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Path dependence in historical sociology

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Recently, several historical sociologists have argued that the study of path dependence has important implications for social research. Analysts such as Ronald Aminzade, Larry Griffin, Larry Isaac, William Sewell, Margaret Somers, and Charles Tilly have suggested that many crucial social phenomena can be adequately explained only in terms of path dependence.¹ Moreover, these scholars have argued that the field of historical sociology offers tools of analysis especially well suited for the study of path dependence. In making this argument, historical sociologists follow the lead of prestigious economic historians who have asserted that the analysis of path dependence opens whole new frontiers of research in economics.²

Unfortunately, analysts have yet to define the concept “path dependence” in a manner that demonstrates why path-dependent patterns and sequences merit special attention. Quite often, path dependence is defined as little more than the vague notion that “history matters” or that “the past influences the future.”³ Such general definitions have led scholars inappropriately to understand path dependence as a form of analysis that simply traces outcomes back to temporally remote causes. While this kind of historical research may employ various modes of “path analysis” in which relationships among temporally sequenced variables are considered, it does not necessarily examine path-dependent processes of change.⁴

In this article, I argue that path dependence characterizes specifically those historical sequences in which contingent events set into motion institutional patterns or event chains that have deterministic properties. The identification of path dependence therefore involves both tracing a given outcome back to a particular set of historical events, and showing how these events are themselves contingent occurrences that

cannot be explained on the basis of prior historical conditions.⁵ Because the presence or absence of contingency cannot be established independent of theory, the specification of path dependence is always a theory-laden process. Nevertheless, within the context of any given research program, criteria exist for determining whether an event is contingent, thereby allowing analysts to make objective claims about the existence of path dependence.

Substantive analyses of path-dependent sequences offer explanations for particular outcomes, often “deviant outcomes” or instances of “exceptionalism.” Deviant case studies, which by definition “analyze cases in which an outcome that had been predicted by theory did not occur,”⁶ follow a path-dependent logic when early contingent events set cases on an historical trajectory of change that diverges from theoretical expectations. In some instances, path-dependent studies focus on deviant cases that have extremely rare or even unique outcomes. In the discussion below, for example, the creation of the global capitalist system in Europe, the fate of socialist organizations in the United States, and the industrial revolution in England are considered from this standpoint. Path-dependent studies may also focus on deviant cases that possess outcomes shared by other cases, but that lack the causal variables normally associated with the occurrence of these outcomes. In the analysis below, for example, the development of large private corporations in the United States is considered as an outcome that occurred despite a lack of the initial conditions associated with its emergence in other countries.

Within the framework of path dependence, scholars often consider two dominant types of sequences. First, some path-dependent investigators analyze *self-reinforcing sequences* characterized by the formation and long-term reproduction of a given institutional pattern. Self-reinforcing sequences often exhibit what economists call “increasing returns.”⁷ With increasing returns, an institutional pattern – once adopted – delivers increasing benefits with its continued adoption, and thus over time it becomes more and more difficult to transform the pattern or select previously available options, even if these alternative options would have been more “efficient.” As yet, however, economists have not fully specified the ways in which institutions deliver increasing returns over time. Most economists assume that utilitarian mechanisms of cost-benefit analysis underpin processes of institutional reproduction once an increasing returns process has been initiated. Historical sociologists enrich the study of reinforcing sequences by identifying

additional mechanisms that can underpin reproductive processes, including functional, power, and legitimation mechanisms. Understanding the specific mechanisms that produce self-reinforcement is of crucial importance because alternative mechanisms suggest different ways in which patterns marked by path dependence might be reversed.⁸

A second basic type of path-dependent analysis involves the study of *reactive sequences*. Reactive sequences are chains of temporally ordered and causally connected events.⁹ These sequences are “reactive” in the sense that each event within the sequence is in part a reaction to temporally antecedent events. Thus, each step in the chain is “dependent” on prior steps. With reactive sequences, the final event in the sequence is typically the outcome under investigation, and the overall chain of events can be seen as a path leading up to this outcome. For a reactive sequence to follow a specifically path-dependent trajectory, as opposed to representing simply a sequence of causally connected events, the historical event that sets the chain into motion must have properties of contingency. Furthermore, the overall event chain itself must be marked by processes of “inherent sequentiality.” As we shall see, many event sequences lack these properties and thus should not be considered path-dependent.

Historically-oriented researchers have been the scholars most concerned with studying path-dependent sequences – whether self-reinforcing or reactive – because these analysts focus on particular outcomes, temporal sequencing, and the unfolding of processes over long periods of time. Non-historically-oriented sociologists, by contrast, may reject the entire enterprise of studying path dependence, both because they may not believe social scientists should be concerned with explaining particular outcomes, and because they may view non-generalizable historical events as invalid explanatory factors. Some historical sociologists may themselves hold a similar view. In fact, most work in historical sociology strives to identify generalizable causal factors that explain outcomes across multiple cases without having to appeal to contingent historical events.¹⁰ This article does not seek to reorient all such modes of analysis toward the study of path dependence. Nevertheless, the article does seek to establish that path-dependent analysis represents one potentially important strand in the overall project of historical-sociological investigation.

Conceptualizing path dependence

In defining path dependence, many historical sociologists employ a broad conceptualization that essentially entails the argument that past events influence future events. For example, according to Sewell's influential definition, path dependence means "that what has happened at an earlier point in time will affect the possible outcomes of a sequence of events occurring at a later point in time."¹¹ Definitions such as this one have led many scholars to characterize their arguments as path-dependent simply because earlier events affect later events. For example, in her excellent study of oil-producing nations, Terry Karl characterizes her argument as path-dependent because it shows that "the impact of decisions made in the past persists into the present and defines the alternatives for the future."¹² And Bart Nooteboom adopts a similar approach when he argues that organizational evolution "is path-dependent in the usual sense that directions for future development are foreclosed or inhibited by directions taken in past development."¹³

Implicitly, most historical sociologists employ a more specific understanding of path dependence that goes beyond the basic notion that past choices affect future processes. This understanding is related to their ongoing and sophisticated efforts to assess how process, sequence, and temporality can be best incorporated into social explanation.¹⁴ At the same time, however, most historical sociologists have not specified exactly how a focus on processes, sequences, and temporality underpins path-dependent explanation.

I suggest that all path-dependent analyses minimally have three defining features. First, path-dependent analysis involves the study of causal processes that are highly sensitive to events that take place in the early stages of an overall historical sequence.¹⁵ As Paul Pierson notes, in a path-dependent pattern "earlier parts of a sequence matter much more than later parts, an event that happens 'too late' may have no effect, although it might have been of great consequence if the timing had been different."¹⁶ A classic illustration of this point is Brian Arthur's discussion of a Polya urn experiment, in which an empty urn is filled by adding colored balls one at a time. After the first color is randomly selected, the probability of all subsequent colors being selected depends on the proportion of colors in the urn. As Arthur shows, the colors selected in the first few rounds are extremely important for the final composition of the urn because mathematical probabilities ensure

that the proportions of colors will soon stabilize around a fixed point.¹⁷ In demonstrating the importance of early events, this example accords with recent dicta in historical sociology that “the order of events makes a difference”; and that “*when* things happen within a sequence affects *how* they happen.”¹⁸

Second, in a path-dependent sequence, early historical events are contingent occurrences that cannot be explained on the basis of prior events or “initial conditions.”¹⁹ Since these early historical events are of decisive importance for the final outcome of the sequence, this criterion rules out the possibility of predicting a final outcome on the basis of initial conditions. As Jack Goldstone notes, “Path dependence is a property of a system such that the outcome over a period of time is *not determined* by any particular set of initial conditions. Rather, a system that exhibits path dependency is one in which outcomes are related stochastically to initial conditions.”²⁰ For instance, in the Polya urn experiment, the final composition of the urn is entirely indeterminate before the first color has been selected; only once early random processes lead to the selection of certain colors does the system begin to stabilize around an equilibrium.

Third, once contingent historical events take place, path-dependent sequences are marked by relatively deterministic causal patterns or what can be thought of as “inertia” – i.e., once processes are set into motion and begin tracking a particular outcome, these processes tend to stay in motion and continue to track this outcome. The nature of this inertia will vary depending on the type of sequence analyzed. With self-reinforcing sequences, inertia involves mechanisms that *reproduce* a particular institutional pattern over time. With reactive sequences, by contrast, inertia involves reaction and counterreaction mechanisms that give an event chain an “inherent logic” in which one event “naturally” leads to another event.²¹ Although both kinds of sequences are characterized by relatively deterministic properties, specific sets of conditions can be identified that cause the “reversal” of path dependence.

Given this definition, it is worth emphasizing that the majority of comparative-historical studies – including important works such as Theda Skocpol’s *States and Social Revolutions* and Jack Goldstone’s *Revolution and Rebellion in the Early Modern World* – do not offer specifically path-dependent explanations.²² Rather, these studies explain similar and contrasting outcomes among cases through configurations of variables that are assumed to have predictable causal effects,

without making any assumptions about the historical contingency of these variables. When scholars describe arguments such as these as path-dependent, they are mistakenly equating path dependence with all historical explanations that highlight the importance of causal sequences in the past.

Self-reinforcing sequences

One type of path-dependent approach examines sequences that have self-reinforcing properties. In these sequences, initial steps in a particular direction induce further movement in the same direction such that over time it becomes difficult or impossible to reverse direction. Economists characterize such self-reinforcing sequences with the expression “increasing returns” to highlight how the probability of further steps along a given path increases with each move down that path until an equilibrium point is reached.²³ In the economic history literature, the logic of increasing returns has been used to explain the persistence of several potentially inefficient technologies, including types of typewriter keyboards, automobiles, video recorders, electricity supplies, nuclear power plants, railroad gauges, pesticides, televisions, pollution control systems, and computer programming languages.²⁴

Although economists often focus on outcomes such as technology development or industry location, many analysts believe increasing returns processes apply to the persistence of a broad range of social and political institutions.²⁵ Despite other differences, almost all institutional perspectives understand “institutions” as enduring entities that cannot be changed instantaneously or easily.²⁶ This quality of persistence makes institutions a particularly useful object of inquiry for analysts concerned with self-reinforcing sequences.

In analyzing institutions from a path-dependent perspective, historical sociologists follow Stinchcombe’s model of historicist explanation, which identifies two types of causes: “The first is the particular circumstances which caused a tradition [i.e., an institution] to be started. The second is the general process by which social patterns [i.e., institutional patterns] reproduce themselves.”²⁷ Thus, with a historicist explanation, the processes responsible for the genesis of an institution are different from the processes responsible for the reproduction of the institution.

Institutional genesis: Critical junctures, counterfactual analysis, and contingency

With self-reinforcing sequences, periods of institutional genesis correspond to “critical junctures.”²⁸ Critical junctures are characterized by the adoption of a particular institutional arrangement from among two or more alternatives. These junctures are “critical” because once a particular option is selected it becomes progressively more difficult to return to the initial point when multiple alternatives were still available.²⁹ Critical junctures are often assessed through counterfactual analysis in which investigators imagine an alternative option had been selected and attempt to rerun history accordingly.³⁰ Such counterfactual thought experiments can illustrate the importance of a critical juncture by showing that the selection of an alternative option would have led to a dramatically different final outcome. This kind of counterfactual analysis is especially persuasive when the investigator explores as a counterfactual antecedent an option that was predicted by theory to be selected, but that was not in fact selected. In doing so, the investigator avoids meaningless “what if” counterfactual analysis by considering a counterfactual antecedent that was actually available during a critical juncture period, and that, according to theory, should have been adopted.

In a path-dependent pattern, selection processes during a critical juncture period are marked by contingency. Contingency refers to the inability of theory to predict or explain, either deterministically or probabilistically, the occurrence of a specific outcome.³¹ A contingent event is therefore an occurrence that was not expected to take place, given certain theoretical understandings of how causal processes work. Although some analysts conceptualize contingency as a type of non-systematic variation inherent in the world that cannot even in principle be eliminated from causal theories,³² many historical sociologists believe contingency does not necessitate an understanding of the world as inherently probabilistic. To argue that an event is contingent is not the same thing as arguing that the event is truly random and without antecedent causes.³³

Figure 1 offers a schematic illustration of the place of contingency in path-dependent, self-reinforcing sequences. In this example, three potential options (A, B, and C) are available for adoption at Time 1. On the basis of the initial conditions present at this time, as identified by one or more explanatory theories, the eventual adoption of a par-

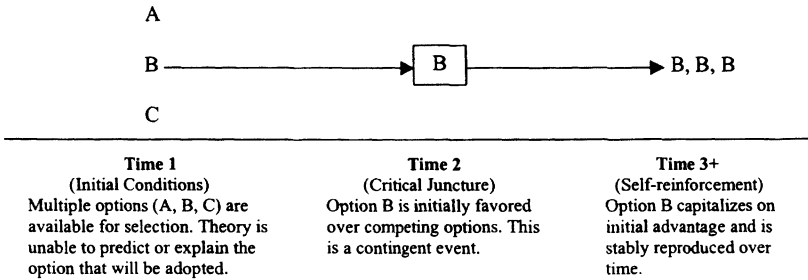


Figure 1. Illustration of contingency in self-reinforcing sequence.

ticular option (in this case, option B) cannot be predicted or explained. In this sense, given the initial conditions and certain theoretical understandings of causal processes, one could hypothetically “rerun” history many times, and there would be no reason for believing option B would be adopted with any more frequency than the alternative options. The initial adoption of option B during the critical juncture period (Time 2) is therefore a contingent event. As the figure suggests, once option B is contingently selected, it is stably reproduced across time in the future.

In the actual practice of research, social analysts will consider an event to be contingent when its explanation appears to fall outside of existing scientific theory. For example, most sociologists will treat as contingent both small events that are too specific to be accommodated by prevailing social theories, such as the assassination of a political leader or the specific choices and “agency” of particular individuals, and large, seemingly random processes such as natural disasters or sudden market fluctuations.³⁴ Analysts may also treat an outcome as contingent if it contradicts the predictions of a *particular* theoretical framework specifically designed to account for this class of outcome. In this case, although the outcome is potentially consistent with the predictions of other theories not examined, the analyst deems it to be contingent because its occurrence directly challenges the specific theoretical framework of interest. For example, economic historians treat the adoption of an inefficient technology as contingent because such an outcome contradicts the predictions of neoclassical theory, even though this outcome may be consistent with the expectations of alternative social theories.

The major theoretical breakthroughs associated with path-dependent work in economics rely fully on the assumption that initial selection

processes are contingent in relation to the neoclassical theoretical framework that guides knowledge accumulation in this field. Without the assumption of initial contingency, path-dependent processes cannot be linked to “unpredictability” and “inefficiency” – properties that are at the heart of the claim that a path-dependent perspective offers a major alternative to the neoclassical paradigm in economics.³⁵ For instance, to argue that the QWERTY typewriter keyboard design prevailed over the alternative Dvorak design even though it was the less efficient format, one must assume that the neoclassical paradigm cannot explain why QWERTY accumulated an early advantage.³⁶ In other words, the causal factors that initially favored QWERTY must be outside the dominant neoclassical paradigm, otherwise the more efficient Dvorak keyboard format would have been selected from the beginning as predicted by neoclassical theory. In fact, the QWERTY example has been called into question precisely because some analysts believe QWERTY was the more efficient format all along.³⁷

Analyzing institutional reproduction

With path dependence, the causes of institutional reproduction are distinct from the processes that bring about the institution in the first place; path-dependent institutions persist in the absence of the forces responsible for their original production.³⁸ Unlike periods of institutional genesis, which are contingent relative to theoretical expectations, institutional reproduction is explained by mechanisms derived from predominant theories. In fact, these mechanisms of reproduction may be so causally efficacious that they “lock-in” a given institutional pattern, making it extremely difficult to abolish.

Institutions that rapidly and decisively trigger mechanisms of reproduction are especially capable of seizing opportunities provided by contingent events and thus setting into motion self-reinforcing sequences that are path-dependent. Efficacious mechanisms of reproduction enable an institution to take advantage quickly of contingent events that work in its favor, solidifying a position of dominance before alternative institutional options can recover. By contrast, with institutions that more gradually trigger mechanisms of reproduction, a contingent event may initially favor the institution, but the institution will not prevail in the long run over superior alternatives because mechanisms of reproduction are not activated quickly enough or powerfully enough to capitalize on the early advantage.³⁹

The combination of contingency during critical junctures with subsequent determinism via mechanisms of reproduction leads to a central paradox characterizing the outcomes of self-reinforcing, path-dependent sequences. Specifically, these outcomes simultaneously: 1) contradict the predictions of a theoretical framework employed by the investigator; and 2) are reproduced by processes associated with the very theoretical framework they contradict. For example, in economic history, path-dependent analysts have gained notoriety by showing how certain economic outcomes are “inefficient,” thereby contradicting the predictions of neoclassical theory. Yet, these same analysts rely fully on mechanisms associated with neoclassical theory to explain the *reproduction* of these inefficient outcomes once they are contingently selected.

To make sense of this paradox, one must recognize that path-dependent arguments contradict prevailing theoretical frameworks only with respect to past options that are no longer viable alternatives. For instance, given the heavy costs of technology reversal, not even Paul David argues it would be efficient for contemporary economic actors to replace QWERTY with the Dvorak format, even though David believes the more efficient choice would have been to adopt Dvorak from the start.⁴⁰ Likewise, when Piore and Sabel argue that mass production is an inefficient outcome, they are comparing mass production to a possibility that existed in the nineteenth century: namely, craft production.⁴¹ Piore and Sabel do not argue it would necessarily be efficient to abandon mass production for craft production at this point in history. In summary, the contradiction with theory inherent in path-dependent reinforcing sequences applies to options that were available at an earlier critical juncture, not options that are presently available.

Many sociologists who study path dependence have been strongly influenced by economic historians, and they commonly assume that one of the most intriguing features of path dependence is potential inefficiency. Yet, potential inefficiency is an interesting outcome only in relation to the utilitarian theoretical framework of neoclassical economics. Sociologists have not explicitly recognized that the fundamental paradox of self-reinforcing, path-dependent sequences identified above can apply to theoretical frameworks outside of the utilitarian tradition. To understand fully the importance of path dependence, therefore, it is necessary to examine the broad range of theoretical frameworks employed in sociology.

Loosely following Randall Collins, the dominant theoretical frameworks used to analyze institutional reproduction in sociology can be categorized in terms of utilitarian, functional, power, and legitimation explanations.⁴² As Table 1 suggests, each of these explanatory modes identifies a different mechanism of institutional reproduction. Furthermore, each explanation suggests a distinctive reason why path-dependent institutions are theoretically intriguing. Finally, each explanation suggests a different mechanism for reversing self-reinforcing processes. The following discussion examines these explanatory modes by considering substantive examples from historical sociology.

Utilitarian Explanation. In economic history, as we have seen, analysts employ a utilitarian theoretical framework to explain self-reinforcing processes.⁴³ In this framework, actors rationally choose to reproduce institutions – including perhaps sub-optimal institutions – because any potential benefits of transformation are outweighed by the costs. For example, with organizational institutions, factors such as information dissemination, organizational interdependencies, and user proficiency may work to lock-in prevailing arrangements that are less optimal

Table 1. Typology of path-dependent explanations of institutional reproduction

	<i>Utilitarian explanation</i>	<i>Functional explanation</i>	<i>Power explanation</i>	<i>Legitimation explanation</i>
<i>Mechanism of reproduction</i>	Institution is reproduced through the rational cost-benefit assessments of actors	Institution is reproduced because it serves a function for an overall system	Institution is reproduced because it is supported by an elite group of actors	Institution is reproduced because actors believe it is morally just or appropriate
<i>Potential characteristics of institution</i>	Institution may be less efficient than previously available alternatives	Institution may be less functional than previously available alternatives	Institution may empower an elite group that was previously subordinate	Institution may be less consistent with values of actors than previously available alternatives
<i>Mechanism of change</i>	Increased competitive pressures; learning processes	Exogenous shock that transforms system needs	Weakening of elites and strengthening of subordinate groups	Changes in the values or subjective beliefs of actors

than previously available alternatives. Douglas North has generalized the utilitarian logic of institutional reproduction in terms of the benefits of learning effects, coordination effects, and adaptive expectations, as well as the costs imposed by irretrievable investments.⁴⁴

In the field of historical sociology, rational choice analysts are the scholars most committed to utilitarian theoretical assumptions and thus the most obvious candidates for developing path-dependent explanations that follow the theoretical logic of economists. However, most historical sociologists who adopt a rational choice perspective do not develop specifically path-dependent explanations. In particular, rational choice analysts do not typically treat the genesis of institutions as contingent vis-à-vis utilitarian theory.⁴⁵ Rather, as Hechter, Opp, and Wippler suggest, rational choice logic “predicts that *institutions will emerge only when it is in the private interests of individuals to establish them.*”⁴⁶ Hence, to this point at least, most path-dependent arguments that employ utilitarian explanation have been advanced by economic historians, not historical sociologists.

In a utilitarian framework, institutional change occurs when it is no longer in the self-interest of actors to reproduce a given institution. Drawing on the logic of the market, utilitarian theorists often emphasize how increased competitive pressures can lead to institutional transformation. They may also emphasize learning processes that help rational actors anticipate negative consequences in the future and encourage them to absorb short-term costs and make a change in the present.⁴⁷ These learning processes may be facilitated by “change agents” – i.e., actors “with an unusually clear notion of future challenges and a high propensity to change.”⁴⁸ Change agents may help individuals develop a clearer notion of incentive structures as they evolve over time. Change agents may also help individuals overcome familiar collective action problems that prevent institutional transformation.

Such utilitarian mechanisms of institutional transformation are often less salient outside the marketplace, however.⁴⁹ In much of the social world, it is difficult for rational actors to evaluate the costs and benefits of alternative institutional outcomes. Likewise, social actors may be less likely to make decisions based on long-run cost-benefit assessments than economic actors are. Whereas property rights stabilize expectations and encourage actors to adopt a long time horizon in the marketplace, equivalent mechanisms often do not exist in the social

world. In this sense, there are good reasons to believe that path-dependent institutions supported by utilitarian mechanisms will be especially enduring outside of the marketplace.

Functional Explanation. Functionalist accounts of self-reinforcing processes can follow either a strong version or a weak version. In the weak version, functionalism simply explains the reproduction of an institution in terms of its consequences, and as such is compatible with a wide range of theoretical orientations.⁵⁰ In the strong version, by contrast, institutional reproduction is explained specifically because of its functional consequences (e.g., integration, adaptation, survival) for a larger system within which the institution is embedded. My concern here is with this strong version of functional explanation, in which the *consequences* of an institution for an overall *system* are also understood to be the *causes* of the reproduction of that institution.⁵¹ Scholars who employ this kind of functional explanation often assume that the initial origins of an institution can be explained teleologically by the beneficial effects the institution brings to a system after it is created.⁵² However, in path-dependent analyses, these origins are contingent. In a path-dependent explanation, system functionality may explain the reproduction of an institution once it is created, but it does not also account for the origins of the institution.⁵³

Once contingent events initially select a particular institution, functionalist logic identifies predictable self-reinforcing processes: the institution serves some function for the system, which causes the expansion of the institution, which enhances the institution's ability to perform the useful function, which leads to further institutional expansion and eventually institutional consolidation. Thus, system functionality replaces the idea of efficiency in utilitarian accounts as the mechanism of institutional reproduction. However, just as utilitarian path-dependent arguments assume that inefficient outcomes may prevail, functionalist path-dependent arguments assume that, as a consequence of initial contingent selection processes, the institution that is ultimately adopted may be less functional in the long-run than alternative institutions that could have been developed.⁵⁴

Immanuel Wallerstein's multivolume project on the *Modern World-System* offers a functional explanation of the reproduction of world capitalist institutions over the last five-hundred years.⁵⁵ Many of Wallerstein's arguments are not path-dependent because they treat episodes of institutional genesis as non-contingent events that result from the

functional needs and teleological imperatives of the overall world capitalist system. Wallerstein's work has been widely criticized in this regard,⁵⁶ and it may seem unnecessary to examine again his functionalist approach. However, some of Wallerstein's most interesting arguments follow a path-dependent logic, and the overall world-system enterprise might be partially reinvigorated by recognizing these arguments.

The most basic institution Wallerstein examines is the world capitalist economy itself, which he argues originally developed in sixteenth-century Europe and gradually spread elsewhere. Although Wallerstein contends that a world capitalist economy had to develop for system maintenance, he suggests that it did not necessarily have to develop in Europe. Indeed, he argues there are good reasons to believe that China – not Europe – should have been the birthplace of world capitalism. His explanation for development of a specifically *European* world capitalist economy – as opposed to a *Chinese* world capitalist economy – takes the form of a path-dependent analysis.

In the *Modern World System I*, Wallerstein argues that there was not “any significant difference between Europe and China in the fifteenth century on certain base points” (p. 62), and both regions represented viable locations for the development of capitalism. According to Wallerstein, the “selection” of Europe over China as the birthplace of capitalism was a contingent outcome, and it may not have been the most functional outcome for the world system in the long run (p. 63).⁵⁷ Once a capitalistic economy was launched in Europe, however, predictable self-reinforcing processes led to its rapid proliferation. The European capitalist system required territorial expansion in order to ensure its survival, and this territorial expansion reinforced the world capitalist system during the period from 1450 to 1640. By the time a full-blown capitalist world economy was consolidated in seventeenth-century Europe, China – until recently Europe's equal or superior – lagged far behind and was locked out of any leading role in the world economy. Indeed, having missed its opportunity to lead the world in the creation of capitalism, China was poised to enter the global capitalist system only as a weak peripheral actor. In summary, according to Wallerstein, small initial differences between Europe and China were extremely consequential for large subsequent differences in the development trajectories of the two regions, and indeed the world system as a whole.

Like most functionalist analysts, Wallerstein has difficulty theorizing the ways in which reinforcing sequences might be reversed. Functional explanations assume the existence of self-regulating systems, and thus institutional change usually requires an exogenous shock that puts pressure on the overall system, making a given institution's function obsolete and demanding its transformation to preserve the system in the new environmental setting.⁵⁸ In the case of Wallerstein, however, no such external forces are identified that might dismantle the global capitalist economy.⁵⁹ Wallerstein seems to assume that a transformation of the system will occur when all workers become capitalist wage laborers.⁶⁰ But, given his assumptions about the self-reinforcing nature of the system, it is difficult to see how this change would amount to anything more than an internal transition in the specific form of global capitalism. Wallerstein's difficulty in explaining change illustrates the more general problem functionalists face in accounting for the reversal of self-reinforcing sequences short of appealing to a contingent event like the one that produces the path-dependent sequence in the first place.

Power Explanation. Like utilitarian analysts, scholars who adopt "power" explanations of self-reinforcing processes assume that actors make decisions by weighing costs and benefits. However, unlike utilitarian analysts, these scholars emphasize that institutions distribute costs and benefits unevenly, and they stress that actors with different endowments of resources will typically have conflicting interests vis-à-vis institutional reproduction. In a power-centered approach, an institution can persist even when most individuals or groups prefer to change it, provided that an elite that benefits from the existing arrangement has sufficient strength to promote its reproduction.⁶¹

In path-dependent analyses that employ a power perspective, the genesis of an institution is not a predictable outgrowth of pre-existing power arrangements. Once the institution develops, however, it is reinforced through predictable power dynamics: the institution initially empowers a certain group at the expense of other groups; the advantaged group uses its additional power to expand the institution further; the expansion of the institution increases the power of the advantaged group; and the advantaged group encourages additional institutional expansion. Because early events are contingent, this sequence of empowerment can take place even though the group that benefits from the institution was initially subordinate to an alternative group that favored the adoption of a different institution. Hence, this form of path-

dependent analysis can be used to show how institutions alter the power structure within society by strengthening previously subordinate actors at the expense of previously dominant ones.

William G. Roy's *Socializing Capital: The Rise of the Large Industrial Corporation in America* offers a power-based, path-dependent explanation of the development and dominance of large private corporations in the United States after the 1830s.⁶² Roy's central argument is that, "The privatization of the corporation was not inevitable, not the result of inexorable historical impulses, but forged out of contingent concrete events" (p. 55; see also pp. 280–283). He argues the initial conditions suggested by previous theorists to explain the privatization of the corporation do not apply to the United States. For instance, Roy stresses the privatization of corporations was not simply an outgrowth of the interests and activities of the previous corporate elite. Rather, corporate leaders often benefited from the privileges of public ownership and did not favor a move toward privatization (p. 73). Likewise, rational utilitarian accounts based on efficiency assumptions cannot explain the emergence of the large private corporation in the United States (chapter 2).

Roy argues that the privatization of corporations depended on the chance coming together of a series of historical events that discredited state-supported corporations – i.e., the depression of 1837, the decision of states to invest in canal corporations, the spread of railroads, and the rise of Jacksonian antistatism (pp. 72–74; 280–281). According to Roy, a small change in the timing of any one of these events could have tipped the balance more in favor of large public enterprises. For example, "If the railroad had developed earlier or later, [the railroad business] probably would have been, and perhaps remained, more of a government enterprise" (p. 78; see also pp. 280–281).

Although the rise of the private corporation was not inevitable, power dynamics increasingly locked-in this form of enterprise once it gained an advantage in the mid-nineteenth century. Most importantly, a new corporate class segment benefited from private corporations and worked to reproduce these corporations. This was true even though, at an earlier point, "The winners [i.e., the corporate leaders] were not always at the top of the social pyramid" (p. 260). Hence, private corporations initially served to constitute and empower U.S. corporate leaders, rather than the other way around. Only once these economic elites came into being did they work to reinforce

the institution responsible for their newly established dominant position.

Power-based accounts assume that institutional reproduction is a conflictual process in which significant groups are disadvantaged by institutional persistence. The presence of this conflict means that a dynamic of potential change is built into institutions, even as a dynamic of self-reinforcement also characterizes institutions. Power-based institutions may reproduce themselves until they reach a critical threshold point, after which time self-reinforcement gives way to the inherently conflictual aspects of the institution and eventually to institutional change.⁶³ For example, some analysts stress that the reproduction of elite-supported institutions may eventually disadvantage subordinate groups to the point that these groups successfully challenge the prevailing arrangements.⁶⁴ Likewise, some theorists hypothesize that the very process through which an institution empowers an elite group may eventually become a source of divisions for this elite group, which in turn can facilitate a transformation of existing arrangements.⁶⁵ In this sense, then, power-based accounts of institutional reproduction offer an intriguing framework for explaining the long-term persistence of an institution as well as its eventual – and perhaps sudden – demise.

Legitimation Explanation. In a legitimation framework, institutional reproduction is grounded in actors' subjective orientations and beliefs about what is appropriate or morally correct.⁶⁶ Institutional reproduction occurs because actors view an institution as legitimate and thus voluntarily opt for its reproduction. Beliefs in the legitimacy of an institution may range from active moral approval to passive acquiescence in the face of the status quo. Whatever the degree of support, however, legitimation explanations assume the decision of actors to reproduce an institution derives from their self-understandings about what is the right thing to do, rather than from utilitarian rationality, system functionality, or elite power.

In a path-dependent framework, legitimation explanations maintain that, once a given institution is contingently selected, the institution will be reinforced through processes of increasing legitimation, even if other previously available institutions would have been more legitimate. Increasing legitimation processes are marked by a positive feedback cycle in which an initial precedent about what is appropriate forms a basis for making future decisions about what is appropriate. As a result, a familiar cycle of self-reinforcement occurs: the institution

that is initially favored sets a standard for legitimacy; this institution is reproduced because it is seen as legitimate; and the reproduction of the institution reinforces its legitimacy.

Karen Orren's *Belated Feudalism: Labor, the Law, and Liberal Development in the United States* is an example of a path-dependent study that uses a primarily legitimation explanation to account for institutional persistence.⁶⁷ The central institution Orren examines is the law of master and servant that characterized labor legislation in the United States from the beginning of the republic until well into the twentieth century. Orren argues that this law defied the liberal principle of sovereign individuality by prescribing enforceable obligations on employees as a status right. For example, being a worker in nineteenth-century America was a legal status conferred upon an individual based on personal characteristics (i.e., a physical ability to work and a lack of other means of support) rather than contractual obligations; all able-bodied individuals without independent wealth were legally defined as workers and potentially faced criminal charges if they failed to work (pp. 74–75). Hence, in the United States, status-based, feudal-like legislation had a belated existence, persisting centuries beyond its demise in most of Europe.

The law of master and servant was originally established in feudal England during the Middle Ages, and its surprising carry-over into the United States is inconsistent with the predictions of legitimation explanation, which assumes liberal labor legislation should have prevailed, given elite culture in America. Once the legislation was adopted at the beginning of United States history, however, it persisted for more than one-hundred-and-fifty years. Orren adopts a legitimation perspective to explain this persistence. In particular, she emphasizes the role of American courts in upholding the law. In her view, judges enforced the law because they believed it was legitimate. Specifically, “the judges believed that what was at stake was no less than the moral order of things,” and hence upheld the law (p. 114). Orren emphasizes that American judges did not follow precedent simply because of personal gain (p. 90). Likewise, she contends that judges did not simply support legislation on behalf of the interests of economic elites, even though the employment legislation clearly benefited employers (p. 91). Rather, she argues “that the law of labor relations was on its own historical track, and that it carried protection of business interests along for the ride” (p. 112).

Over time, with each ruling in defense of the legislation, a new precedent was established that reinforced the legitimacy of the master-servant employment legislation. In this sense, with the passage of time, it became increasingly less likely that American judges would overturn the legislation. Eventually, however, the old arrangements did give way: in a series of cases during the 1930s, the Supreme Court upheld new legislative acts that destroyed the remnant of feudalism and replaced it with liberal principles (p. 209). According to Orren, pressure from social groups does not explain this reversal: “It would be fatuous to argue that the Court was in any way compelled in those cases to arrive at the results it did” (p. 207). Instead, she stresses the changing beliefs of justices about what was appropriate in the industrial setting of early twentieth-century America. In particular, she argues that the advent of collective bargaining led the Court to believe that old status-based standards no longer applied to the practices that characterized the contemporary economy (chapter 5).

As this example suggests, legitimation explanations locate institutional transformation with inconsistencies in the multiplicity of cognitive frameworks that are predominant in society, providing a basis for actors to adopt new subjective evaluations and moral codes concerning appropriateness. The legitimacy underlying any given institution can be cast off and replaced when events bring about its forceful juxtaposition with an alternative, mutually incompatible conceptualization. Depending on the specific institution in question, the events that trigger such changes in subjective perceptions and thus declines in legitimacy may be linked to structural isomorphism with rationalized myths, declines in institutional efficacy or stability, or the introduction of new ideas by political leaders.⁶⁸ However, regardless of the particular cause of declining legitimacy, the immediate mechanism of change is a contradiction among prevailing cognitive frameworks and a resulting breakdown in consensual beliefs regarding the reproduction of an institution. In a legitimation framework, then, institutional transformation results from changes in actors’ subjective beliefs and preferences, not changes in the power distribution of actors or changes in the utility functions of actors who are assumed to have constant preferences.

Summary. The analysis of contingent events that become locked-in represents the core of path-dependent research in economic history. Yet, economic historians analyze lock-in only through the lens of utilitarian theory. As a consequence, they fail to theorize many poten-

tial intriguing features of path-dependent sequences, including the persistence of institutions that are less functional, less supportive of elite interests, and less legitimate than institutions that could have been adopted. Furthermore, by focusing on only utilitarian mechanisms, economic historians offer a limited discussion of the ways in which path dependence might be reversed. As a corrective to these shortcomings, this section discussed how historical sociologists analyze path dependence in relation to the functional, power, and legitimation theoretical traditions – as well as utilitarian theory. The next section explores further how historical sociologists enrich the study of path dependence by examining a second type of sequence not explicitly theorized by economic historians: reactive sequences.

Reactive sequences

Reactive sequences are chains of temporally ordered and causally connected events. In a reactive sequence, each event in the sequence is both a reaction to antecedent events and a cause of subsequent events. Early events in the sequence are especially important to final outcomes because a small change in one of these events can accumulate over time and make a great deal of difference by the end of the sequence.⁶⁹ These sequences have the familiar logic of A leads to B, which leads to C, which leads to D, and so on, such that the final event of the sequence depends on the occurrence of the first event. For example, Isaac, Street, and Knapp argue that the death of Martin Luther King, Jr. led to the expansion of race-based poor relief at the expense of more progressive programs of class-based economic reform. To simplify their sophisticated event-structure argument, they show how King's death (Event A) caused the failure of the Poor People's Campaign (B), which in turn led to massive summer riots (C), which heightened welfare militancy (D), which brought about an increase in AFDC applications and court rulings that liberalized AFDC acceptance criteria (E), and which fostered an explosion in the AFDC rolls in the late 1960s (F).⁷⁰

Reactive sequence arguments follow a different logic from that of self-reinforcing sequences. Whereas self-reinforcing sequences are characterized by processes of reproduction that *reinforce* early events, reactive sequences are marked by backlash processes that *transform* and perhaps *reverse* early events. In a reactive sequence, early events trigger subsequent development not by reproducing a given pattern,

but by setting in motion a chain of tightly linked reactions and counterreactions. As Pierson suggests, “initial disturbances are crucial not because they generate positive feedback, but because they trigger a powerful response.... action and reaction move the system in a new direction, but not one that reinforces the first move.”⁷¹

Contingency and conjunctural causation

With a reactive sequence, it is not self-evident how one should conceptualize the starting point of the sequence, which raises an important problem. Because the decision to select any particular events as the starting point of analysis may seem arbitrary, the investigator is prone to keep reaching back in time in the search for foundational causes that underlie subsequent events in the sequence. In other words, without criteria for identifying a meaningful beginning point, the investigator can easily fall into the trap of infinite regress – i.e., perpetual regression back in time to locate temporally prior causal events. This is a well-known problem, but few commentators have proposed serious ideas for its resolution.⁷²

In a path-dependent reactive sequence, the initial event that sets into motion the overall chain of reactions is contingent. From the perspective of theory, such an event appears as a “breakpoint” that could not have been anticipated or predicted. For example, in the Isaac, Street, and Knapp study mentioned above, the death of King is a salient starting point because it represents an unpredictable departure from previously established practices. As Sewell suggests, it is common for historical analysts to begin their sequential analyses with these “initial ruptures” that mark a “surprising break” with theoretical expectations.⁷³ By focusing on such breakpoints, analysts of reactive sequences offer one possible solution to the problem of infinite historical regress.

The contingent initial event that triggers a reactive causal chain is often itself the intersection point of two or more prior sequences. Historical sociologists use the expression “conjuncture” to refer to this coming together – or temporal intersection – of separately determined sequences.⁷⁴ The point in time at which two independent sequences intersect will often not be predictable in advance. Likewise, the specific event generated by the intersection of the sequences may be outside of the resolving power of prevailing theories. Hence, conjunctures are often treated as contingent occurrences.⁷⁵ This is true even though

each of the sequences that collide to make a conjuncture may themselves follow a highly predictable causal pattern.

Figure 2 presents hypothetical examples of sequences and conjunctures. In these examples, the lettered cells represent different events (i.e., particular values on variables) that are linked in a temporal and causal sequence. The examples in the figure demonstrate how the intersection – and the *timing* of the intersection – of separate sequences can have a major impact on subsequent events.

Example 1 presents two independent reactive sequences of events. In this example, there is no conjuncture, because the sequences do not intersect. Hence, each sequence follows its own autonomous causal logic independent of a breakpoint. The subsequent three examples consider what might occur if these two sequences were to intersect. In example 2, the two sequences intersect to produce a conjunctural event (i.e., event Z) not found in the trajectory of either sequence independent of their intersection. However, the overall trajectory of the sequences is only temporarily disrupted. In other words, following the conjuncture point represented by event Z, the two sequences are restored to their original trajectories. In this example, therefore, the conjuncture has no enduring consequence.

Examples 3 and 4 consider conjunctures that do have enduring effects on subsequent trajectories. These examples illustrate the type of conjunctural argument used in many path-dependent analyses of reactive sequences. In the examples, the intersection of the two sequences produces a trajectory that is distinct from the trajectory either sequence would have followed in the absence of the conjuncture. However, in examples 3 and 4, the sequences intersect at different temporal points. As a result, the subsequent chain of events generated by each conjuncture is quite distinct. Examples 3 and 4 thus illustrate that *when* sequences intersect is extremely consequential for the subsequent chain of events that occurs; it matters a great deal if two sequences collide at an earlier or later point in their trajectories.

Unpredictability, narrative, and inherent sequentiality

Even with knowledge of the contingent breakpoint that launches a reactive sequence, analysts may have difficulty predicting or explaining the final outcome of the sequence. As chaos theorists have stressed,

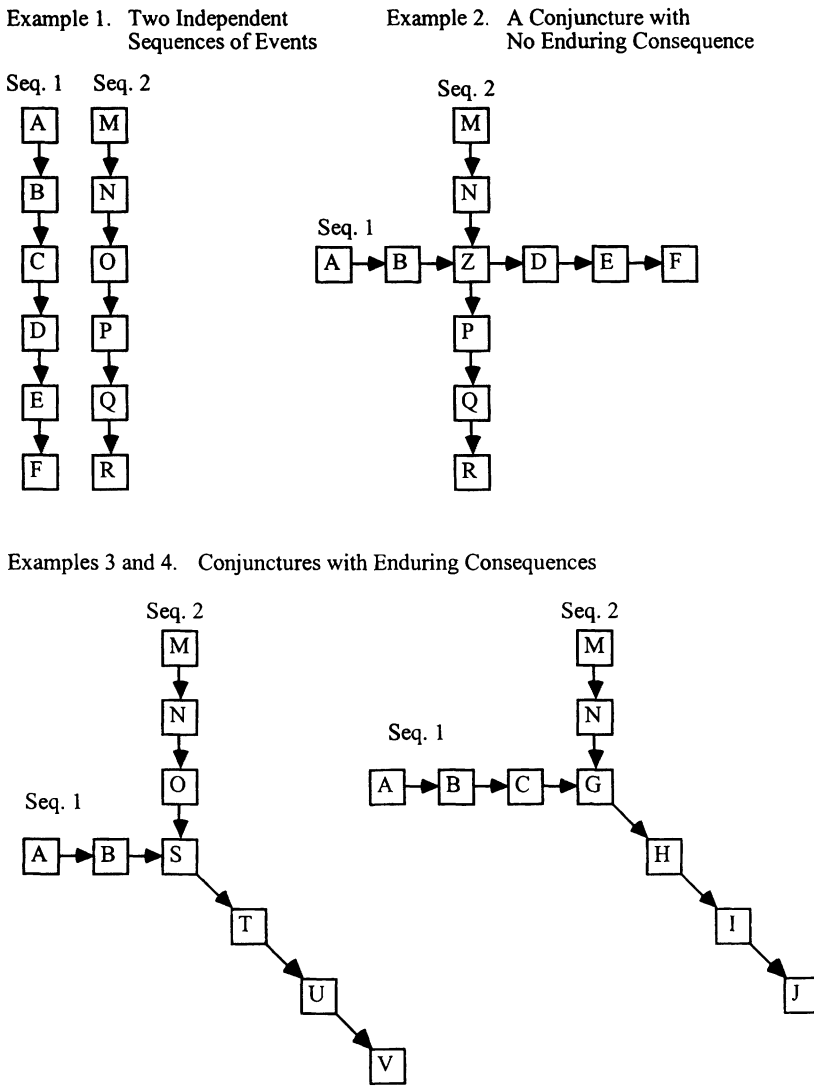


Figure 2. Examples of sequences and conjunctures.

final outcomes cannot necessarily be predicted on the basis of early events in a sequence, even if the sequence is governed by rigid mathematical laws.⁷⁶ Yet, smaller intervals of connected events within overall sequences often can be predicted or explained.⁷⁷ For path-dependent investigators, these smaller sets of intervening steps through which initial breakpoints produce final outcomes – not the direct link between breakpoints and outcomes – are the central objects of analysis.

Historical narrative offers an especially useful method for making sense of the multiple steps in a reactive sequence.⁷⁸ Through a narrative account, the analyst can provide “a scene by scene description of the particular causal paths” through which an initial breakpoint leads to a final outcome.⁷⁹ Furthermore, the step-by-step approach of narrative allows the analyst to use counterfactual methods in exploring specific causal links in the overall chain. When only the initial step and final outcome of the sequence are considered, counterfactual analysis is problematic because imagining that a change in initial conditions produces a different final outcome will require imagining that many other aspects of the world are different. By contrast, each of the many smaller steps identified through narrative can potentially be analyzed using counterfactual analysis without having to assume that the world is completely different.⁸⁰ In conjunction with such counterfactual analysis, narrative can help the investigator identify what Aminzade calls “key choice points” in a reactive sequence – i.e., “forks in the road ... marked by the presence of alternative possible paths.”⁸¹ These choice points facilitate an exploration of “suppressed historical alternatives” and hypothetical “paths not taken” that could have occurred if particular events in the reactive sequence had been different.

The events that make up a reactive sequence are connected by tight causal linkages, or what Griffin and Ragin call “inherent sequentiality.”⁸² The basic idea underlying inherent sequentiality is Abbott’s notion that an “inherent logic of events” characterizes enchainment sequences.⁸³ However, this formulation leaves open the question of how one event “logically” or “inherently” follows from another. As Goldstone suggests, path-dependent analysts cannot simply appeal to Dr. Seuss-like explanatory principles – i.e., “it just happened that this happened first, then this, then that, and is not likely to happen that way again.”⁸⁴ Rather, analysts must provide some causal account of linkages among variables, a topic that historical sociologists have only begun to address systematically.⁸⁵

Although it is difficult to generalize about all reactive sequences, processes of inherent sequentiality are often marked by three features that enable path-dependent analysts to avoid arbitrary Seussian explanation. First, events in a path-dependent reactive sequence are often necessary or sufficient conditions for subsequent events.⁸⁶ Causal determinism is sometimes defined by the use of necessary and sufficient conditions,⁸⁷ underscoring the deterministic side of reactive sequences. Necessary and sufficient causes are themselves not logically

equivalent, and, as Abbott argues, it is helpful to maintain a distinction between the two. “Sufficient links project forward in time, asking how events make other events happen. Necessary ones project backward, asking what events might have prevented the present state of things from happening. Separating the two makes a sequential analysis much clearer.”⁸⁸ For example, the methodological technique of event-structure analysis used by Isaac, Street, and Knapp analyzes events that are understood to be specifically *necessary* conditions within a reactive sequence. That is, event-structure analysts project backward to those events that are “required for the occurrence of a subsequent action.”⁸⁹ Other scholars project forward by focusing on sufficient conditions that generate subsequent stages in a sequence. These scholars may contrast the reactive sequences of two or more cases in order to demonstrate that specific events were sufficient for the production of subsequent events.⁹⁰

Second, inherent sequentiality permits a fine-grained analysis of the “causal mechanisms” that link initial conditions with final outcomes. Causal mechanisms are the intervening processes through which one variable exerts a causal effect on another variable.⁹¹ In a reactive sequence, each intermediary event represents a causal mechanism that links an initial breakpoint with a final outcome. At the same time, causal mechanisms connect all temporally consecutive events in the sequence. For instance, as presented above, Isaac, Street, and Knapp’s argument linking King’s death to the expansion of AFDC provisions represents a reactive sequence of six linked events: $A \Rightarrow B \Rightarrow C \Rightarrow D \Rightarrow E \Rightarrow F$. In this sequence, events B, C, D, and E are causal mechanisms standing between King’s death (Event A) and the AFDC expansion (Event F). At the same time, there is a causal mechanism standing between each pair of linked events in the sequence (e.g., between King’s death [Event A] and the failure of the Poor People’s Campaign [Event B]). One cannot meaningfully assert that event A leads to event B, or that event B leads to causal event C, without some understanding of these mechanisms.⁹² When path-dependent analysts explicitly identify these mechanisms, they draw on existing theoretical frameworks, including the utilitarian, functional, power, and legitimation approaches discussed above.⁹³

The final component of inherent sequentiality is a clear temporal ordering among events in a sequence. In much social research, establishing the time order of variables can be a difficult task. For historical sociologists who analyze reactive sequences, however, this problem is

partially overcome through narrative analysis, which portrays social phenomena as “stories” that unfold in a clear chronological order.⁹⁴ The chronological ordering of events in narrative is a key reason why reactive sequences appear to follow an inherent logic in which one event naturally leads to another. Indeed, if the events in a reactive sequence cannot be clearly arranged in a precise chronological order, the notion that one event logically follows from another is considerably harder to sustain.

Reactive sequences in substantive research

Reactive sequence arguments in historical sociology are extremely common, but most of these arguments do not model path-dependent patterns. Studies that employ variants of “path analysis” examine chains of linked events, but these studies do not usually trace outcomes back to contingent breakpoints. It is important to recognize that a scholarly emphasis on “pathways” or “paths of development” does not mean that a study examines path dependence.

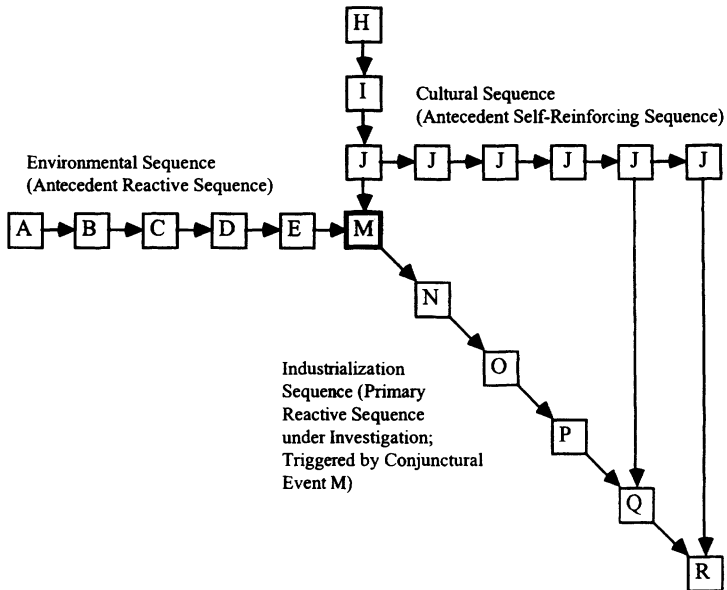
Substantive path-dependent analyses of reactive sequences often examine cases in which early contingent events produce a trajectory of change that culminates in an outcome that deviates from other similar cases. For instance, students of “American exceptionalism” have emphasized historical accidents, contingent events, or small differences in starting conditions to explain the absence of socialism in the United States.⁹⁵ In those rare cases where socialist organizations are present in the United States, scholars have also traced these unusual occurrences back to particularistic historical factors. For example, to explain the development of radicalism among the West Coast International Longshoremen’s and Warehouse’s Union (ILWU), Howard Kimeldorf places considerable emphasis on the leadership of Harry Bridges during the key early-1930s juncture in U.S. labor history. The emergence of Bridges during this time and his extraordinary leadership could not have been predicted, but without him the ILWU would have followed a quite different path of evolution.⁹⁶ Similarly, Lipset, Trow, and Coleman’s massive study of the International Typographical Union (ITU) traces union democracy back to a conjuncture of events that could not have been anticipated by organizational theorists. As they suggest, “Democracy in the ITU was . . . no necessary consequence of a particular set of static factors.” Rather, “the existence of democracy in the ITU is largely the result of the convergence of a set of events....

If some one event in the early history had turned the other way, then present-day democracy in the union would have been less likely.”⁹⁷ Because of the extremely low probability of all the necessary events for union democracy coming together, Lipset and collaborators conclude that a democratic outcome in the ITU was indeterminate even when the union was first formed. Still other scholars have analyzed outcomes such as delayed industrialization in Italy and the decline of central state expansion in the United States following the Civil War as path-dependent occurrences that resulted from processes of reaction and counterreaction originally set into motion by a contingent breakpoint.⁹⁸

Jack Goldstone’s recent explanation of the industrial revolution in England illustrates the logic of a path-dependent reactive sequence argument.⁹⁹ As Figure 3 suggests, Goldstone’s argument can be broken down into three main sequences: an “environmental” sequence, a “cultural” sequence, and an “industrialization” sequence. The industrialization sequence is the primary sequence under investigation because it contains the events that directly led to a modern industrial economy in England. Yet, this sequence was triggered by a contingent event – the development of the steam engine (Event M) – that in turn grew out of a conjuncture between the environmental and cultural sequences.

In the figure, the environmental sequence is launched by certain features intrinsic to England: insignificant forest area, thick seams of coal near the sea, and a cold climate (Event A). These conditions were necessary for England’s heavy reliance on coal (rather than wood) for heating (B). The extensive use of coal for heating, however, eventually led to the exhaustion of surface-level coal (C), which in turn triggered efforts to dig deeper for coal beneath the surface (D). Yet, digging deeper caused ground water to fill the mineshafts and prevent successful mining (E). Hence, by the early eighteenth century, miners faced problems extracting the coal needed to heat homes across England.

In Goldstone’s formulation, England’s cultural sequence is characterized by a “liberalizing” set of values in which new ways of thinking, new modes of economic activity, and risk-taking are tolerated by the state (J). As Figure 3 demonstrates, this cultural sequence is marked by reinforcing – not reactive – properties. Goldstone’s analysis suggests that England’s liberalizing culture was itself a product of causally connected antecedent events, including the absence of a significant monarchy in England (H) and limited Anglican authority and a cli-



Key:

- A: Limited forest area, abundant coal near sea, and cold climate.
- B: Long-term heavy reliance on coal for heat.
- C: Surface coal is exhausted.
- D: Effort to dig for deeper coal.
- E: Ground water fills mine shafts.
- H: Limited monarchy.
- I: Limited Anglican authority and toleration.
- J: Liberalizing culture open to technological experimentation.
- M: Development of first steam engine.
- N: Improvement of steam engine.
- O: Reduction in coal prices.
- P: Reduction in price of iron and steel.
- Q: Development of railways and ships.
- R: Mass distribution of industrial production and goods.

Figure 3. Goldstone's reactive sequence explanation of English industrialization.

mate of toleration (I). The reinforcing aspect of the cultural sequence (i.e., the repetition of Event J) is important because this sequence later influences developments in the primary industrialization sequence.

The intersection of these two sequences (i.e., Event E with Event J) produced a major conjunctural event: the development of the first steam engine (M). In 1712, in a successful effort to produce a machine for pumping water to clear the deep-shaft mines, Thomas Newcomen

created a bulky, noisy apparatus that made steam from the water and coal found at the mouth of the mines. According to Goldstone, “it was just chance that England had been using coal for so many centuries, and now needed a way to pump clear deep mines that held exactly the fuel needed for the clumsy Newcomen pumping machine” (p. 273). Indeed, in Goldstone’s view, the unlikely events that led to the steam engine were a “perhaps one-in-a-million conjuncture” (p. 271).

Yet, once the first steam engine was developed, it triggered a quite predictable sequence of reactions in which further innovations and improvements followed. First, the inefficient Newcomen steam engine itself was improved by subsequent inventors such as James Watt (N). Then, these more efficient steam engines dramatically improved the extraction of coal, which led to a reduction in coal prices (O). In turn:

Cheap coal made possible cheaper iron and steel. Cheap coal plus cheap iron made possible the construction of railways and ships built of iron, fueled by coal, and powered by engines producing steam. Railways and ships made possible mass national and international distribution of metal tools, textiles, and other products that could be more cheaply made with steam-powered metal-reinforced machinery [Events P, Q, and R] (p. 275).

In summary, according to Goldstone, “there was nothing necessary or inevitable” about England’s breakthrough to modern industrialism (p. 275). Rather, this outcome was dependent on the development of steam power – a contingent breakpoint that grew out of a highly improbable concurrence of events.

Conclusion

Discussions of path dependence have been hampered by a basic problem: analysts often lack a clear understanding of the meaning of path dependence. In this article, I have argued that path dependence occurs when a contingent historical event triggers a subsequent sequence that follows a relatively deterministic pattern. In the case of a self-reinforcing sequence, the contingent period corresponds with the initial adoption of a particular institutional arrangement, while the deterministic pattern corresponds with the stable reproduction of this institution over time. By contrast, in the case of a reactive sequence, the contingent period corresponds with a key breakpoint in history, while the deterministic pattern corresponds with a series of reactions that logically follow from this breakpoint.

Path-dependent analyses depart decisively with sociological approaches predicated on general linear reality. According to Abbott, the general linear model is based on the notion that “the order of things does not influence the way they turn out.”¹⁰⁰ By contrast, the very definition of path dependence stresses the importance of early events for later occurrences. Likewise, whereas the general linear model assumes that, “Cause can never flow from small to large, from the arbitrary to the general, from the minor event to the major development,” path dependence by definition assumes that causation flows from contingent historical events to general processes of potentially broad significance.¹⁰¹ To take one striking example considered above, Wallerstein argues that the fundamental organization of the entire global capitalist economy hinged on small peculiarities in the nature of Europe’s agricultural system in the fifteenth century.

Given that path dependence presents an intriguing mode of explanation for sociology, one must ask about the kinds of phenomena that are especially likely to exhibit path dependence. As Goldstone has pointed out, outcomes like the Industrial Revolution that occur only once and then perhaps diffuse to other places are frequently subject to path dependence.¹⁰² Cases with such outcomes often exhibit path dependence because they witness contingent historical events that separate them from other cases that share similar initial conditions. For example, the development of the steam engine was a contingent breakpoint that led England to diverge sharply from other countries with similar preconditions for industrialism. At the same time, however, path dependence may characterize particular instances of historical phenomena that occur in multiple cases. In these situations, a given outcome that is shared by several cases emerges in one particular case from an atypical set of initial conditions that are stochastically related to the outcome. For example, as we have seen, Roy argues that the privatization of large corporations in the United States was a path-dependent outcome because the initial conditions from which it emerged do not correspond to the kind of generalizable conditions that may explain the triumph of the large private corporation in other countries.

To some degree, work on path dependence conflicts with efforts in the field of historical sociology to identify generalizable configurations of causal processes that explain similarities and differences across multiple cases. Indeed, the researcher who wants to document path dependence for a particular outcome may ruthlessly move back in history to uncover a point in time when initial conditions cannot

predict the outcome. Even if this outcome has been explained by generalizable causal variables, the aggressive path-dependent researcher may seek out prior conditions before those causal variables came into being. This kind of path-dependent analysis sharply contrasts with much mainstream comparative-historical sociology, where analysts attempt to locate points in time when generalizable variables exist and try to avoid having to characterize outcomes as indeterminate occurrences.

The tension between path-dependent arguments and more commonplace causal arguments in historical sociology hinges significantly on the temporal location of initial conditions in a sequence. Skeptics of path dependence might argue that any outcome could be viewed as path-dependent if one goes back far enough in time – i.e., eventually initial conditions can be identified when final outcomes appear to be stochastic. Path-dependent analysts might respond to such a charge by pointing out that the historical starting point in alternative kinds of comparative-historical work is often arbitrary. This debate underscores the need for analysts to develop more objective criteria for determining what temporal point should represent the “initial” or “starting” conditions of a sequence.

With a self-reinforcing sequence, I would suggest that the period immediately preceding a critical juncture marks a reasonable point in time for specifying the beginning of the sequence. During this pre-critical juncture period, different options become available for selection and potential processes affecting the choice made at the critical juncture become active. If the conditions present at this time can predict or explain the outcome of the critical juncture, the given sequence should not be considered path-dependent. By contrast, if the outcome of the critical juncture is related stochastically to these conditions, the sequence should be considered path-dependent. Using this standard, the arguments of Wallerstein, Orren, and many economic historians can be considered path-dependent because conditions immediately prior to critical junctures left open the outcome of these junctures.

With reactive sequences, it is harder to identify a temporal point corresponding to initial conditions, since the outcome under investigation may follow a seemingly endless flow of causally-connected events going back in time. Although advocates of path dependence may be tempted to move back in time until theory can no longer explain final outcomes, such a strategy leaves them vulnerable to the charge that any

outcome can be construed as path-dependent if one looks hard enough. Perhaps a more reasonable approach is to use comparisons with other cases and generalized understandings of what is historically possible as a basis for identifying the initial conditions of a sequence. For example, Kimeldorf's path-dependent explanation of the emergence of socialism in the ILWU is convincing because, through a comparison with unions that did not develop a socialist orientation, he illustrates that this outcome was indeterminate even when it was a meaningful possibility for the ILWU to follow the anti-socialist path of most other U.S. unions. Similarly, Goldstone's analysis of the industrial revolution in England makes sense because he shows that this outcome is stochastically related not only to conditions found in the distant past of England, when theory is less relevant for explaining industrialization, but also to conditions present only shortly before England embarked on a course of rapid industrialization, when theories of industrialization are most applicable. And Lipset, Trow, and Coleman's contention that the development of socialism in the ITU was indeterminate makes sense because the claim is applied to a period in time when other similar unions were developing in a decidedly non-socialist direction. For all of these studies, the argument that final outcomes are stochastically related to initial conditions is sensible because the analyst focuses on a starting point when theory suggests that the non-occurrence of these outcomes was a realistic historical possibility.

Using these criteria for specifying the beginning of sequences will help researchers make more plausible claims that certain important outcomes are ultimately generated through a path-dependent logic. Along with more clearly elaborating the theoretical frameworks from which one evaluates path dependence, which will help in assessing claims about contingency, this effort could represent a big advance for path-dependent research. In the meantime, it is important that all analysts become clearer and more explicit about the meaning of path dependence. If this concept continues to be used loosely and without clear definition, the study of path-dependent sequences by historical sociologists will probably not amount to anything more than a faddish trend in the discipline. In explicating the specific meaning and uses of path dependence, this article provides sociologists with conceptual and methodological tools for avoiding this outcome.

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Notes

1. Ronald Aminzade, "Historical Sociology and Time," *Sociological Methods and Research* 20 (1992): 462–467; Larry J. Griffin, "Temporality, Events, and Explanation in Historical Sociology: An Introduction," *Sociological Methods and Research* 20 (1992): 413–414; Larry J. Griffin, "Narrative, Event-Structure, and Causal Interpretation in Historical Sociology," *American Journal of Sociology* 98 (1993): 1099; Larry W. Isaac, "Transforming Localities: Reflections on Time, Causality, and Narrative in Contemporary Historical Sociology," *Historical Methods* 30 (1997): 7; William H. Sewell, Jr., "Three Temporalities: Toward an Eventful Sociology," in Terrence J. McDonald, editor, *The Historic Turn in the Human Sciences* (Ann Arbor: University of Michigan Press, 1996), 262–264; Margaret R. Somers, "We're No Angels: Realism, Rational Choice, and Relationality in Social Science," *American Journal of Sociology* 104 (1998): 768–769; Charles Tilly, "Future History," *Theory and Society* 17/6 (1988): 710; Charles Tilly, "The Time of States," *Social Research* 61 (1994): 270.
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3. North, *Institutions, Institutional Change*, 100; Sheri Bernan, "Path Dependency and Political Action: Reexamining Responses to the Depression," *Comparative Politics* 30 (1998): 379–400.
4. Path analysis has roots in the Simon-Blalock model of linear causal analysis. In a discussion of this model, Boudon identified a weak form of path analysis that he referred to as "dependence analysis." See Herbert A. Simon, *Models of Man* (New York: John Wiley and Sons, 1957), chapter 2; Hubert M. Blalock, Jr., *Causal Inferences in Nonexperimental Research* (Chapel Hill: University of North Carolina Press, 1964); and Raymond Boudon, "A Method of Linear Causal Analysis," *American Sociological Review* 30 (1965): 365–374.
5. See Jack A. Goldstone, "Initial Conditions, General Laws, Path Dependence, and Explanation in Historical Sociology," *American Journal of Sociology* 104 (1998): 843.

6. Rebecca Emigh, "The Power of Negative Thinking: The Use of Negative Case Methodology in the Development of Sociological Theory," *Theory and Society* 26 (1997): 649.
7. This argument is developed in Paul Pierson, "Increasing Returns, Path Dependence, and the Study of Politics," *American Political Science Review* 94 (2000): 251–267. See also Arthur, *Increasing Returns*; Elhanan Helpman and Paul Krugman, *Market Structure and Foreign Trade* (Cambridge: MIT Press, 1985); Paul Krugman, "History and Industry Location: The Case of the Manufacturing Belt," *American Economic Review* 81 (1991): 80–83; Paul M. Romer, "Increasing Returns and Long-Run Growth," *Journal of Political Economy* 94 (1986): 1002–1037.
8. On the importance of the mechanisms underpinning self-reinforcing sequences, see Kathleen Thelen, "Historical Institutionalism in Comparative Politics," *Annual Review of Political Science* 2 (1999): 388–392.
9. See Andrew Abbott, "Sequences of Social Events: Concepts and Methods for the Analysis of Order in Social Processes," *Historical Methods* 16 (1983): 129–147; Griffin, "Temporality, Events, and Explanation"; Sewell, "Three Temporalities."
10. See James Mahoney, "Strategies of Causal Inference in Small-N Analysis," *Sociological Methods and Research* 28 (2000): 387–424.
11. Sewell, "Three Temporalities," 262–263. For scholars who basically adopt this definition, see Barbara Geddes, "Paradigms and Sand Castles in Comparative Politics of Developing Areas," in William Crotty, editor, *Political Science: Looking to the Future*, vol. 2. (Evanston, Ill.: Northwestern University Press 1991), 59; Isaac, "Transforming Localities," 7; Terry Lynn Karl, *The Paradox of Plenty: Oil Booms and Petro-States* (Berkeley: University of California Press, 1997), 11; Jill Quadagno and Stan J. Knapp, "Have Historical Sociologists Forsaken Theory?: Thoughts on the History/Theory Relationship," *Sociological Methods and Research* 20 (1992): 481–507; Somers, "We're No Angels," 768–769; Tilly, "Future History," 710.
12. Karl, *The Paradox of Plenty*, 11.
13. Bart Nooteboom, "Path Dependence of Knowledge: Implications for the Theory of the Firm," in Lars Magnusson and Jan Ottosson, editors, *Evolutionary Economics and Path Dependence* (Cheltenham, U.K.: Edward Elgar, 1997), 57.
14. Abbott, "Sequences of Social Events"; Andrew Abbott, "Conceptions of Time and Events in Social Science Methods: Causal and Narrative Approaches," *Historical Methods* 23 (1990): 140–150; Andrew Abbott, "From Causes to Events: Notes on Narrative Positivism," *Sociological Methods and Research* 20 (1992): 428–455; Griffin, "Temporality, Events, and Explanation"; Griffin, "Narrative, Event-Structure"; Jeffrey Haydu, "Making Use of the Past: Time Periods as Cases to Compare and as Sequences of Problem Solving," *American Journal of Sociology* 104 (1998): 339–371; Isaac, "Transforming Localities"; Larry W. Isaac and Larry J. Griffin, "Ahistoricism in Time-Series Analysis of Historical Process: Critique, Redirection, and Illustrations from U.S. Labor History," *American Sociological Review* 54 (1989): 873–890; Paul Pierson, "Not Just What, but *When*: Timing and Sequence in Political Processes," *Studies in American Political Development* 14 (2000): 73–93; Quadagno and Knapp, "Have Historical Sociologists Forsaken Theory?"; Sewell, "Three Temporalities"; William H. Sewell, Jr., "Historical Events as Transformations of Structures: Inventing Revolution at the Bastille," *Theory and Society* 25/6 (1996): 841–881; Charles Tilly, *As Sociology Meets History* (New York: Academic Press, 1981); Charles Tilly, *Big Structures, Large Processes, Huge Comparisons* (New York: Russell Sage Foundation, 1984); Tilly, "Future History."
15. For illustrations of this idea, see Thomas C. Schelling, *Micromotives and Macro-*

- behavior* (New York: W.W. Norton, 1978), 15; James Gleick, *Chaos: Making a New Science* (New York: Penguin, 1987), 8.
16. Pierson, "Increasing Returns," 263.
 17. Arthur, *Increasing Returns*, 6–7.
 18. Abbott, "Sequences of Social Events," 129; Tilly, *Big Structures*, 14, his emphasis.
 19. Arthur, *Increasing Returns*, 17; Haydu, "Making Use of the Past," 352; Goldstone, "Initial Conditions," 834–835.
 20. Goldstone, "Initial Conditions," 834.
 21. Abbott, "From Causes to Events," 445.
 22. Theda Skocpol, *States and Social Revolutions: A Comparative Analysis of France, Russia and China* (Cambridge: Cambridge University Press, 1979); Jack A. Goldstone, *Revolution and Rebellion in the Early Modern World* (Berkeley: University of California Press, 1991).
 23. Pierson, "Increasing Returns"; Arthur, *Increasing Returns*; David, "Clio and the Economics of QWERTY."
 24. Arthur, *Increasing Returns*; David, "Clio and the Economics of QWERTY"; Paul A. David and Julie Bunn, "The Economics of Gateway Technologies and Network Evolution: Lessons from Electricity Supply History," *Information Economics and Policy* 3 (1988): 165–202; Robin Cowan, "Nuclear Power Reactors: A Study in Technological Lock-In," *Journal of Economic History* 50 (1990): 541–567; Robin Cowan and Philip Gunby, "Sprayed to Death: Path Dependence, Lock-In and Pest Control Strategies," *Economic Journal* 106 (1996): 521–542; Eban Goodstein, "The Economic Roots of Environmental Decline: Property Rights or Path Dependence," *Journal of Economic Issues* 29 (1995): 1029–1043; John Hartwick, "The Persistence of QWERTY and Analogous Suboptimal Standards," unpublished manuscript. Kingston, Ontario: Queen's University, 1985. The empirical accuracy of some of these examples has been contested by Liebowitz and Margolis. These authors present a broad theoretical critique of path dependence that suggests inefficient outcomes occur rarely or never in the marketplace. See S. J. Liebowitz and Stephen E. Margolis, "Path-Dependence, Lock-In, and History," *Journal of Law, Economics, and Organization* 11 (1995): 205–226. However, as Pierson ("Increasing Returns," 15) argues, this critique is less relevant to non-market social settings. See also Oliver E. Williamson, "Transaction Cost Economics and Organizational Theory," *Industrial and Corporate Change* 2 (1993): 107–156.
 25. Haydu, "Making Use of the Past"; Stephen D. Krasner, "Sovereignty: An Institutional Perspective," *Comparative Political Studies* 21 (1988): 66–94; North, *Institutions, Institutional Change*; Pierson, "Increasing Returns"; Walter W. Powell, "Expanding the Scope of Institutional Analysis," in Walter W. Powell and Paul J. DiMaggio, editors, *The New Institutionalism in Organizational Analysis* (Chicago: University of Chicago Press, 1991); Mark J. Roe, "Chaos and Evolution in Law and Economics," *Harvard Law Review* 109 (1996): 641–668; Anthony Woodlief, "The Path-Dependent City," *Urban Affairs Journal* 33 (1998): 405–438.
 26. Robert R. Alford and Roger Friedland, *Powers of Theory: Capitalism, the State, and Democracy* (Cambridge: Cambridge University Press, 1985); Walter W. Powell and Paul J. DiMaggio, editors, *The New Institutionalism in Organizational Analysis* (Chicago: University of Chicago Press, 1991); Peter A. Hall and Rosemary C. R. Taylor, "Political Science and the Three New Institutionalisms," *Political Studies* 44 (1996): 936–957; Krasner, "Sovereignty"; James G. March and Johan P. Olsen, "The New Institutionalism: Organizational Factors in Political Life," *American Political Science Review* 78 (1984): 734–749; John W. Meyer and Brian Rowan,

- “Institutionalized Organizations: Formal Structure as Myth and Ceremony,” *American Journal of Sociology* 83 (1977): 340–363; W. Richard Scott, “The Adolescence of Institutional Theory,” *Administrative Science Quarterly* 32 (1987): 493–511; Arthur L. Stinchcombe, *Constructing Social Theories* (Chicago: University of Chicago Press, 1968); Kathleen Thelen and Sven Steinmo, “Historical Institutionalism in Comparative Politics,” in Sven Steinmo, Kathleen Thelen, and Frank Longstreth, editors, *Structuring Politics: Historical Institutionalism in Comparative Analysis* (Cambridge: Cambridge University Press, 1992).
27. Stinchcombe, *Constructing Social Theories*, 103. See also Ernest Nagel, *The Structure of Science: Problems in the Logic of Scientific Explanation* (Indianapolis: Hackett, 1979), 25–26.
 28. Seymour Martin Lipset and Stein Rokkan, *Party Systems and Voter Alignments: Cross-National Perspectives* (New York: Free Press, 1967); Ruth Berins Collier and David Collier, *Shaping the Political Arena: Critical Junctures, the Labor Movement, and Regime Dynamics in Latin America* (Princeton: Princeton University Press, 1991); Andrew Abbott, “On the Concept of Turning Point,” *Comparative Social Research* 16 (1997): 85–105.
 29. Margaret Levi, “A Model, a Method, and a Map: Rational Choice in Comparative and Historical Analysis,” in Mark Irving Lichbach and Alan S. Zuckerman, editors, *Comparative Politics: Rationality, Culture, and Structure* (Cambridge: Cambridge University Press, 1997), 28.
 30. James D. Fearon, “Counterfactuals and Hypothesis Testing in Political Science,” *World Politics* 43 (1991): 577–592; James D. Fearon, “Causes and Counterfactuals in Social Science: Exploring an Analogy Between Cellular Automata and Historical Processes,” in Philip E. Tetlock and Aaron Belkin, editors, *Counterfactual Thought Experiments in World Politics* (Princeton: Princeton University Press, 1996).
 31. There are other understandings of “contingency” available in the literature. See, for example, Larry Griffin and Charles C. Ragin, “Some Observations on Formal Methods of Qualitative Analysis,” *Sociological Methods and Research* 23 (1994): 16; Edgar Kiser and Michael Hechter, “The Role of General Theory in Comparative-Historical Sociology,” *American Journal of Sociology* 97 (1991): 6; and Quadagno and Knapp, “Have Sociologists Forsaken Theory?” 499–500.
 32. See Jerome G. Manis and Bernard N. Meltzer, “Chance in Human Affairs,” *Sociological Theory* 12 (1994): 45–56; Gary King, Robert O. Keohane, and Sidney Verba, *Designing Social Inquiry: Scientific Inference in Qualitative Research* (Princeton: Princeton University Press, 1994), 59–60; Isaiah Berlin, *Historical Inevitability* (London: Oxford University Press, 1954); Lorenz Kruger, Lorraine J. Daston, and Michael Heidelberger, *The Probabilistic Revolution: Ideas in History* (Cambridge, Mass.: MIT Press, 1987).
 33. Edward Hallett Carr, *What is History?* (New York: Alfred A. Knopf, 1962), chapter 4.
 34. Aminzade, “Historical Sociology,” 463; Collier and Collier, *Shaping the Political Arena*, 27; Gerardo L. Munck, “Between Theory and History and Beyond Traditional Area Studies: A New Comparative Perspective on Latin America,” *Comparative Politics* 25 (1993): 491.
 35. Liebowitz and Margolis, “Path-Dependence,” 210.
 36. David, “Clio and the Economics of QWERTY.”
 37. S. J. Liebowitz and Stephen E. Margolis, “The Fable of the Keys,” *Journal of Law and Economics* 33 (1990): 1–25. Additional typewriter formats besides QWERTY and Dvorak have emerged over time, and it is now clear that QWERTY is not an optimal design – even though, as discussed below, the costs of technology reversal

would make it inefficient to abandon QWERTY. One might be inclined to argue that QWERTY should be considered a path-dependent outcome because its persistence reveals how historical conditions can lead to sub-optimal outcomes, even if its initial adoption and subsequent persistence are fully consistent with neoclassical theory. In this formulation, path dependence entails a self-reinforcing outcome that seems regrettable or illogical in light of currently available options, even though this outcome was fully predictable given the choices that were actually available when the initial selection process occurred (Liebowitz and Margolis, "Path-Dependence," 211). This broad definition has the unfortunate consequence of making the presence or absence of path dependence hinge on discoveries that occur only *after* the self-reinforcing sequence is initiated. For example, in this formulation, the QWERTY typewriter became a path-dependent outcome only once actors gained knowledge of superior formats: before this time, it was not possible to assert that QWERTY was sub-optimal. In this definition, then, the key event that triggers path dependence is *knowledge* that a superior alternative exists – not the actual adoption of the outcome in the first place. Yet, with many or most self-reinforcing institutions, new knowledge eventually leads actors to realize that an alternative arrangement might have better served needs. Hence, this definition stretches the concept of path dependence to include nearly all institutions, and may degenerate into a kind of "what if" analysis in which the investigator speculates about how the world could have been improved with better knowledge at an earlier point in time. In short, the mere presence of regrettable or seemingly illogical outcomes does not necessarily signify path dependence.

38. Stinchcombe, *Constructing Social Theories*, 103–104; Krasner, "Sovereignty," 80–85.
39. The specific characteristics of institutions especially susceptible to self-reinforcing path dependence will vary depending on the mechanism of reproduction that characterizes an institution (see below for a discussion of these mechanisms). In the case of utilitarian mechanisms of reproduction, institutions that quickly confer important benefits and rapidly impose costs to transformation are more likely to be characterized by path dependence. For example, in his work on technologies, which relies on an utilitarian framework, Arthur (*Increasing Returns*, 118) has noted that path dependence is especially likely when there are high set-up costs, positive network externalities, and immediate benefits of adoption through learning processes. These qualities probably apply to many social institutions (Pierson, "Increasing Returns"; Kiser and Hechter "The Debate on Historical Sociology," 807). Likewise, with power mechanisms of reproduction, institutions that clearly and quickly benefit a particular group of actors without immediately disadvantaging other actors are particularly likely to be characterized by path dependence.
40. David, "Clio and the Economics of QWERTY."
41. Michael J. Piore and Charles F. Sabel, *The Second Industrial Divide: Possibilities for Prosperity* (New York: Basic Books, 1984), chapter 2.
42. These frameworks are derived from Collins's well-known discussion of the rational/utilitarian, Durkheimian, conflict, and microinteractionist traditions. See Randall Collins, *Four Sociological Traditions* (New York: Oxford University Press, 1994). Of course, there are other ways of characterizing the theoretical frameworks that guide sociological research. See, for example, Raymond Boudon, *Problems of Sociological Epistemology* (New York: Columbia University Press, 1980); Tom Campbell, *Seven Theories of Human Society* (Oxford: Clarendon Press, 1981); and Anthony Giddens, *Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis* (Berkeley: University of California, 1979). I make no

claim that the four-fold typology discussed here is a definitive characterization. In addition, I am aware that these theoretical traditions might be conceived as “meta-theories” that offer only general theorems and no specific propositions independent of “bridging assumptions.” Here I take the liberty of giving empirical content to these theoretical traditions by specifying specific propositions associated with each tradition.

43. Charles Camic, “The Utilitarians Revisited,” *American Journal of Sociology* 85 (1979): 516–550; James S. Coleman, *Foundations of Social Theory* (Cambridge: Belknap Press, 1990); Collins, *Four Sociological Traditions*, chapter 2.
44. North, *Institutions, Institutional Change*, 94.
45. Greg Hill, “History, Necessity, and Rational Choice Theory,” *Rationality and Society* 9 (1997): 189–213. Edgar Kiser (personal communication) points out that many rational choice analysts do not believe path dependence exists. He suggests that this might explain why there are so few (if any) empirical examinations of path dependence by rational choice theorists in the discipline of sociology.
46. Michael Hechter, Karl-Dieter Opp, and Richard Wippler, “Introduction,” in Michael Hechter, Karl-Dieter Opp, and Richard Wippler, editors, *Social Institutions: Their Emergence, Maintenance and Effects* (New York: Aldine de Gruyter, 1990), 5. See also Michael Hechter, “The Emergence of Cooperative Social Institutions,” in Hechter, Opp, and Wippler, editors, *Social Institutions*; Edgar Kiser, “The Revival of Narrative in Historical Sociology: What Rational Choice Can Contribute,” *Politics and Society* 24 (1996): 249–271. Recently, Kiser and Hechter have suggested that path dependence may be a useful mode of analysis for historical sociologists. See Edgar Kiser and Michael Hechter, “The Debate on Historical Sociology: Rational Choice Theory and Its Critics,” *American Journal of Sociology* 104 (1998): 785–816.
47. Williamson, “Transaction Cost Economics,” 116–117. This learning explanation assumes that there are long-run benefits to institutional change.
48. Jorg Meyer-Stamer, “Path Dependence in Regional Development: Persistence and Change in Three Industrial Clusters in Santa Catarina, Brazil,” *World Development* 26 (1998): 1508.
49. Pierson, “Increasing Returns.”
50. Stinchcombe, *Constructing Social Theories*, 80.
51. Robert K. Merton, *Social Theory and Social Structure: Toward the Codification of Theory and Research* (Glencoe, Ill.: Free Press, 1949), 23–24; Francesca M. Cancian, “Varieties of Functional Analysis,” in David L. Sills, editors, *International Encyclopedia of the Social Sciences* (New York: MacMillan, 1968), 30.
52. See Nagel, *The Structure of Science*, 24; Dietrich Rueschemeyer, *Power and the Division of Labour* (Stanford: Stanford University Press, 1986), 36–39.
53. This functional path-dependent logic underlies the punctuated equilibrium model of evolutionary change in biology. See Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History* (New York: W.W. Norton and Company, 1989); Stephen Jay Gould and Niles Eldredge, “Punctuated Equilibria: The Tempo and Mode of Evolution Reconsidered,” *Paleobiology* 3 (1977): 115–151. Thus, in the punctuated equilibrium model, random mutations in specific individuals initially introduce change into a population. This change may rapidly spread through a whole species if – given earlier adaptations and immediate environmental incentives – it is functionally efficient. Once the adaptation is stabilized, it will tend to maintain itself and channel future change. This is true even though the selected adaptation may not be optimal for the species in a functional or utilitarian sense.

- See also Goldstone, "Initial Conditions," 836, for a discussion of the path-dependent aspects of evolutionary biology.
54. Organizational theorists make a related argument in suggesting that inefficient institutions within an organizational system may persist so long as they enhance the survival prospects of the overall organization. See Paul J. DiMaggio and Walter W. Powell, "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields," *American Sociological Review* 48 (1983): 147–160; W. Richard Scott and John W. Meyer, "The Organization of Societal Sectors," in John W. Meyer and W. Richard Scott, editors, *Organizational Environments: Ritual and Rationality* (Beverly Hills, Cal.: Sage, 1983).
 55. Immanuel Wallerstein, *The Modern World System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (New York: Academic Press, 1974); Wallerstein, *The Modern World System II: Mercantilism and the Consolidation of the European World-Economy, 1600–1750* (New York: Academic Press, 1980); Wallerstein, *The Modern World System III: The Second Era of Great Expansion of the Capitalist World-Economy, 1730s–1840s* (New York: Academic Press, 1989).
 56. Theda Skocpol, "Wallerstein's World Capitalist System: A Theoretical and Historical Critique," *American Journal of Sociology* 82 (1977): 1075–1090; Alexander E. Wendt, "The Agent-Structure Problem in International Relations Theory," *International Organization* 41 (1987): 335–370.
 57. Wallerstein (*The Modern World System I*) traces the selection of Europe over China to historical peculiarities in the nature of political structures and agrarian economies (p. 63). He suggests these peculiarities favored Europe over China, even though China had many features that would have allowed for a more rapid consolidation of capitalism, which in turn likely would have been beneficial to the system as a whole.
 58. Kenneth E. Bock, "Evolution, Function, and Change," *American Sociological Review* 28 (1963): 229–237; Ronald Philip Dore, "Function and Cause," *American Sociological Review* 26 (1961): 843–853; Talcott Parsons, *The Social System* (New York: Free Press, 1951).
 59. The problem is that Wallerstein's system expands to encompass the entire globe, precluding the possibility of an external shock (barring, for example, an alien invasion or an asteroid collision).
 60. See Immanuel Wallerstein, "The Rise and Future Demise of the World Capitalist System: Concepts for Comparative Analysis," *Comparative Studies in Society and History* 16 (1974): 387–415.
 61. See Collins, *Four Sociological Traditions*, 123; Randall Collins, *Conflict Sociology: Toward an Explanatory Sociology* (New York: Academic Press, 1975), 57–59; Rueschemeyer, *Power and the Division of Labour*; Max Weber, *Economy and Society* (Berkeley: University of California Press, 1978), chapter 2; Anthony Oberschall and Eric M. Leifer, "Efficiency and Social Institutions: Uses and Misuses of Economic Reasoning in Sociology," *Annual Review of Sociology* 12 (1986): 233–253.
 62. William G. Roy, *Socializing Capital: The Rise of the Large Industrial Corporation in America* (Princeton: Princeton University Press, 1997).
 63. S. N. Eisenstadt, "Institutionalization and Change," *American Sociological Review* 29 (1964): 235–247.
 64. Michael Burawoy, *The Politics of Production: Factory Regimes under Capitalism and Socialism* (London: Verso, 1985), 85–86.
 65. Peter Evans, *Embedded Autonomy: States and Industrial Transformation* (Princeton: Princeton University Press, 1995), 229–230; Dietrich Rueschemeyer and Peter

- B. Evans, "The State and Economic Transformation: Toward an Analysis of the Conditions Underlying Effective Intervention," in Peter B. Evans, Dietrich Rueschmeyer, and Theda Skocpol, editors, *Bringing the State Back In* (Cambridge: Cambridge University Press, 1985).
66. John Dowling and Jeffrey Pfeffer, "Organizational Legitimacy: Social Values and Organizational Behavior," *Pacific Sociological Review* 18 (1975): 122–136; Juan J. Linz, *the Breakdown of Democratic Regimes* (Baltimore: Johns Hopkins University Press, 1978), 16–23; W. Richard Scott, "Unpacking Institutional Arguments," in Walter W. Powell and Paul J. DiMaggio, editors, *The New Institutionalism in Organizational Analysis* (Chicago: University of Chicago Press, 1991), 169–170; Thelen, "Historical Institutionalism," 387.
 67. Karen Orren, *Labor, the Law, and Liberal Development in the United States* (Cambridge: Cambridge University Press, 1991).
 68. Meyer and Rowan, "Institutionalized Organizations"; Linz, *The Breakdown*; Richard R. Fagen, *The Transformation of Political Culture in Cuba* (Stanford: Stanford University Press, 1969).
 69. Chaos theorists have popularized this idea of "sensitive dependence on initial conditions" with the famous butterfly effect – i.e., "the notion that a butterfly stirring in the air today in Peking can transform storm systems next month in New York." Gleick, *Chaos*, 8.
 70. Larry W. Isaac, Debra A. Street, and Stan J. Knapp, "Analyzing Historical Contingency with Formal Methods: The Case of the 'Relief Explosion' and 1968," *Sociological Methods and Research* 23 (1994): 114–141.
 71. Paul Pierson, "Not Just What, But *When*: Issues of Timing and Sequence in Comparative Politics," paper prepared for presentation at the American Political Science Association Meetings, Boston, September 1998, 21. A revised version of the article is forthcoming in *Studies in American Political Development*. The forthcoming article will be accompanied by commentaries from Amy Bridges, Robert Jervis, and Kathleen Thelen, as well as a response to the commentaries by Pierson.
 72. See the "Cleopatra's Nose Problem" discussed in Blaise Pascal, *Pensées and Other Writings*, translated by Honor Levi (New York: Oxford University Press, 1995/1670); and Carr, *What is History?*.
 73. Sewell, "Historical Events," 843.
 74. Skocpol, *States and Social Revolutions*, 320; Abbott, "From Causes to Events," 438–439; Aminzade, "Historical Sociology," 466–467; Quadagno and Knapp, "Have Historical Sociologists," 499; Sewell, "Historical Events," 862. The concept of "conjuncture" has been defined in other ways. For example, Braudel defines conjuncture as a substantial period of time (e.g., 10 to 50 year periods). See Fernand Braudel, *On History* (Chicago: University of Chicago Press, 1980).
 75. Alan S. Zuckerman, "Reformulating Explanatory Standards and Advancing Theory in Comparative Politics," in Mark Irving Lichbach and Alan S. Zuckerman, editors, *Comparative Politics: Rationality, Culture, and Structure* (Cambridge: Cambridge University Press, 1997), 289; Raymond Boudon, *Theories of Social Change: A Critical Appraisal* (Berkeley: University of California Press, 1986), 175; Maurice Mandelbaum, *Purpose and Necessity in Social Theory* (Baltimore: Johns Hopkins University Press, 1987), 156–157. The contingency of conjunctures is precisely why some historical sociologists argue that "agency" can be especially efficacious during these periods (e.g., Aminzade, "Historical Sociology," 467; Sewell "Three Temporalities").
 76. Leon Glass and Michael C. Mackey, *From Clocks to Chaos: The Rhythms of Life*

- (Princeton: Princeton University Press, 1988), 6–7; Donald N. McCloskey, “History, Differential Equations, and the Problem of Narration,” *History and Theory* 30 (1991): 32; George Reisch, “Chaos, History, and Narrative,” *History and Theory* 30 (1991): 4–6; David Ruelle, *Chance and Chaos* (Princeton: Princeton University Press, 1991), 47.
77. Michael Shermer, “Exorcising Laplace’s Demon: Chaos and Antichaos, History and Metahistory,” *History and Theory* 34 (1995): 73; Reisch, “Chaos, History, and Narrative,” 17–18.
 78. Reisch, “Chaos, History, and Narrative”; George Reisch, “Scientism without Tears: A Reply to Roth and Ryckman,” *History and Theory* 34 (1995): 45–58. See also Paul A. Roth and Thomas A. Ryckman, “Chaos, Clio, and Scientific Illusions of Understanding,” *History and Theory* 34 (1995): 30–44. On narrative, see Philip Abrams, *Historical Sociology* (Ithaca: Cornell University Press, 1982); Aminzade, “Historical Sociology,” 463; Isaiah Berlin, “The Concept of Scientific History,” *History and Theory* 1 (1961): 1–31; Griffin, “Narrative”; James Mahoney, “Nominal, Ordinal, and Narrative Appraisal in Macrocausal Analysis,” *American Journal of Sociology* 104 (1999): 1164–1168; Dale H. Porter, *The Emergence of the Past: A Theory of Historical Explanation* (Chicago: University of Chicago, 1981).
 79. Reisch, “Chaos, History, and Narrative,” 17.
 80. Fearon, “Causes and Counterfactuals,” 56–58, 66.
 81. Aminzade, “Historical Sociology,” 463; see also Tilly, *As Sociology Meets History*; Collier and Collier, *Shaping the Political Arena*; Griffin, “Narrative.”
 82. Griffin and Ragin, “Some Observations,” 13.
 83. Abbott, “From Causes to Events,” 445.
 84. Goldstone, “Initial Conditions,” 833. See also Haydu, “Making Use of the Past,” 350–351.
 85. A promising technique for analyzing the linkages in reactive sequences is discussed in Peter Bearman, Robert Faris, and James Moody, “Blocking the Future,” *Social Science History* 23 (1999): 501–534.
 86. Abbott, “Sequences of Social Events,” 130, 132.
 87. Mahoney, “Strategies of Causal Inference”; Michael E. Sobel, “Causal Inference in the Social and Behavioral Sciences,” in Gerhard Arminger, Clifford C. Clogg, Michael E. Sobel, editors, *Handbook of Statistical Modeling for the Social and Behavioral Sciences* (New York: Plenum Press, 1995), 5.
 88. Abbott, “Sequences of Social Events,” 132.
 89. Griffin, “Narrative,” 1105. Event-structure analysis offers a formal basis for transforming a chronological narrative of events into a series of “yes/no” questions in which the analyst decides whether a given event is “required” (i.e., necessary) for a subsequent event.
 90. See Abbott, “Sequences of Social Events,” 130, 132; Mahoney, “Nominal, Ordinal, and Narrative.”
 91. A wide range of scholars have underscored the importance of identifying such mechanisms because they are the processes that “explain” how values on one variable actually *cause* values on another variable. For example, see Roy Bhaskar, *A Realist Theory of Science* (London: Leeds Books, 1975); Hubert M. Blalock, *Causal Inferences in Nonexperimental Research* (Chapel Hill: University of North Carolina Press, 1961); Jon Elster, *Nuts and Bolts for the Social Sciences* (Cambridge: Cambridge University Press, 1989); Alexander L. George and Timothy J. McKeown, “Case Studies and Theories of Organizational Decision Making,” *Advances in Information Processing in Organizations* 2 (1985): 21–58; John H.

- Goldthorpe, "Causation, Statistics and Sociology," unpublished manuscript, Nuffield College, Oxford University, 1998; Peter Hedstrom and Richard Swedberg, editors, *Social Mechanisms: An Analytical Approach to Social Theory* (New York: Cambridge University Press, 1998); Kiser, "The Revival of Narrative"; Kiser and Hechter, "The Role of General Theory"; Somers, "We're No Angels"; 722–784; George Steinmetz, "Critical Realism and Historical Sociology," *Comparative Studies in Society and History* 40 (1998): 170–186. The study of causal mechanisms is connected with the realist school in the philosophy of science, which is itself quite divided (see Craig Calhoun, "Explanation in Historical Sociology: Narrative, General Theory, and Historically Specific Theory," *American Journal of Sociology* 104 [1998]: 846–871). In this article, I am not concerned with uncovering the ontological underpinnings of realism.
92. Haydu, "Making Use of the Past," 351; Goldstone, "Initial Conditions," 833.
 93. Ultimately, all scholarly enterprises must take certain mechanisms for granted. For example, in historical sociology, in order that analysts can focus on the macro-processes of interest, it is often necessary to leave psychological mechanisms implicit.
 94. Aminzade, "Historical Sociology"; Larry J. Griffin, "Temporality, Events, and Explanation"; Margaret R. Somers, "Narrativity, Narrative Identity, and Social Action: Rethinking English Working-Class Formation," *Social Science History* 16 (1992): 591–630; Lawrence Stone, "The Revival of Narrative: Reflections on a New Old History," *Past and Present* 85 (1979): 3–24; Robin Stryker, "Beyond History Versus Theory: Strategic Narrative and Sociological Explanation," *Sociological Methods and Research* 24 (1996): 304–352.
 95. Peter Temin, "Free Land and Federalism: American Economic Exceptionalism," in Byron E. Shafer, editor, *Is America Different? A New Look at American Exceptionalism* (Oxford: Clarendon Press, 1991); Kim Voss, *The Making of American Exceptionalism: The Knights of Labor and Class Formation in the Nineteenth Century* (Ithaca: Cornell University Press, 1993).
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