differ on the independent variable, try to control for other factors and nominate the remaining differences as possible effects of the independent variable. Alternatively, or in addition, process tracing might be used to explore how the values of the variables under study have changed within a given case over time, whether the context has indeed remained stable, or in an attempt to discover the causal process linking these variables. Even without a substantive theory at hand, this approach need not be pure guesswork (George and Bennett, 1997). Again, the researcher's existing preconceptions about the phenomenon or those of the actors who are present in the field, as well as more general 'framework theories', can guide the analysis.

In general, causes-of-effects designs have to rely more heavily on process tracing as a tool to manage causal complexity, since the causal chains under examination are given by the study phenomenon and cannot be arbitrarily shortened. This is not true with regard to effects-of-causes designs, where a researcher can decide to focus on the proximate effects of the study variable in order to reduce the number of potential confounding factors (Ganghof, 2005; Scharpf, 1997, chapter 1). Causes-of-effects designs therefore inherit a major shortcoming of process tracing: a tendency to overlook the importance of latent, structural factors, insofar as these do not vary within-case over time. Ganghof (2005) therefore advocates combining both approaches. The trick is to do this in such a way that it cancels out the shortcomings of each other rather than to add them up.

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AN APPLICATION

This section describes an application of process tracing in the study of environmental policy-making in the EU. I use the above-elaborated categories to describe the design of this study. The usual 'work in progress' caveat applies.

RESEARCH PUZZLE

The theoretical vantage point of my work is the expectation, informed by Fritz W. Scharpf's (2011) *joint-decision trap*, that negotiation systems, of which the EU is a prime example, are prone to deadlock whenever truly contentious issues (usually those with an underlying distributional conflict) are debated. Likely results are non-decisions or lowest common denominator solutions. EU environmental policy-making takes place in this setting and it often involves high levels of conflict between member states with their different institutional and socio-economic backgrounds. Yet, it usually does not result in deadlock. On the contrary, EU environmental policies more often than not prescribe a high level of protection, as high as or even higher than that of the most ambitious member state (Hix, 2005: 254;

Holzinger *et al*, 2008; Holzinger, 2011). How can this outcome be explained? Which mechanism(s) account(s) for the efficient prevention of deadlock?

Seen from a more empirical perspective, another way of stating this research question is that it tries to account for a variance in policy choices. EU environmental policies more often than not prescribe high levels of protection. There are, however, exceptions to this tendency. Some legislative proposals have been watered down to the lowest common denominator of preferences in the Council. Some pieces of environmental legislation have even resulted in stalemate, and certain areas have remained relatively under-regulated as a result. How can we account for this empirical variance in legislative output? Couched in methodological terms, one could finally also describe the issue as one of devising antecedent conditions for the joint-decision trap to operate in EU policy formulation.

RESEARCH DESIGN

The research design relies on case studies of selected environmental policy items. Although the issue of policy-innovation in joint-decision systems is almost a classical topic, there are no theories that could be readily applied 'off the shelf'. This is not unusual in research on particular policy outcomes. There are, to be sure, hints in the literature that explicate some of the antecedent conditions of interest. For example, some analysts maintain that the Commission and the European Parliament (EP) press for a high level of protection (Pollack, 1997; Burns and Carter, 2010). Others emphasise the role of political horse-trading (package deals) and (diffuse) reciprocity in securing agreements on progressive policies (Héritier, 1999; Hayes-Renshaw and Wallace, 2006, chapter 11). Again, others maintain that potential conflicts are obscured when policy-making is de facto delegated to quasi-independent expert bodies (Majone, 1993) or sectoral councils (Steunenberg, 2003; Franchino and Rahming, 2003). So why not apply an effects-of-causes approach instead? First, I suspect that these explanations hold in some cases, but not in others. They can hardly be framed as competing explanations that would merit a 'theory test', the result of which would probably be rather mixed, without adding much interesting knowledge. Instead, it is much more likely that several of these 'theory modules' interact in complex ways to produce the outcome. Second, it would also not be clear whether all potentially relevant variables could be identified and thus controlled for. Process tracing limits this problem, as the effects of omitted variables should announce themselves in the in-depth study of the case. Therefore, I have opted for a straightforward research strategy that consists of two stages – one explanation developing, and one explanation testing – which, as advertised by Ganghof (2005), build on causes-of-effects and effects-of-causes designs, respectively. Hence, my examples cover the fields (1) and (3) of the matrix (see Table 1). Process tracing is employed in both stages, but in different ways.

PROCESS TRACING IN THREE CAUSES-OF-EFFECTS, EXPLANATION-DEVELOPING CASE STUDIES

The aim of the first, exploratory stage of the analysis is to generate theoretical explanations that can later be tested with different empirical information. It consists of three causes-of-effects case studies that I have chosen with a view to maximise the variance on the outcome variable. (1) The first case is the development of a common EU approach to energy efficiency. A directive was proposed in mid-2011 after long and intense

negotiations in which the level of ambition was greatly reduced; indeed, a cornerstone of the directive – the idea that utility companies should make quantifiable efforts at energy saving – was scrapped completely, mainly due to German and Swedish resistance. Despite this watering-down, negotiations have not led to tangible results. The value of the outcome variable is accordingly deadlock, or non-decision, which presumably is an effect of the joint-decision trap. (2) The second case is not an example of deadlock in the sense that decision-making was blocked due to the resistance of a minority, but it is a case where the level of regulation was effectively determined by a minority. This is true of the recently approved regulation on CO_2 emission standards for passenger cars, which a coalition around Germany was able to water down considerably. (3) The third case concerns the EU's recent approach to phase out the conventional light bulb and other related measures under the 'ecodesign directive'. With the phase-out, the EU acted as a pacesetter and arguably went beyond a minimal Council compromise.

Again, these cases have been chosen quite simply 'to introduce variation on the key variable of interest' (Gerring, 2007: 100): the outcome of the policy decision.[2] At the same time, only cases with zero-sum distributive conflicts are included, to 'control for' the level of conflict as a factor that too obviously affects the problem-solving capacity of joint-decision systems.[3] In this sense, the case selection mirrors the logic of a 'most-similar-cases' design. However, the aim of this is not to isolate one particular factor and test its impact.

The overall aim of the first stage is to produce case-specific accounts that are able to exhaustively explain the particular outcomes of each case. This is done by process tracing the crucial phases of the decision-making process. Accordingly, at this stage, there is no cross-case comparison. The logic is similar to historical analysis, in that an important, although intermediate, result ought to be a coherent story without internal contradictions. The way in which process tracing is used here best fits the definition of Roberts (as cited in Gerring, 2004: 348) as a 'minute tracing of the explanatory narrative to the point where the events to be explained are microscopic and the covering laws correspondingly more certain'. This approach of course has the danger of 'explanatory overdeterminacy'. It is likely to yield a precise, rich and complex description of the chain of events that led to the outcome of interest, without however determining the causal relevance of each event. The researcher would not only 'lose the big picture', but also fail 'to determine whether a specific factor did really contribute to the outcome' (Dür, 2007: 186).

The second step within the exploratory and causes-of-effects analysis is therefore to evaluate each candidate's explanation of the case-specific outcomes against each other. At the end, there should be no alternative explanation that better explains the outcome of each case. The within-case explanation must get rid of everything that seems irrelevant for explaining the result. This process of purification relies to some extent on counterfactual analysis: 'What would have happened, if member state x had had different preferences; what if another government was holding the Council presidency?' Since counterfactual analysis implies theoretical expectations, some sort of theoretical preconception must already be present in the theory-generating exercise.[4]

As stated above, the explanation-developing exercise is, maybe paradoxically, not completely a-theoretic (George and Bennett, 1997). A certain sometimes implicit, previous knowledge about the policy field that shapes the process-tracing observations and establishes relevancy criteria is always present. At this

stage, it is particularly useful to draw on a 'framework theory' (Scharpf, 1997: 29–34) or 'approach', such as veto player analysis or actor-centred institutionalism that aids in couching the historical explanation in more general terms. These heuristics 'are not directly testable but seek to establish the most fruitful intellectual framework for the investigation' (Rueschemeyer, 2003: 329). They help to discover explanations and to formulate testable hypotheses by providing building blocks for the study of politics understood as interdependent decision-making. For example, in EU legislative politics, a framework such as veto player theory would identify the relevant actors (the governments making up the Council of Ministers, the European Commission and the European Parliament), their motivations and the factors that might affect their ideal positions (as far as the member states are concerned: national adaptation costs, organised domestic interests, the party in government), and the rules that govern the decision-making procedure (qualified majority voting versus factual unanimity, a veto position of the EP etc). The framework of actor-centred institutionalism covers additional theory elements such as the dominant mode of negotiation (distributive bargaining versus problem solving). The aim of the exploratory analysis is to combine these elements with enough empirical information in order to develop hypotheses that may be able to explain the cases at hand or even to travel across cases.

In the exploratory case study on the regulation of CO_2 emissions from passenger cars, I identified, along these lines, a number of mechanisms that together contributed to shape the observed outcome (Deters, 2010). In this case, it was possible to adopt a common policy (however on a rather low level of ambition) despite quasi-unanimous decision-making and a high level of conflict. The actors could be grouped into two categories: the first supported the stringent regulation proposed by the European Commission. This group included the EP and some traditionally environmentally friendly member states without a relevant domestic car industry such as Denmark and the Netherlands and (with reservations) also those countries where an economically important domestic car industry was present but which specialised in fuel-saving, small cars (e.g. France and Italy). The other group was built around Germany with its large automobile manufacturers, specialised in heavy premium cars, and included Eastern European countries where German production sites are located. It constituted a blocking minority. Since the default outcome was non-decision rather than allowing each country to adopt individual standards, it would have been able to delay or block the decision. What, from seeing how the negotiations unfolded, seemed crucial in getting to an agreement was, first, that the German demands for less stringent standards were accommodated without alienating the more ambitious 'camp' through an elaborated burden-sharing agreement. Second, several loopholes were built into the regulation to accommodate the more specialist demands of individual car manufacturers. And maybe most significantly, the final agreement was only achieved in bilateral talks on the highest level between the French President of the Republic Sarkozy and German Chancellor Merkel, which opened the way for diffuse reciprocity. As there was no indication of a package deal, this was ruled out as an alternative explanation.

A COMPLEMENTARY EFFECTS-OF-CAUSES ANALYSIS

The case selection at the first stage serves the dual purpose to specify the research question more clearly and to control for certain variables such as the policy area or the level of conflict.

The purpose is not to isolate a single explanatory factor and test its impact. This is different at the second stage, which adds an effects-of-causes angle to the case studies. The aim is to break down the case-specific explanations of the first stage into more precise mechanisms and derive from them causal process hypotheses that can be tested on other cases. Now, it might become necessary, depending on the results of the prior within-case analysis, to select cases according to new criteria, in order to isolate the impact of those mechanisms or variables that have been detected as operative in the causes-of-effects analysis of each single case (Ganghof, 2005). Thus, this procedure has, of course, a downside in that it requires a certain amount of flexibility, not only with regard to the final selection of cases, but even concerning the choice of those explanatory mechanisms that will in the end be the focus of an effects-of-causes analysis (cf. De Bièvre (2007) on the problem of theory reformulation). Only once the first stage has been completed, can the researcher decide to focus on a particular aspect that seems worthwhile to examine across cases in an effects-of-causes analysis. But there is a remaining risk that the first stage will yield only rather idiosyncratic single-case explanations. If the result is that one explanation applies in one case but not in another, then a useful strategy would be to look for possible antecedent conditions that could be responsible for this divergence. This works as long as these conditions are themselves theoretically interesting, that is, as long as they explain more than one 'divergent case'.

Take the following example of my case study on the phase-out of incandescent light bulbs. The decision must be regarded as contentious: consumers and the media heavily criticised the measure – although the protest was significantly stronger only after the fact. The association of European lighting producers (ELC) had themselves proposed an energy-saving measure, but much less ambitious than what was ultimately approved in 2009. In 2007, they had advocated to replace the conventional light bulb in several stages by only slightly more efficient halogen lamps – not, as later decided, mainly by significantly more efficient 'energy-saving lamps' (CFL, compact fluorescent lighting). Changing production facilities from conventional to halogen bulbs requires only relatively slight adaptations, as opposed to a shift to CFLs. Process tracing the decision-making and policy environment reveals a change of the position taken by ELC, and a plausible explanation for this change. The lighting sector in Europe is divided mainly between the Dutch Philipps and the German Osram, with Philipps producing its labour-intensive CFLs outside and Osram inside the EU. Osram therefore profited from antidumping duties that the EU had imposed on east-Asian CFLs. The legality and political legitimacy of these duties became increasingly disputed and Philipps, in 2008, announced its intention to challenge a possible extension of the antidumping measure in front of the European Court of Justice. As it became clear, that the Commission would answer negatively, Osram decided not to apply for another prolongation.[5] This decision coincides with ELC's position change. Arguably, the new situation led Osram to accept a more ambitious measure since, in addition to energy efficiency criteria, it also contained a number of requirements such as light quality and mercury content that many of the east-Asian products would not be able to meet.

Hence, what David Vogel (1997) has described as a 'Baptist-bootlegger-coalition' between industrial protectionist interests and environmental concerns ensued and made the measure more likely to be adopted. This is one, rather case-specific aspect of the explanation.

But what about the fierce domestic criticism from consumers and the media campaign to 'save the light bulb'?[6] Looking at the temporal development of these voices, it seems that they were loudest when the measure was already adopted and second loudest at the beginning of the procedure, when the phase-out was first considered on higher levels of decision-making, in particular at the European spring summit in 2007. Afterwards, the issue percolated downwards into the technical arena of comitology and stakeholder committees, where it was finally adopted by bureaucratic experts as an implementing regulation under the eco-design directive. I suggest that during this phase, public and media attention diminished and gave way to a policy that in the end was conceived by many consumers as imposition.

In sum, I found a constellation of different factors that facilitated the adoption of an ambitious measure or, put differently, that explains the outcome. In comparison with the CO_2 regulation, which also defines a product regulation for energy efficiency, but with a less ambitious result, one striking difference is the arena of decision-making. While the automobile efficiency regulation was politicised right from the beginning and concluded only during negotiations at the summit level, the lighting efficiency regulation became an issue of fierce contestation only after the fact and was adopted at the technical level of comitology. From the many factors that together determined the respective outcomes in the CO_2 case and the light bulb case, I therefore focus on the level of decision-making as a supplemental effects-of-causes perspective. Clearly, this does not imply an additional study of the same cases, but simply a closer investigation of this factor during a second round of research.

As mentioned before, the main downside of this two-stage approach is the late completion of the case selection. An initially planned case study on the fate of the soil framework directive proposal, a case of stalemate, may serve as a final example. The policy-decision was deadlocked mainly because, according to the German constitution in policy areas concerning land use and planning, any EU proposal needs the agreement of the German federal chamber, the *Bundesrat*. The *Bundesrat* rejected the proposal mainly due to institutional reasons and hence the previously positive German position shifted and completed a blocking coalition in the Council (Bückmann and Heui Lee, 2008). Although this is a potentially interesting story about how Council log-rolling is impeded by domestic veto players, I decided to discard this case from my sample. The single-case explanation – the veto position of the *Bundesrat* in this particular policy field – was obviously too idiosyncratic to yield interesting comparisons.

CONCLUSION

This contribution began with a description of how the use of process tracing might differ in causes-of-effects and effects-of-causes research designs and in developing, as well as in testing, theoretical explanations. It has applied these categories to describe an ongoing study that examines the question of how the conflicts latent in EU environmental policy-making are tackled. Many similar policy studies rely on process tracing to examine the factors that contributed to particular collective decisions. Yet, as opposed to cross-case techniques, the role of process tracing for their argumentation often remains implicit. The examples discussed above show the usefulness of process tracing in both developing complex theoretical explanations and in examining the potential for generalising more 'parsimonious' elements of these explanations in an 'abductive' two-step procedure, but

they also hint at a major caveat of this approach: the risk of producing historically contingent explanations at the first stage without merit for further examination during a second, effects-of-causes analysis.

'The examples discussed … show the usefulness of process tracing in … developing complex theoretical explanations…'

Notes

1 Hall (2008) draws a related distinction between 'historically specific' and 'multivariate' explanations.
2 Gerring (2007: 98) calls this the 'diverse case method'. See the same author for the following terminology.
3 The cases are also similar in regard to the policy area, the time frame and the decision-making procedure.
4 I do not wish to imply that this process usually has to be reported from beginning to end, but it is rather something that should happen in the researcher's mind. Unless of course, there are different explanations that prima facie seem equally plausible and must be evaluated against another.
5 http://ictsd.org/i/news/biores/28646/.
6 See for example 'Die Zeit', 27 August 2009.

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