CHAPTER 8

Case Selection and Nesting Process-Tracing Studies in Mixed-Method Designs

Explaining-outcome process-tracing studies are almost by definition standalone single-case studies. In contrast, single-case studies using either theory-building or theory-testing variants are not intended to stand alone; instead, they seek to contribute with their specific comparative advantages to what we know about a broader social phenomenon. A case study of two democracies that did not go to war despite severe conflicts of interest updates our degree of confidence in the existence of a more general causal relationship between mutual democracy and peace, at the same time shedding light on the mechanisms that explain how mutual democracy produces peace.

Yet how can single-case studies contribute to our broader knowledge of causal relationships? This chapter illustrates how the theory-building and -testing variants of process-tracing can be nested into a broader research program, something that is possible given that they share the theory-centric ambition of studying systematic elements of causal relationships with other social science research methods. But nesting is possible only through case selection techniques building on cross-case inferences made using other methods. Furthermore, explaining-outcome process-tracing studies cannot be embedded in a nested analysis because of the inclusion of nonsystematic, case-specific mechanisms in explanations.

As introduced in chapter 2, choosing which variant of process-tracing to employ depends on the purposes of the study. First, is the purpose of the study to explain a particularly interesting outcome, or does the study have theory-centric ambitions? If the former is the answer, then the explaining-outcome design is chosen, with the focus of crafting a minimally sufficient

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explanation of the particular outcome. In contrast, ambitions to understand causal relationships across a population of cases lead to the choice of either theory-building or theory-testing designs.

Second, when choosing between theory-building and -testing variants, are there well-developed theoretical conjectures for empirical correlations between known independent and dependent variables or conditions, or are we in a situation where there is either no well-developed theory explaining a phenomenon or where existing theories have been disconfirmed in prior empirical analysis? In the first situation, we choose theory-testing designs, whereas theory-building designs are chosen when we lack plausible theoretical mechanisms to account for outcomes.

Case selection strategies in process-tracing differ for each of the three variants of process-tracing, a fact that the existing methodological literature on case selection in process-tracing has overlooked by treating process-tracing as a single method. We discuss why existing methodological prescriptions for selection strategies are not always applicable for the different variants of process-tracing (e.g., Gerring 2007a; King, Keohane, and Verba 1994; Lieberman 2005). Prescriptions are developed for case choice in the theory-building and -testing variants of process-tracing, in particular focusing on how these prescriptions differ from existing guidelines. In contrast, cases are chosen in explaining-outcome designs not on the basis of research design strategies but instead because the cases are substantively important (e.g., the French Revolution), although explaining-outcome studies also have the potential to contribute insights to ongoing theoretical debates in the field.

Common to all three variants, however, is the need for the analyst to be explicit about the case selection strategy, detailing the reasoning behind the selection of specific cases. Given that the perfect case for a particular research purpose usually does not exist, arguments need to be put forward that substantiate why the case can fulfill the research's goals.

After discussing case selection strategies and how they enable nesting of only theory-centric process-tracing studies into broader mixed-method designs, we discuss the challenges in making the results of process-tracing research communicate with those from other research methods. Whereas methods such as frequentist, large-*n* statistical methods or small-*n* comparative methods analyze patterns of regularity between X and Y, process-tracing methods look at both X and the mechanism linking it with Y. Therefore, there is the risk that the two talk past each other, with analyses of the causal effects of X on Y potentially incompatible with analyses of the causal relationship of X and a mechanism with Y. We now turn to a discussion of case selection strategies in the three process-tracing variants.

8.1. Theory-Testing Process-Tracing

Case Selection Strategies

Theory-testing process-tracing has at its core the ambition to go beyond correlations that have been found using large-*n* methods, attempting to test whether hypothesized causal mechanisms are to be found between X and Y. According to Lieberman, "Given the potential for problems of endogeneity and poor data in statistical analyses carried out at the country level of analysis, statistical results alone rarely provide sufficient evidence of the robustness of a theoretical model. Almost inevitably, strong questions arise about causal order, heterogeneity of cases, and the quality of measurement. SNA [small-*n* designs such as process-tracing] provides an important opportunity to counter such charges" (2005: 442).

Theory-testing process-tracing strategies are used in two situations. First, theory-testing is used when there are well-developed theoretical conjectures but we are unsure whether they have empirical support. In Moravcsik's (1999) test of a supranational entrepreneur mechanism (see chapter 4), there was a well-developed theory that could be tested but there was uncertainty regarding whether there was an actual empirical correlation between X and Y.

Second, and more common, is when theory tests are performed after a regular association between X and Y has been found with other methods (often large-*n* studies). Here, the analytical ambition is to test whether there is evidence that a causal mechanism links X and Y. In this situation, typical cases are chosen to test whether a hypothesized causal mechanism is present, with a typical case selected on the basis of the previous large-*n* analysis (Gerring 2007a: 89; Lieberman 2005: 444–45). A typical case is "representative of a population of cases (as defined by the primary inference)" (Gerring 2007a: 96).

How do we identify a typical case that is appropriate for theory-testing process-tracing? The answer to this question depends on whether the preceding large-*n* analysis was undertaken using frequentist methods or using comparative, set theoretic methods such as fuzzy-set QCA.

Looking first at case selection after frequentist analysis, existing methodological prescriptions suggest that after we have performed a regression analysis, a typical case is the case with the smallest residuals (Gerring 2007a; Lieberman 2005). According to Lieberman, when we are using small-*n* methods to test a theory, our case selection strategy should be informed by the best fitting statistical model that has been found using regression analysis (2005: 444–45). Cases that are on or close to a regression line that plots the actual dependent variable scores against regression-predicted scores are identified as possible candidates for in-depth analysis as a consequence of their low residuals.

In this case selection strategy, a case on the regression line (on-lier) enables the analyst to check for spurious correlation and can help to fine-tune the theoretical argument by elaborating the causal mechanisms linking X and Y (Lieberman 2005). The logic behind the selection strategy is presented in figure 8.1, which illustrates how we could depict the empirical results of large-*n* statistical analyses of the economic development thesis using interval-scale variables for levels of economic development and democracy. Increasing values of economic development are expected to result in an increase in the level of democracy in a country (e.g., Burkhart and Lewis-Beck 1994). Candidates for typical cases would be cases 1, 2, 3, and 5, since they are on-line cases with small or zero residuals. We would not consider cases 7 and 8 as candidates because of their larger residual values in relation to the regression line, whereas cases 4 and 6 would be less attractive than 1, 2, 3, and 5.

According to Lieberman, our confidence would be updated even more if we select two or more on-liers that have a wide range of observed scores on the outcome (2005: 444). In figure 8.1, this would involve selecting cases 1 and 5 for two parallel theory tests.

Yet these existing recommendations for case selection strategy ignore the purpose of theory-testing process-tracing: to investigate whether the hypothesized causal mechanism was present in a case. Both X and Y need to be present in the chosen case for the hypothesized causal mechanism to be present, even in theory. It therefore makes no sense to test whether a hypothesized causal mechanism was present in a case when we know a priori that it could not be present, given that either X or Y was not present. Further, the scope conditions that enable the mechanism to function also have to be present.

Cases with low values of X and/or Y are in practice cases where X and/or Y are not present. In figure 8.1, if we are interested in testing whether there is a hypothesized economic development causal mechanism that can be found using in-depth process-tracing methods, choosing case 1 (an economically backward, autocratic country) would do nothing to update our confidence in whether an economic development mechanism exists, nor would it shed light on how it functioned.

In theory-testing process-tracing, cases should be chosen where X and Y are present, along with the relevant scope conditions. Yet frequentist methods offer us few tools for determining whether these conditions are present

Fig. 8.1. The conventional wisdom for case selection in theory-testing process-tracing after a frequentist analysis illustrated using hypothetical data for the economic development thesis.

except when X and Y are conceptualized as dichotomous variables. If we are operating with an interval-scale variable, at which value can we say that X is actually present?

Comparative methods using set theoretic logic give us more useful tools for selecting a typical case for theory-testing process-tracing. As we argued in chapter 4, X and Y should be conceptualized in terms of set-theoretical terms instead of as variables when we are engaging in process-tracing. Whereas variables describe the full variation of a concept, including both poles, a set-theoretical conceptualization of X and Y understands them in terms of presence or absence.

This can take two forms. In crisp-set logic, concepts take either two values: fully in or fully out of the set. In terms of figure 8.2, cases to the right of the qualitative threshold line are scored as members of the set democracy and vice versa. More realistically, fuzzy-set logic describes concepts as either being a member of a set or not (differences in kind) but opens up the possibility that cases can either be more in than out, or vice versa (differences in degree) (Ragin 2008). The key difference between fuzzy sets and variables is that there is a qualitative threshold that marks membership of cases in the set, demarcating them from cases that are outside of the set. Understood in fuzzy-set terms, the threshold lines in figure 8.2 would mark the qualitative

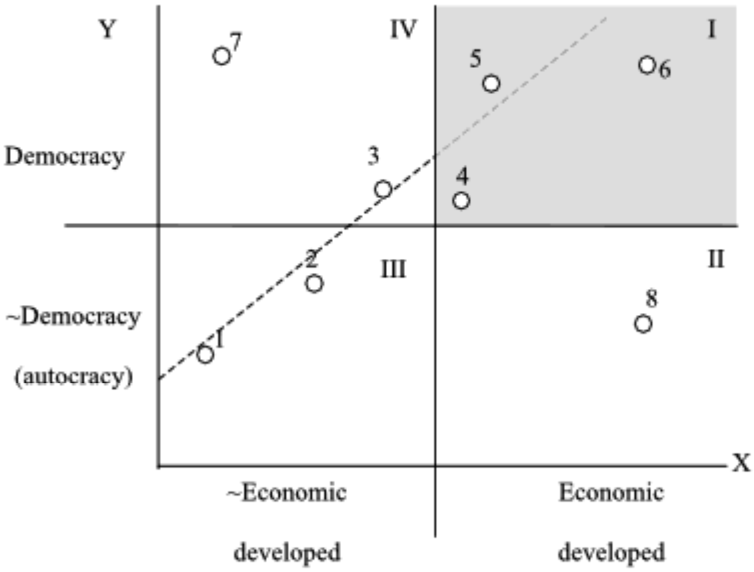

Fig. 8.2. Case selection in theory-testing process-tracing illustrated using hypothetical data for the economic development thesis.

thresholds that determine membership within the set, whereas the placement within the quadrants is based on the degree of membership in the set (more in than out, fully in, and so forth). Using real data, the placement of cases within quadrants would usually be different in fuzzy sets than using normal interval-scale scores, depending on how fuzzy sets are calibrated (see Ragin 2008, chap. 4). For heuristic reasons we keep the same placement in all of the figures.

The importance of conceptualizing in set-theoretical terms and how it impacts case selection is illustrated in figure 8.2. Instead of an interval variable, we have substituted hypothetical fuzzy-set scores for the cases. (The basic prescriptions for case selection are the same regardless of whether crisp- or fuzzy-set scores are used.) Fuzzy-set scores of 1 equal full membership in the set, a value of 0.5 is the qualitative threshold between being in or out, and a value of 0 is fully out of the set.

The critical distinction between figures 8.1 and 8.2 is that the inclusion of a qualitative threshold line for membership in the sets of democracy and economic development enables us to detect which typical cases are relevant for testing whether there is a causal mechanism linking X and Y. Cases that can be chosen are those that are members of the set of democracy and economically developed countries, depicted in the shaded quadrant I (cases 4, 5, 6).

Whereas cases 1, 2, and 3 were appropriate based on Lieberman's suggested strategy, choosing them would do little to update our confidence in the existence of a hypothesized economic development causal mechanism. Cases 1 and 2 are cases of nondeveloped and autocratic countries, whereas case 3 would be a deviant case where we should expect that mechanisms other than economic development are contributing to produce democracy. Cases 4 and 6 become more relevant for theory-testing process-tracing, as despite having relatively large residuals in relation to the regression line found using interval-scale variables (reproduced solely for heuristic purposes in figure 8.2), both cases fulfill the most important criteria for selection—both X and Y are members of the set of X and Y. If we are using fuzzy-set scores, the best typical case would be the one that was in the middle of a distribution of cases in quadrant I. Beyond X and Y, the scope conditions for the operation of the mechanism also need to be present.

In summary, typical cases that can be selected for theory-testing process-tracing are those where both X and Y are present (at least hypothetically), along with the scope conditions that allow the theorized mechanism to operate.

There are, however, differences of degree between typical cases when concepts are formulated in fuzzy-set terms, ranging from most-likely to least-likely cases depending on how conducive the context is to the operation of the mechanism and the degree of membership that X and Y have in the set (Eckstein 1975: 118–20; Gerring 2007a: 116–21). These differences of degree are also captured to some extent when X and Y are formulated as interval-scale variables, although using traditional interval-scale variables, we lack information regarding the cutoff marking whether X and Y are present. Therefore, we suggest that fuzzy-set QCA scores provide more relevant information for selecting most- and least-likely cases in theory-testing process-tracing because they capture both the distinction between differences in kind (present or not) and differences in degree (most versus least likely). Cases that are within the zones of most likely (case 6) and least likely (case 4) are depicted in figure 8.3, whereas case 5 remains merely a typical case.

Most-likely typical cases are cases where we would most expect that a hypothesized causal mechanism was present given that X and Y have high fuzzy-set scores and the scope conditions that enable the mechanism to function are highly favorable. Using fuzzy-set scores, both X and Y would have

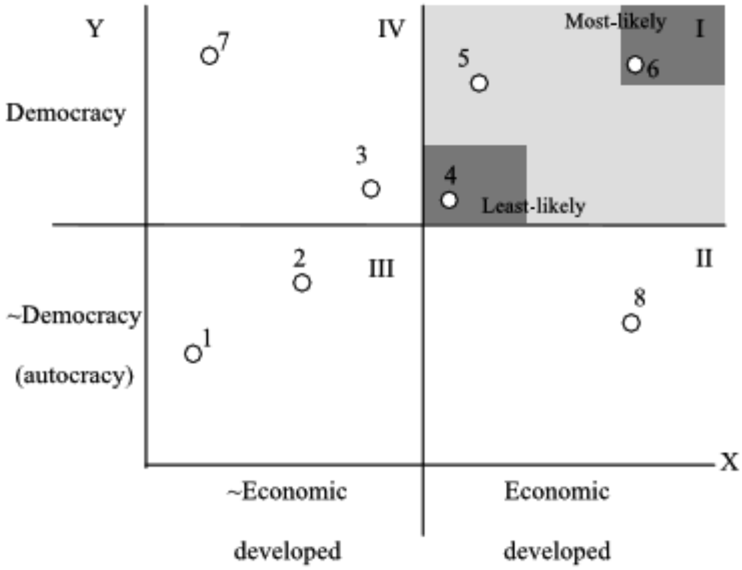

Fig. 8.3. Most- and least-likely cases in theory-testing process-tracing illustrated using hypothetical data for the economic development thesis. (The zone of most-likely cases is depicted as the box in the upper right corner of quadrant I. The zone of least-likely cases is depicted as the box in the lower left corner of quadrant I.)

high membership scores (case 6 in figure 8.3). In contrast, least-likely typical cases are cases where we should least expect that a hypothesized causal mechanism would be present; X and Y are present (but to a lower degree when fuzzy-set scores used, depicted as case 4 in figure 8.3), and the scope conditions lead us to predict that the mechanism is less probable to be present. Regarding the scope conditions, an analogy would be to testing a fire causal mechanism. A most-likely case context would be one where the scope conditions were strongly conducive (plenty of oxygen, massive amounts of dry fuel, etc., and so forth), whereas a least-likely case context could be one where the facilitating scope conditions were not plentiful (e.g., there was little oxygen, the fuel was relatively damp, and so on) but where fire was at least still theoretically possible.

Most-likely single cases serve two functions. First, most-likely cases can be used when we are unsure about whether a hypothesized causal mechanism exists at all. Here, our prior about the presence of the mechanism in a population of cases (p(h)) would be very low. A single theory test that found the mechanism was present would increase our initially very low confidence in the existence of the mechanism by raising the posterior ($p(h_p|e)\uparrow$), enabling us to infer with greater confidence that the mechanism exists. However, based on the single most-likely case, we are unable to make any inferences about the range of its existence in a broader population of cases. Further, additional most-likely case studies that found the mechanism to be present would do little to update our confidence once the prior has been updated above a very low level.

Second, most-likely studies enable cross-case inferences to be made in the direction of decreasing our confidence in the existence of a causal mechanism, or what Eckstein terms "invalidation," when the causal mechanism and/or Y are not found (Eckstein 1975: 119). When Moravcsik found that supranational actors did not have influence and that the causal mechanism that was hypothesized to link X and Y was not present in a most-likely case, this enabled a cross-case inference to be made that updated the confidence in the supranational entrepreneur mechanism in a downward direction in the whole population of comparable cases (Moravcsik 1999).

Least-likely cases enable cross-case inferences to be made when a causal mechanism is found in a single case, based on what Levy refers to as a "Sinatra inference"—"if I can make it there, I'll make it anywhere" (2002: 144). Testing a theory using a least-likely case can be considered as a high-risk strategy, since the potential for failure is relatively high. Failure is understood as a research outcome that enables no updating to take place. If the mechanism is not found in a least-likely case, we cannot update our confidence in its presence in the broader population given that we initially had little hope of finding it present. Conversely, this might also be considered a potentially high-benefit strategy since if we are able to find the mechanism in a nonfavorable setting, this significantly increases our confidence in the existence of the casual mechanism in a wider population of cases.

In both instances, what enables cross-case inferences to be made is classification of a case as most/least likely based on a larger-*n* comparative analysis using a fuzzy-set theoretical definition of concepts. In other words, cross-case inferences are not made based on the findings of the single process-tracing study but instead are only enabled by nesting the single case into the broader research program by using comparative fuzzy-set methods. On its own merits, a single process-tracing theory test is unable to produce any cross-case inferences but can only update our confidence in the presence/absence of a causal mechanism in a particular case, enabling strong within-case inferences to be made but not cross-case inferences.

Cross-case inferences are stronger when we engage in multiple parallel theory tests of typical cases. It is important, though, to first underline that if we take seriously the mechanismic understanding of causality, the results of two or more theory tests of typical cases cannot be strictly compared against each other as causal mechanisms have case-specific manifestations. If we are studying a mechanism dealing with parliamentary dynamics, while the mechanism would be conceptualized as composed of comparable parts, the actual empirical manifestations in cases would be very different across cases and therefore would in principle be noncomparable. For example, a part of a mechanism could deal with interparty dynamics, which would look very different depending on whether we were studying the Dutch, French, or Spanish parliaments.

The number of typical cases necessary to enable us to infer with a reasonable degree of confidence that the mechanism exists in a population of cases depends on (1) the ability of the case to update our confidence in the presence/absence of a mechanism and (2) our assumptions regarding causal complexity and contextual specificity of mechanisms.

First, building on the Bayesian logic of inference and in particular on the idea of research as updating of confidence in the validity of theories, least-likely cases can often stand alone if a mechanism is found, although if it is not found, they do little to update our confidence. A least-likely case therefore has strong confirmatory power but little disconfirmatory power. Therefore, an iterative research strategy of a most-likely followed by a least-likely case study can often be a more productive line of attack, especially when we initially are not very confident in the validity of a theory. If the mechanism is found to be present in the most-likely, the least-likely can be used to establish the bounds of its operation.

However, our ability to assess the contextual specificity of a mechanism is contingent on our assumptions about causal complexity. Simplifying slightly, for causal inferences to be made using frequentist methods, assumptions about causal homogeneity are made that imply that there are not multiple different causal mechanisms that could link any given X to Y. That is, equifinality is assumed away. If we assume causal homogeneity, one typical case would strongly increase our confidence in the presence/absence of a mechanism across a population of cases. In contrast, in both small-*n* comparative and process-tracing methods, it is assumed that causal relationships are much more complicated, with multiple paths to the same outcome (equifinality is ever-present). This, then, severely limits our ability to make cross-case inferences based on a single typical case, as we cannot infer that if we found a causal mechanism between X and Y, the same mechanism operates in other comparable cases as there can be multiple mechanisms that

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contribute to producing the same outcome. In this situation, we would need to engage in multiple tests of typical cases before we could make cross-case inferences.

8.2. Theory-Building Process-Tracing

Theory-building process-tracing research aims to build theories of causal mechanisms that are applicable beyond a single case. Given the theory-centric ambition, only systematic parts that are theorized to have causal effects across the population of cases are included in the theorized mechanism.

Case selection strategies depend on whether the purpose is to (1) uncover a mechanism between X and Y or (2) whether we are attempting to build a theory when we know the outcome but are unsure about what mechanism(s) made it happen.

The first situation is when we know that a correlation exists between X and Y but we are in the dark regarding potential mechanisms linking the two. In this form of X-Y-centric theory-building, the analyst should choose to examine a typical case to identify a plausible causal mechanism that can be tested empirically in subsequent research (Gerring 2007a: 91–97). Here, a typical case is defined as one that is a member of the set of X and Y; moreover, the scope conditions required for it to operate are present. The candidate cases for theory-building under these circumstances are the same as the candidates for the theory-testing variant (cases 4, 5, and 6 in quadrant I in figure 8.4). Case 8 is a deviant case when studying how economic development contributes to producing democracy, which would be relevant to compare with typical cases to learn in what context the mechanism does not work.

An example of a typical case selection strategy for building a new theorized causal mechanism is Janis's (1983) investigation of groupthink. Knowing both the value of X (whether a decision was made in a small group) and Y (a poor decision-making process), Janis chose a typical (though quite puzzling) case on which to build his theory by studying the decision-making process in which a group of the "best and the brightest" officials in the Kennedy administration decided to support the Bay of Pigs invasion by exile Cubans, assisted by U.S. assets.

The second situation is where the outcome (Y) is known but we are unsure about what caused it to happen. A sufficient explanation is not being built; instead, a relatively parsimonious mechanism is uncovered that contributes to Y occurring but does not fully explain it.

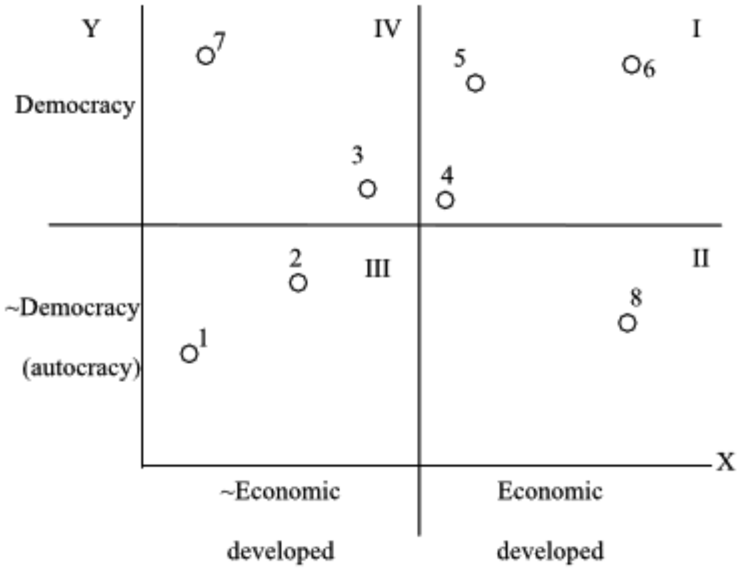

Fig. 8.4. Case selection in theory-building process-tracing illustrated using hypothetical data for an economic development causal mechanism.

Case selection in this second situation resembles a deviant case selection strategy. Gerring defines a deviant case as one "that, by reference to some general understanding of a topic (either a specific theory or common sense), demonstrates a surprising value [outcome]" (2007a: 105). A deviant case is therefore defined in relation to existing knowledge. The outcome of a deviant case may prove to have been caused by mechanisms that have been previously overlooked but whose effects are well known from other research (George and Bennett 2005: 111). The new theorized causal mechanism derived from studying the deviant case can then be tested either using large-*n* methods or a theory-testing process-tracing case study.

Candidates for case selection in the Y-centric variant of theory-building would be cases 3 or 7 in quadrant IV if we want to explain alternative mechanisms that can contribute to producing the outcome democracy in nondeveloped countries. The outcome democracy has to be present, but a deviant case implies that an existing X (economic development) cannot account for the outcome, meaning that cases in quadrant I are not deviant cases. In cases 3 and 7, an economic development mechanism cannot explain democracy as a consequence of the lack of economic development. Instead, case studies of 3 or 7 could be used to build a plausible alternative democratization causal mechanism in nondeveloped countries. Cases in quadrants II and III are not deviant cases, as the outcome democracy is not present.

Existing recommendations suggest that it is beneficial to compare typical and deviant cases to detect omitted variables (Gerring 2007a; Lieberman 2005). Yet as with existing suggestions for case selection in theory-testing process-tracing, this reflects a lack of taking causal mechanisms seriously. What analytical leverage can be gained by comparing a case investigating the economic development mechanism with a completely different mechanism? Traction in building and testing theories can be gained only by comparing mechanisms that contribute to producing the same outcome.

8.3. Explaining-Outcome Process-Tracing

> "Not all cases are equal. Some have greater visibility and impact because of their real-world or theoretical consequences. World War I is nonpareil in both respects. Its origins and consequences are also the basis for our major theories in domains as diverse as political psychology, war and peace, democratization, and state structure."
>
> —Lebow 2000–2001: 594

The purpose of explaining-outcome process-tracing differs from the two other variants. In explaining-outcome process-tracing, we try to establish a minimally sufficient explanation for why an outcome has been produced in a specific case. Explaining-outcome process-tracing includes both systematic parts and more case-specific (nonsystematic) parts. This type of process-tracing leans more heavily toward being a case-centric case study instead of a theory-centric ambition to generalize to a broader population. The distinction is fittingly described by Przeworski and Teune (1970) as the difference between cases described using proper nouns preceded by definite articles (case-centric cases like *the* French Revolution) and those described by common nouns coupled with indefinite articles (theory-centric—*a* revolution).

Case selection strategies in explaining-outcome process-tracing are driven by a strong interest in accounting for a particular outcome. However, this does not mean that there is no interest in accounting for outcomes across cases. For example, Jervis's (2010) analysis of intelligence failures by the U.S. national intelligence community attempts to build minimally sufficient explanations of failure in two cases: the failure to detect the coup against the Iranian shah in 1979 and the belief that weapons of mass destruction were present in Iraq in 2003. Yet the conclusions discuss the lessons that can apply to other comparable cases, lessons that can be understood as potentially systematic mechanisms that can be investigated in further research in other cases.

Therefore, we should not draw the line between explaining-outcome and theory-building process-tracing too sharply. The difference between them is more a matter of degree rather than a difference in kind, and explaining-outcome process-tracing case studies often point to specific systematic mechanisms that in principle can be tested in a wider population of cases or that can act as building blocks for future attempts to create generalizable causal mechanisms that can explain outcomes across the population of relevant cases.

The conclusion, however, is that the inclusion of nonsystematic mechanisms in explaining-outcome process-tracing studies makes it impossible to nest this type of process-tracing case study explicitly in a mixed-method research design (Rohlfing 2008: 1494–95).

8.4. Challenges of Nesting Theory-Centric Process-Tracing Studies in Mixed-Method Designs

Theory-testing studies are often explicitly nested in a broader mixed-method research program as case selection strategies based on the results of larger-*n* analyses. Two challenges must be tackled to nest a theory-testing process-tracing study into a mixed-method research design.

First, the type of theory being tested using process-tracing needs to be compatible with that tested in the large-*n* analysis. As discussed in chapter 2, testing a probabilistic theory in a single-case study basically makes no sense in that if we do not find the hypothesized mechanism, we do not know whether the theory is faulty or whether the particular case was an exception that proves the general rule. However, the requirement that theories be deterministic poses a daunting challenge when attempting to combine process-tracing theory-testing with frequentist large-*n* methods that understand theories in a probabilistic fashion. It is, however, theoretically possible to transform a probabilistic theory into a deterministic theory by reconceptualizing a theory formulated as "When X increases, we should expect that Y will tend to increase" into a theory such as "X is a necessary condition for Y" (for further discussion of this challenge, see Goertz and Starr 2003; Mahoney 2008).

Second, frequentist and comparative methods are basically studying different types of causal relationships than process-tracing (see chapter 2). The problem relates to what exactly we are inferring about. In frequentist, large-*n*, and comparative methods, inferences are made about patterns of regularity between X and Y, whereas in process-tracing, we are making inferences about the presence of a causal mechanism between X and Y. A typical frequentist analysis will investigate the causal effects of X on the incidence of Y, whereas a process-tracing study will investigate whether a mechanism was present in a case, investigating whether $X \rightarrow [(n_1 \rightarrow) \times (n_2 \rightarrow)]$ Y. Investigating mechanisms means that the focus is on what takes place between X and Y, whereas frequentist approaches focus on X and Y. In effect, we are studying two different things: causal effects versus causal mechanisms. Using an analogy to eating a pizza, in a frequentist analysis, we would only taste the crust on each side, whereas a process-tracing study involves eating both crusts and all of the stuff in between.

How can we ensure that what we are studying in the process-tracing case study can communicate with the inferences made using other research methods? One potential solution to this conundrum is to investigate ways that process-tracing results can be exported by reconceptualizing X and a mechanism as a causal configuration that is compatible with QCA (Ragin 2000). For example, Owen's democratic peace causal mechanism could be reconceptualized as a causal configuration composed of democracy & liberal groups & responsive government that could then be analyzed using other methods such as medium-*n* QCA. In many instances, QCA uses a deterministic understanding of causality, making it more easily compatible with process-tracing tests.

Another solution is to be pragmatic, explicitly flagging the problem in one's analysis, while ensuring that one utilizes conceptualizations of X that are comparable with each other across methods. If our process-tracing theory test utilizes a conceptualization of X that is comparable to the X used to study the phenomenon in other methods, we can make two inferences in a process-tracing theory test: (1) based on the found evidence, we can infer that X and the mechanism were present in case A, and (2) given that case A was a least-likely case, we can infer that X and the mechanism are also present in the rest of the relevant population of cases. The first within-case inference is made using process-tracing, whereas the subsequent cross-case inference draws on a comparative logic that divides the population into most- and least-likely cases. However, a single (or small handful) of process-tracing theory tests cannot by themselves make cross-case inferences about the presence of X and a mechanism in a population.

A theory-building process-tracing case study does not seek to make cross-case inferences per se but instead seeks solely to build a plausible hypothetical causal mechanism based on induction from the empirical evidence. However, theory-building process-tracing does not build a theory for theory's sake. Theory-building process-tracing is nested either implicitly or explicitly in a broader research design, where the newly built hypothetical mechanism can subsequently be tested using either theory-testing process-tracing or other methods to detect whether it is present in other cases. This means that we run into the same problems as in theory-testing both with regard to causal theories versus mechanisms and in the understanding of causality used in different theories. This means that there are clear limits to our ability to build theories about causal mechanisms using process-tracing that then can be tested using other research methods where theories are formulated in a probabilistic fashion in a mixed-method design.

Additional challenges include the risk that in building a theorized mechanism, we overlook an important systematic part of a mechanism or misclassify a nonsystematic part of a mechanism as systematic, or vice versa (Rohlfing 2008: 1509–10).

8.5. Conclusions

Table 8.1 summarizes the key differences across the three variants of process-tracing with regard to purpose and ambition, case selection strategies, and the type of causal mechanisms that are included (systematic or nonsystematic).

First, theory-testing and -building share theory-centric theoretical ambitions that aim at developing generalizations about causal relationships within a population of a given phenomenon, whereas, when push comes to shove, explaining-outcome studies prioritize the particular case over generalizability.

Second, case selection strategies vary, with cases in theory-testing merely chosen because both X and Y are present. When we attempt to nest a theory test in a broader mixed-method design, within the group of cases where X and Y are present we attempt to choose most-likely cases when we are unsure whether there is any empirical basis for a mechanism. In contrast, when assessing a thoroughly studied empirical correlation like the economic development thesis, we might choose a least-likely case to enable stronger cross-case inferences about the presence of the mechanism.

TABLE 8.1. Differences in Research Design in the Three Variants of Process-Tracing

	Theory-Testing	Theory-Building	Explaining-Outcome
Ambitions of study	Theory-centric	Theory-centric	Case-specific
Purpose of analysis	Test causal mechanism linking X:Y	(1) Identify potential causal mechanism linking X:Y in typical case, or (2) Formulate mechanism that produced Y in deviant case	Build minimally sufficient theoretical explanation of particular outcome
Case selection strategy	X, Y, and scope conditions present	X + mechanism and Y hypothetically present (typical), or Y present (deviant case)	Interesting outcomes, both substantively and theoretically important
Case chosen because ambition is to . . .	Test the necessity of the parts in the causal mechanism in empirical test	Theorize a plausible causal mechanism based upon the empirical evidence	Prove minimal sufficiency of causal mechanism (or set of mechanisms) in a single important case
Uses of variant of process-tracing in a broader mixed-method design	(1) An X:Y correlation has been found but we are unsure of causality (2) A well-developed theory exists but we are unsure whether there is empirical support	(1) An X:Y correlation has been found but we are unsure of the mechanism whereby X produces Y (2) We are unable to explain what caused Y with existing theories, resulting in the building of a new theorized mechanism that can account for the deviant case	Not possible due to the inclusion of nonsystematic parts, although limited lessons can be drawn about potential systematic parts that merit further research in other cases

Beach, Derek; Pedersen, Rasmus Brun. Process-Tracing Methods : Foundations and Guidelines.
Ann Arbor, MI, USA: University of Michigan Press, 2013. p 169.
http://site.ebrary.com/lib/fuberlin/Doc?id=10658497&ppg=169

In theory-building, we choose typical cases when we know X and Y but are unsure of the mechanism linking the two, whereas deviant cases are chosen when we know Y but not X. Explaining-outcome studies choose particularly interesting outcomes, both because of their substantive and theoretical importance (e.g., the end of the Cold War, the start of World War II) and because we are unable to account for the particular outcome with existing theories.

Theory-testing process-tracing assesses whether there is empirical evidence that updates our confidence in the presence/absence of the theorized causal mechanism in a single case, whereas theory-building uses empirical evidence as the starting point, using backward induction to build a plausible theoretical causal mechanism linking X and Y based on the empirical evidence. Explaining-outcome process-tracing studies involve a series of steps in which existing theorized mechanisms are tested for their explanatory power, followed by theoretical revisions based on the lessons of the first analytical cut, and so on until a minimally sufficient explanation of the outcome is crafted.

Finally, while both theory-building and -testing process-tracing can be nested into broader mixed-method research designs, explaining-outcome studies cannot be incorporated as a consequence of their inclusion of nonsystematic parts in the analysis. However, for either theory-building or theory-testing to be utilized in a mixed-method design, theories need to be formulated in a deterministic manner, and when we export the findings of a process-tracing analysis to a regularity approach, we need to make sure we are studying roughly the same thing (either an X:Y regularity or X and a mechanism).