

# RESEARCH ARTICLE

## systematic process analysis: when and how to use it<sup>1</sup>

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### Abstract

Challenging the contention that statistical methods applied to large numbers of cases invariably provide better grounds for causal inference, this article explores the value of a method of systematic process analysis that can be applied in a small number of cases. It distinguishes among three modes of explanation – historically specific, multivariate and theory-oriented – and argues that systematic process analysis has special value for developing theory-oriented explanations. It outlines the steps required to perform such analysis well and illustrates them with reference to Owen's investigation of the 'democratic peace'. Comparing the results available from this kind of method with those from statistical analysis, it examines the conditions under which each method is warranted. Against conceptions of the 'comparative method', which imply that small-*n* case-studies provide weak grounds for causal inference, it argues that the intensive examination of a small number of cases can be an appropriate research design for testing such inferences.

**Keywords** systematic process analysis; methods; small-*n*; explanation

**F**or securing causal explanations of social or political phenomena, how useful are research designs based on the intensive investigation of a small number of cases? A series of works, from Lijphart's (1971) seminal article on the comparative method to the influential text of King *et al* (1994), declare them inferior to designs that apply statistical methods to a large number of cases. By contrast, this article argues that 'small-*n*' research

designs can be valuable for causal inference in the field of management studies and social science more generally, especially if a methodological approach that I term 'systematic process analysis' is applied to the cases. In order to make the case I outline several modes of explanation in social science, describe what 'systematic process analysis' entails, show how one analysis uses it, and consider when it might most usefully be employed.

## MODES OF EXPLANATION IN SOCIAL SCIENCE

In what does a causal explanation for a social phenomenon consist? Perhaps because this question is daunting, few empirical works consider it, but, if we are to compare methods and research designs, the issue cannot be avoided, although many aspects of it, such as the role of interpretation, cannot be covered here.<sup>2</sup> To delimit the issues, I adopt a positivist perspective that sees the problem as one of identifying a set of variables ( $x_1 \dots x_n$ ), understood as events or phenomena whose 'value' can vary across time or space, that exert a causal impact on a set of outcomes ( $y_1 \dots y_n$ ) the investigator is interested in explaining, as well as an appropriate theory specifying how and why these variables should affect the outcome in question. Even on this delimited terrain, it is useful to distinguish three related, but distinctive, approaches to the question: what constitutes a good causal explanation?

One mode of explanation might be described as *historically specific*. This is the type historians typically seek. Their objective is usually to explain the occurrence of a specific set of events in a limited set of cases, such as the outbreak of the English Revolution in 1640 or of World War I in 1914. Events such as these are typically the product of a long chain of causal factors in which one development conditions another ( $x_1 \rightarrow x_2 \rightarrow x_3 \dots$ ) and historically specific explanations are distinguished by their ambition to identify the full set of causal factors important to an outcome, establishing not only why the outcome was likely but why it happened in a particular time and place. Whether explicitly or not, many such analyses assert some order of priority among the factors cited as causes of the outcome, as when Stone (1972) classifies the causes of the English Revolution as

preconditions, precipitants or triggers. Moreover, historians are unusually attentive to the importance of context, namely to how factors interact to generate an outcome and to the spatial or temporal specificities affecting the value of each factor. Contingent events that do not themselves seem predictable often figure prominently in the causal chains cited in this mode of explanation.

However, even in narrative mode, when engaged in explanation as opposed to description, historians are doing more than listing 'one damned thing after another'.<sup>3</sup> Although they rarely use the language of 'variables' and often concentrate on a single case, when making causal assertions, they refer implicitly to the operation of variables as general causes (Roberts, 1996). To say that the arbitrary efforts of King Charles to raise taxes caused discontent implies that, under a given set of conditions, arbitrary efforts to increase taxes will tend to cause discontent. Similarly, although historians wear their theories lightly, such assertions are underpinned, not only by implicit contentions about causal regularities, but by theories specifying why it is reasonable to see one set of factors as the cause of another. Despite its distinctive qualities, a historically specific mode of explanation shares some features of all positivist explanations.

It can usefully be compared to a second modality that I will call *multivariate explanation*. Here, the objective is not to explain a historically specific event but to identify the causal factors conducive to a broad class of events. Accordingly, if historians adduce long causal chains, multivariate analysts typically attempt to identify a small set of variables that can be said to cause such outcomes in a general class of times and places, independently of the other factors that might contribute to the relevant causal chain in

any one case. Their objective is often also to estimate the magnitude of the effect of each variable and the confidence with which we can assert its effect. From this perspective, good explanations are parsimonious ones that specify the precise impact of a few key variables. Needless to say, this approach to explanation tends to privilege statistical modes of inquiry capable of generating precise parameter estimates. However, because 'correlation is not causation', this mode of explanation too depends on the elaboration of a theory specifying how and why each variable should have the impact associated with it (Waltz, 1979).

Finally, we can identify a third mode of explanation that I will term *theory-oriented explanation* because it construes the task of explanation as one of elucidating and testing a theory that identifies the main determinants of a broad class of outcomes and attaches special importance to specifying the mechanisms whereby those determinants bear on the outcome. In contrast to historically specific explanation, the object is not to provide a complete explanation for why one outcome occurs at a particular time and place, but to identify the most important elements in the causal chain generating this class of outcomes. In contrast to multivariate explanation, this approach attaches less value to securing precise parameter estimates for a few key variables seen as the 'ultimate causes' of the outcome and more value to identifying regularities in the causal chain through which the relevant outcome is generated. The focus is on elucidating the process whereby the relevant variables have effects. In this respect, if the multivariate mode of explanation was usually grounded in nomological philosophies of science, theory-oriented explanation has more affinities with the critical realism that succeeded nomological approaches (Moon, 1975; Archer *et al*, 1998).

## CHOOSING A RESEARCH DESIGN AND METHOD

It should be apparent that the choice of methodology and research design for any project must depend, in the first instance, on selecting the mode of explanation to be employed in it. Many factors will influence this choice, including the tastes of the investigator, the state of the existing literature, and the object of inquiry. If one wants to know why an outcome occurred in a particular time and place, a historically specific mode of explanation may be most useful, as other modalities can rarely explain the exact timing or location of the relevant outcome. If one is considering a problem dominated by debate about the precise magnitude of the impact of well-known causal factors, a multivariate mode of explanation will be useful for securing the parameter estimates to resolve such debates. Alternatively, if there is contention among competing theoretical perspectives about what kinds of causal factors matter to a given outcome, a theory-oriented mode of explanation may be most appropriate.

However, the choice of a methodology must be conditioned, not only by the state of the literature, but by the state of the world, as we perceive it, and notably by the character of the causal relations in the cases to be investigated. Although the object of the inquiry is to propose and test some specific inferences about causal relations, every methodology produces valid inferences only when some assumptions about the general structure of the causal relations to be investigated are met (see Hall, 2003). To take one example, most standard forms of regression analysis, the most popular statistical technique employed in social science, produce valid causal inferences only when several conditions are met. The method assumes unit homogeneity, namely that a given change in the value of a causal variable produces a corresponding

change in the value of the outcome of the same magnitude across all cases. It assumes that the causal variables included in the analysis are uncorrelated with any causes of the outcome omitted from the analysis, that all the relevant interaction effects among the causal variables have been specified by interaction terms in the regression, and that the cases are fully independent, such that the values of the causal variables or outcomes in one case are unaffected by the corresponding variables in the other cases in the analysis (Wallerstein, 2000). Although there are techniques that allow one to relax some of these assumptions in particular instances, in general, if the causal structure to be investigated does not meet these preconditions, regression analysis is unlikely to produce estimates on which valid inferences can be based.

Thus, one's presuppositions about the type of causal factors and structure of the causal relationships likely to condition an outcome – derived from observation, existing studies and intuition – must influence the mode of inquiry to be used. Where it is thought that an outcome is determined by a small set of structural factors operating with great force and analogous effect across cases, for example, statistical methods may be effective for assessing their impact. They were usefully employed to assess the conditions conducive to securing stable democracy, when those conditions were thought to include basic socioeconomic factors such as the level of economic development, related levels of literacy, and the correlates of 'modernisation' (Lipset, 1959). However, when theorists began to see stable democracy as the product of an intricate strategic interaction among reformers, extremists and defenders of the old regime, statistical methods were no longer so appropriate for assessing the causal chain. Instead, analysts turned toward theory-oriented modes of explanation and historical methods for

assessing the adequacy of specific theories in individual cases (O'Donnell and Schmitter, 1986; Bates *et al*, 1998).

In short, despite some claims to the contrary, there is no single methodology that is invariably most powerful for assessing the validity of causal inferences in social science. The usefulness of any particular method and research design will depend on both the mode of explanation the analyst deems most appropriate and the overarching assumptions made about the structure of causal relations in the cases at hand.

## THE VALUE OF SMALL-N RESEARCH DESIGNS

Some of the contexts in which small-*n* research designs that investigate a few cases in detail have special value can now be identified. Obviously, this approach is useful when the object is to produce a historically specific explanation for an outcome. Here, the most salient issue is whether the analyst should try to investigate more than one such case, and the answer turns heavily on whether it is practicable to secure enough contextual information to establish the full causal chain in more than one case.

In political science and sociology, where multivariate and theory-oriented modes of explanation are generally preferred, the choice among research designs is more difficult to make and will be influenced by the considerations mentioned in the preceding section. How certain are we *a priori* that we can identify all the important variables with causal impact on the outcome? How numerous are they? How readily can they be measured and how consistent do we expect their impact to be across cases? Where we are reasonably confident that one existing theory specifies the relevant variables well and where they are measurable and few in number, a multivariate mode of explanation that employs statistical

analysis on a large number of cases makes good sense, for reasons well-presented by King *et al* (1994). By looking at many cases, we increase the reliability of our estimates of each variable's impact and, by looking at a diverse set of cases, we decrease the likelihood that those estimates are being distorted by the presence of another causal variable not incorporated into the analysis. More cases increase the degrees of freedom in the analysis, allowing the analyst to incorporate further variables in order to examine interaction effects, to assess competing hypotheses, or to explore variation in causal impacts among subsets of cases.

However, there are many important issue-areas in the social and political world where the conditions required for the successful use of regression-based modes of statistical analysis do not apply. In some instances, the task of producing quantifiable measures of the relevant variables requires such oversimplification that the resulting proxies distort reality beyond reasonable limits. In others, the causal structures generating the relevant developments contain more causal variables relative to the number of relevant cases available that we lack the degrees of freedom necessary to employ statistical methods with validity. The presence of multiple interaction effects can quickly exhaust the degrees of freedom needed to perform a valid statistical analysis.

In recent years, social science has become increasingly conscious of such interaction effects (Ragin, 1987). Several of the most prominent theoretical developments in fields such as political science draw our attention to them. Rational choice models of political behaviour that view outcomes as the product of long sequences of interactions among strategic actors often lend themselves less readily to testing by statistical methods than did earlier causal models that attributed similar outcomes to the impact of a

few key socioeconomic variables. Path-dependent models of the polity often specify an accumulation of interaction effects over time, creating so many divergent contextual effects in the cases that it becomes unreasonable to expect the same causal factor to produce similar effects in each of them (Pierson, 2000; Mahoney, 2000a). In short, despite the continuing popularity of regression analysis, recent theoretical developments in social science tend to specify a world whose causal structure is too complex to be tested effectively by conventional statistical methods (Hall, 2003).

Faced with such dilemmas, analysts have turned only reluctantly to small-*n* research designs for solutions, because those designs have become associated with the use of the 'comparative method' as defined by Lijphart (1971) and a succession of other scholars (see Collier, 1991). In the terms many use to describe it, the comparative method is essentially the statistical method writ small. Their emphasis remains correlational, stressing the causal inferences that can be drawn by comparing the correspondence between a small number of ultimate causal variables and a relevant outcome across the cases. Much attention has been devoted to how the cases should be chosen, when only a few cases are available, so as to maximise the validity of this type of causal inference. Some advocate choosing cases that are similar on all relevant dimensions except on the values of the outcome and causal variables of interest. Others argue for choosing cases that are as different as possible in the hope that the selection will approximate a randomisation of other potential causal factors and that systematic correspondence can still be found between the outcomes and key causal variables (Przeworski and Teune, 1970). However, all who adhere to the conventional view assume that the basis for causal inference lies in the correlation to be found, across the cases,

between a few causal variables and the relevant outcomes.

From this perspective, the weakness of small-*n* research designs is obvious. The conventional comparative method employs the same basis for inference as the statistical method, but small-*n* designs lack the degrees of freedom that large-*n* designs provide for considering substantial numbers of causal variables and interaction effects among them. Seen from this perspective, it is not surprising that small-*n* research designs based on intensive investigation of a few cases have been considered the weak sister of statistical methods applied to a large number of cases.

However, they are not necessarily so. As George (1979), George and McKeown (1985) and Campbell (1975) have noted, when we have a small number of cases to work with, we need not approach the problem of causal inference in the correlational terms of the conventional comparative method (Bennett and George, 2005). On the contrary, a small set of cases, from which many observations can be drawn, can be used as terrain for 'process tracing' in which many facets of the causal chain are examined. A more intensive examination of the causal chain, in turn, provides a new and different basis for causal inference, one especially well-suited to assessing the complex causal theories now prominent in many of the social sciences. In short, small-*n* research designs can be valuable for testing causal propositions if a method that I will term 'systematic process analysis' is applied in them.<sup>4</sup>

## **THE METHOD OF SYSTEMATIC PROCESS ANALYSIS**

As a method, systematic process analysis draws heavily on longstanding conventional wisdom about how social science advances.<sup>5</sup> Under one rubric or another, it

has been practiced to good effect, albeit with some variation, by many scholars, including Moore (1966), Skocpol (1979), Collier and Collier (1991), Rueschemeyer *et al* (1992) and Moravcsik (1998). The basic steps of the technique are as follows.

### **THEORY FORMATION**

The investigator begins by formulating a set of theories that identify the principal causal variables said to conduce to a specific type of outcome to be explained as well an accompanying account, which may be more or less formal, about how those and other variables interact in the causal chain that leads to the outcome. In general, these theories will not only identify a few variables thought to have an especially important impact on the outcome but also outline the processes whereby those variables are thought to secure such an impact. As Cartwright (1997) notes, these theories should also specify some basic assumptions about how variables of the type on which the theory focuses operate in the world and why they have causal force, especially where alternative assumptions are plausible or adduced by others.

By and large, the theory should be specified as deductions from more general contentions about the world based on previous observations and axiomatic premises. In this respect, any theory, however novel, depends on previous investigations as well as deduction. The theory of principal interest to the investigator may be original or drawn from the work of others. But the crucial point is that the investigator should approach the case, not only with a principal theory, but with it and one or more other theories that could plausibly be adduced to explain the outcome. The object will be to test one theory against another.

The rationale for this injunction is the familiar point of Kuhn (1970) and others

that the 'facts' against which a theory is tested are always generated, to some extent, by the theory itself. As a result, one secures a more stringent assessment of the validity of a theory by comparing how well it explains the facts one observes with how well another theory explains such facts. Moreover, as the results often reveal that a theory corresponds well in some respects and poorly in others with the observations made in the course of research, the analyst must then make a judgment about whether to reject the theory or to accept it and question the adequacy of the observations. Such judgments are invariably better informed when the fit between the theory and the observations can be compared with the fit between the latter and the next most plausible theory. As the familiar adage has it, research in social science is most likely to advance when it focuses on a 'three-cornered fight' among a theory, a rival theory, and a set of empirical observations (Lakatos, 1970).

### **DERIVING PREDICTIONS**

For each of the theories to be considered, the investigator then derives predictions about the patterns that will appear in observations of the world if the theory is valid and if it is false. Special attention should be devoted to deriving predictions that are consistent with one theory but inconsistent with its principal rivals so as to be able to discern which among a set of competing theories is more likely to be valid.<sup>6</sup> In many instances, the most important of these predictions will be specified as the hypotheses to be examined in the research. The emphasis should be on deriving predictions that are as 'brittle' as possible, against observations and other theories. That is to say, theories should be formulated so as to yield predictions that can be shown to be false by available data and that are distinguishable from the predictions of rival theories.

### **MAKING OBSERVATIONS**

Observations relevant to these predictions are then made of the world, drawn from the cases to be examined. Since there is often ambiguity about the point, let me note that I define a case as a unit in which the relevant outcome takes on a specific value, whether that be a region, nation, organization or other unit at a given time. Thus, comparison across cases may be across units at one point in time or within the same unit across time. An observation consists of a piece of data drawn from, or 'observed', in that case, using whatever technology is appropriate for securing it, whether documentary research, interviews or computation.

It should be apparent that many observations can be drawn from each case. The strength of this method rests on the multiplicity of the observations, and hence tests of the theory, that it allows. Of course, observations of the sort central to the conventional comparative method, namely ones drawn on the outcome and a small set of variables identifiable as the principal causal variables will be germane to the inquiry. But correlation between these types of variables is not the only way to assess the validity of a theory. Instead, this method assumes that observations bearing on a theory's predictions about the *process* whereby an outcome is caused provide as relevant a test of that theory as predictions about the correspondence between a few key causal variables and the outcomes they are supposed to produce. Even where the object of the analysis is to identify a few such causal variables, any theory identifying them as causes must also specify a process whereby they operate, and the validity of the theory can be assessed by observations designed to assess whether that process is present in the cases being investigated.

Therefore, relevant observations include ones about the events that can be

expected to occur if a theory is valid, the sequence of those events, the specific actions taken by various types of actors, public and private statements by those actors about why they took those actions, as well as other observations designed to establish whether the causal chain that each theory anticipates is present in the cases. This is not simply a search for 'intervening' variables. The point is to see if the multiple actions and statements of the actors at each stage of the causal process are consistent with the image of the world implied by the theory.<sup>7</sup> In keeping with the advice of King *et al* (1994), the investigator should seek as large and diverse a set of observations as feasible from each case. *Ceteris paribus*, a theory that survives tests against more observations of different kinds is more likely to be valid than one tested against a smaller or more homogenous set of observations.

### **DRAWING CONCLUSIONS**

In the penultimate stage of the investigation, the observations drawn from the cases are compared with the predictions of the theories to reach a judgment about the relative merits of each theory, on the basis of congruence between the predictions of each and the observations. This is a matter of judgment, rather than one of tallying points of congruence, because the accuracy of some predictions will usually be more crucial to the survival of a theory than others, based on their pertinence to its core propositions and the confidence with which they can be extrapolated from the theory.

As in all such enterprises, deciding whether a theory is valid after observations are made calls for a fine-grained judgment. In many instances, there will be some discrepancies between the theory and the observations. The analyst must then make simultaneous judgments about the plausibility of the theory and

about the validity of the observations. This is one reason why effective theory-building is as important a part of the exercise as gathering empirical data. Although the observations drawn in the study at hand must weigh most heavily, judgments about the intrinsic plausibility of a theory can also be based on the support available for its core propositions from other studies and the quality of the deductions used to generate it. Similarly, judgments about the adequacy of the observations should be based on such factors as the reliability of the methods used to secure them and the credibility of the sources. Where some observations support the theory, while others contradict it, judgments must be made about the trustworthiness of the data before the theory is rejected. If there are reasons to doubt the adequacy of the data or to attach high value to a theory that seems contraindicated, further observations can be made in existing cases or new cases examined to improve the judgment. As I have noted, this process of judgment can be improved by comparing the observations not only against one theory but against its principal rival.

### **AN EXAMPLE: OWEN ON THE DEMOCRATIC PEACE**

John Owen's (1994) analysis of the 'democratic peace' provides an illustration of how systematic process analysis can illuminate causal problems in social science. Inspired by Kant's discussion of 'perpetual peace' reformulated in empirical terms by Doyle (1983, 1986), the proposition that democracies are unlikely to go to war against other democracies has become one of the most prominent contentions in the study of contemporary international relations. Most efforts to assess the empirical validity of this claim use statistical methods on large numbers of cases. Although these studies show



that democracies rarely go to war against other democracies, they leave open the precise status of the causal claim. As the number of cases available for examination is relatively small, it has been difficult for those who use statistical methods to dismiss rival explanations for their results based on contentions that the infrequency of war between democratic states is a random outcome or an artifact of factors cited by rival realist theories of international politics. Owen suggests improving the basis for causal inferences about this issue by formulating a theory about the causal mechanisms that lead democracies to be reluctant to attack other democracies and examining a set of cases to see whether such a causal mechanism operates in them. This is the project on which he embarks.

Here, we see one of the contexts in which systematic process analysis is most useful, namely a setting in which the number of available cases is too small to allow a statistical analysis to control for all the potentially relevant causal factors as well as one in which many of the relevant variables do not lend themselves readily to accurate measurement. Indeed, as Owen notes, there has been contention about which states should be classified as democratic for the purposes of testing this proposition partly because there has been relatively little investigation of, and no agreement on, the causal mechanisms lying behind the proposition itself.

Owen begins by developing a theory designed to elucidate these causal mechanisms. As is well-advised in such instances, he uses elements from existing theories to formulate his own, in this case combining structural theories that attribute the democratic peace to the institutional constraints democracy imposes on governments and normative theories that attribute it to the ideas embraced in democratic polities. He adds precision by identifying the core set of operative ideals as liberal ones and links the two pathways

into a synthetic theory based on the premise that both the institutions and ideology of democracies flow from the character of liberal ideas. He is careful to provide a rationale for why each of the operative variables in the causal chain should have the effects he posits, and he uses the historical documents of liberalism to show why key elements in this rationale are plausible. Here, we see the importance and value of specifying the causal process that lies behind an outcome with precision and of adducing a coherent rationale for the operation of each variable within it.

To justify the plausibility of the assumptions made in the causal model, Owen draws on previous observations about the world and the existing literature about it. Although some have argued that the realism of a model's assumptions is irrelevant to its validity, on the grounds that the latter should be judged only by the accuracy of its predictions (cf. Friedman, 1968), it strikes me as perilous for analysts of causal mechanisms to ignore the realism or plausibility of their assumptions. Although the accuracy of a theory's predictions provide an important test of its validity, given how difficult it is to assess the validity of a theory, even under the best of circumstances, and the omnipresent possibility that more than one theory will generate predictions fitting the empirical data, we need additional criteria with which to discriminate among valid and invalid theories; and, in such instances, the plausibility of a theory's assumptions, especially about how causal mechanisms operate, are useful additional grounds for making such determinations.

From the causal model he has formulated, Owen then develops predictions about what should be observed in the cases if his theory is correct and if it is incorrect, couched as six-key hypotheses, as well as analogous predictions for alternative theoretical approaches. The

emphasis of these predictions is on the attitudes liberals will have toward foreign states of various types and the actions they will take, key components of the causal processes he posits. Owen then examines four cases in which war between the US and another nation was a realistic prospect, two in which it occurred and two in which it did not, with a view to assessing whether observations drawn from these cases conform to the predictions of his theory.<sup>8</sup> Broadly speaking, he finds that they do.

Several features of Owen's investigation deserve note. He increases the credibility of his observations about the causal process by examining archival material about the cases and paying careful attention to the perceptions and statements of the historical actors themselves. This is especially crucial here because much of his argument turns on the contention that liberals were reluctant to go to war with states they viewed as liberal and those perceptions about whether a potential antagonist was liberal did not turn entirely on the nature of its electoral institutions. In most cases, he examines developments at several stages in the causal process to see if they are congruent with his theory, rather than scrutinising only one moment in an extended causal chain. He is especially attentive to ambiguous cases, such as that of Wilhelmine Germany, which might appear exceptional from some perspectives, with a view to assessing whether such 'hard cases' conform to his theory.

Finally, Owen is unusually balanced in his conclusions. In contrast to many in social science who seem to believe that, in order to show that their theory is correct, they have to show that all other theories are not only incomplete but totally wrong, Owen acknowledges the insights of the realist perspective that is the principal rival to his own theory and suggests how some of its contentions can be rendered congruent with his own

theory and with the empirics of the cases, while rejecting other elements of that perspective. As a result, his work moves the relevant research program forward in a constructive way toward new types of theoretical syntheses (Lakatos, 1970).

For the ease of those who wish to consult an example, I have taken an article as an example of systematic process analysis. However, it can be difficult to report this kind of an analysis fully in an article, and some features of the method receive less emphasis here than they would deserve in a full treatment. In particular, although Owen examines the predictions of rival theories at various points, a more complete test of his theory would dictate more extensive tests of its principal rivals (see Owen, 1997). This is a facet of the method on which many who undertake it skimp. In such works, it is common to see relatively brief discussions of the claims of rival theories, because it can be expositively awkward to discuss them at length, but, unless rival theories are also examined carefully (even if the results of the examination are not reported at length), it can be difficult to assess fully the causal claims of the analysis.

Needless to say, although I have taken Owen's work as an example of fine systematic process analysis, it does not definitively settle all disputes about the democratic peace. It is in the nature of social science that there remain grounds for querying some of his contentions. However, by taking an issue often treated with correlational methods and examining the causal processes behind the correlations, Owen shows how illuminating this type of inquiry can be.

## **EMPLOYING SYSTEMATIC PROCESS ANALYSIS**

To most social scientists, the account I have given of systematic process analysis

will be a familiar recipe, since it parallels many basic descriptions of the scientific method. The key point, however, is that the method can be used to examine the causal processes a theory invokes, allowing those interested in social explanation to move beyond a focus on simple correlations between a set of outcomes and a small set of 'explanatory variables' toward which the popularity of regression analysis and the infelicities in many conventional discussions of the comparative method have drawn the field.

It should be apparent that systematic process analysis is most useful when an analyst seeks a theory-oriented mode of explanation. Although it can yield assessments about the relative impact of causal factors, a key objective of multivariate modes of explanation, the estimates of this sort that it yields are usually less precise than the ones generated by a good statistical analysis. Because it depends on detailed analysis of a small number of cases, systematic process analysis cannot produce precise parameter estimates that are reliable. However, when the decisions or actions of key participants are crucial to the outcome, by comparing the statements and actions of those participants, the process analyst can often establish the relative influence various factors had over them with more precision than can be secured by statistical analysis.

There are several contexts in which systematic process analysis is especially valuable. Statistical analysis is often most useful when there is broad agreement on the basic causal processes behind an outcome and dispute about the relative impact of particular factors within it. By contrast, process analysis can be particularly useful when several theories alluding to rather different causal processes have been proposed to explain the same phenomenon, because it mobilises multiple observations to reach fine-grained

assessments about the presence of a specific causal process. In such contexts, the parameter estimates generated by statistical methods often assess the causal chain in terms that are too indirect to provide reliable tests for the presence of one particular kind of chain. In instances where the causal chains are highly complex or do not yield specific predictions about measurable parameters, of course, systematic process analysis is indispensable. That is often true of processes that are path dependent or rooted in strategic interaction.

Bates *et al* (1998) have proposed an alternative method, based on 'analytic narrative' to assess the validity of theories in which strategic interaction figures prominently. It shares several features of systematic process analysis but differs in two key respects. On my reading, their approach does not attach as much importance as systematic process analysis does to testing rival theories against each other but proposes, instead, an iterative process in which one main theory is examined and actively refined when the analyst encounters data that contradicts it. As a result, although analytic narrative can be useful for refining a theory, it may not offer as stringent a test of that theory as systematic process analysis would. If the investigator's principal theory is not tested against other theories and if it is adjusted to fit non-conforming observations when they are encountered, it becomes increasingly difficult to falsify the theory using the observations, and the risk of affirming a false theory increases. In particular, if rational choice theories are not assessed against other theories lying outside that perspective, there is some chance that the use of analytic narratives will advance one research program at the cost of neglecting others that may offer more purchase over some issues (see Elster, 2000).

Even when applied to a single case, systematic process analysis offers some

grounds for causal inference. Provided the principal theories being tested are formulated in terms that apply to a wide range of cases and spell out the relevant causal process in detail, much can be learned from establishing whether that process is present in a single case (Mahoney, 2000b; Becker, 1992; Eckstein, 1975). Because they are numerous and diverse, the predictions and observations made in a single case are not necessarily less informative than correlations calculated between a small number of causal variables and the outcomes in multiple cases. Where feasible, however, it is desirable to apply systematic process analysis to several cases, even if the number examined must be small to accommodate the gathering of an extensive set of observations in each. Increasing the number and diversity of the cases increases the investigator's confidence that the causal process observed is not idiosyncratic to one of them. As most of the theories generated by social science are meant to apply to specific types of cases rather than in all times and places, however, the diversity of the cases chosen should be limited to diversity within the universe of cases to which the theory is meant to apply and that universe should be clearly specified.

Similarly, because the object of the inquiry is usually to explain a particular kind of outcome, there is also special value in extending the analysis to cases in which that outcome does not occur, as well as those in which it does, because the explanatory theory being tested implicitly contains important predictions about both types of cases. Where the values taken by a small group of causal variables is especially important to the causal process, it will be useful to examine cases displaying a range of values on those variables, because these are instances in which clear and important predictions can

be made from the theory about the correspondence between those values and the outcomes. However, one should not become a fetishist for this point (cf. Geddes, 1990). Many theories in social science do not attribute dominant causal importance to one or two variables but rather describe causal processes of a particular character, and, in such instances, it may be sufficient for causal inference to establish that those processes were present in cases where the outcome occurred.

In sum, systematic process analysis and small-*n* research designs complement each other nicely and, used together, they provide a good basis for causal inference. By using process analysis, researchers take full advantage of the wealth of detail that investigation of a small number of cases offers, and they secure more powerful grounds for causal inference than the conventional comparative method offers. This type of method and research design correspond nicely to the recent emphasis in the philosophy of science on critical realism, and they are especially well-suited to assessing the complex causal chains that many theoretical perspectives in social science, including historical institutionalism and rational choice analysis, have begun to posit. As such, they deserve the popularity they have long had among sophisticated social scientists.

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## Notes

- 1 This paper was first published in *European Management Review* 3(1): 24–31. Reprinted with kind permission from Peter Hall and the European Academy of Management.
- 2 For discussion of this issue see: Roberts (1996) and Taylor (1971).
- 3 This phrase is usually attributed to the American author, Elbert Hubbard.
- 4 Although my argument is similar in key respects to the important formulations of George (1979), Campbell (1975), Bennett and George (2005), I adopt a slightly different term for it in order to associate it with the very specific conditions I consider crucial to its practice. However, I want to acknowledge here the similarity and fruitfulness of these prior formulations.
- 5 This section draws on Hall (2003).
- 6 When I use the term 'predictions', I refer not only (or even primarily) to future developments but to predictions about patterns observable in data gathered from past events.
- 7 Although not strictly entailed by the method, as Weber (1949) advises, the investigator should also ask whether each theory is consistent with the meanings the historical actors themselves attributed to their actions.
- 8 In a work larger than the article discussed here, Owen (1997) considers an additional eight cases, gaining further comparative leverage. Although his own theory was developed in the context of these cases, as he notes, there would be stronger grounds for causal inference if the theory had been developed in some cases and then tested in others.

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