Blocking the Future: New Solutions for Old Problems in Historical Social Science

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Blocking the Future

New Solutions for Old Problems in Historical Social Science

The only true voyage would be not to travel through a hundred different lands with the same pair of eyes, but to see the same land with a hundred different pairs of eyes.

Marcel Proust

Although it may turn out to be otherwise, this is an early article in what is hoped to be a larger series of studies in the application of network methods to historical problems. This article explores some new solutions to old problems in historical social science and history more generally and provides some templates for thinking about an old problem in a new light. The old problem is the problem that arises when one considers how we know what historical events mean and how we can have confidence in our interpreta-

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tions. For many social science historians, the problem of meaning is secondary to the problem of making causal arguments. And often the practical reality of much historical work is that more mundane problems of data and evidence often consume an unusual amount of time and energy, drawing attention away from the luxurious concerns discussed in this article—concerns with what things actually mean. Despite the recognition that the problem of meaning may not lurk around every corner for all social science historians, the goal of this article is to propose some new strategies for determining what things mean in historical context.

The argument we make is simple. The meaning of an event is conditional on its position in a sequence of interrelated events, what we conventionally call a case. Consequently, for those who are interested in what events mean, the problem of casing event sequences is one of the most fundamental problems that confront historians and historical sociologists. Casing is a prerequisite for meaning: only when we can provide a beginning and an end to a sequence of interrelated events can we understand the meaning of an event within the sequence and, by extension, the meaning of an event sequence as a whole. Developing this part of the argument is the focus of the first section.

Identifying “casing” as one of the problems to be solved is the first and easiest step. The next step is to propose a solution. Our solution exploits developments in social network analysis that are relevant for the analysis of complex event structures. Historical sociologists and others before us (Bearman 1993; Gould 1995, 1996; Padgett and Ansell 1993; Rosenthal et al. 1987; Barkey and Van Rossen 1997; Brudner and White 1997; White et al. 1999) have made significant substantive contributions to our understanding of particular historical problems through the application of network models for populations of (among other things) persons, institutions, lineages, and other elements linked through flows of (among other things) resources, patronage, joint commitment, and kinship. In the second section, we briefly discuss these contributions. We then focus on the similarities between social structures and event structures. These similarities point to the applicability of network methods for the analysis of historical data. These similarities also suggest that historical processes may be more robust to perturbation than many social science historians think. Finally, we discuss the implications of redundancy in event structures for models of historical change that rely on chance and contingency.

Casing, bounding the beginning and end of event sequences, is not dissimilar from an old problem in structural analysis: how to specify a boundary on a network (e.g., a population of nodes connected by flows). The problem for historical social science involves generating a population of events. Strategies for generating a population of events in historical contexts are briefly described in the third section, where we also describe and use data that are convenient for illustrating the core methodology: life stories. We exploit modeling techniques for narrative networks described earlier in Bearman and Stovel's article (forthcoming) and suggested by Roberto Franzosi (1999) to transform life stories into networks.

In the fourth section, we describe the general historical context and illustrate our method (without technical detail) with respect to a single complex case: revolution, counterrevolution, and revolution in a Chinese village between 1920 and 1950. Operations on the network of events induced from the intercalation of multiple stories provide the foundation for our analyses, in which we "test" our casing solution by simulating the future. Robust cases are those that are insensitive to minor perturbation. This suggests that history is far less conditional than is often thought, an idea we return to later in the article. In some ways, we implicitly propose a new method for doing historical social science (and history more generally). We explore these implications further in the discussion section.

The Problem of Casing

In many respects, the problem of casing historical event sequences is the most fundamental problem confronting historians and historical sociologists. Casing is necessarily implicated in the simple task of constructing a historical narrative. Likewise, casing is a prerequisite for meaning, for only when we can provide a beginning and an end to a sequence of interrelated events can we understand the meaning of an event within the sequence and, by extension, the meaning of an event sequence as a whole. That narrative and meaning are the product of casing is hardly a new idea for historians. For social scientists, this insight has come harder.¹

The importance of casing for history tells us that we should not be too surprised that historians don't feel the need to write a "joy of casing" cookbook. Something as fundamental to a whole discipline could hardly be purely

menu-driven, as accessible to the pure novice as to those initiated through the arduous practice of disciplinary initiation we now label graduate school. Since casing is what historians and historical social scientists do, and since the adequacy of their interpretations depends on casing, casing is necessarily seen as a matter of insight and the judgment that arises from such insight.² Explicit acknowledgment of the idea that casing is a matter of judgment is routine. Consider in this light the following passage:

Once again, deciding how to bound an event is necessarily a matter of judgement. One may state as a rule of thumb that how an analyst should delimit an event will depend on the structural transformation to be explained. . . . Such decisions must be made post hoc: with some confidence when dealing with an event that occurred two-hundred years ago and whose consequences have generally been fixed for some time, more tentatively when the consequences of a rupture have only recently begun to appear and when additional, perhaps surprising, consequences may yet emerge. (Sewell 1996: 877–88)

Our first goal in this article is to propose a method for casing historical events. But what initially seems simple turns out to be especially complicated. One complication comes from the future. Because the meaning of an event is conditional on its position in a sequence of interrelated events,³ it is necessarily impossible to fix forever the meaning of an event—that is, to fix forever the end and beginning of a sequence of events. To do this, we would have to stop history, because future events can activate, or draw into a new event sequence, past events. Therefore, it is always the case that the future could condition the meaning of the past. Many examples of this process come to mind. To select one example, the AIM takeover at Wounded Knee in 1973 activated the previously minor event the Battle of Wounded Knee,⁴ thereby bringing the initial event into a new “end,” and consequently changed its meaning. In this sense, casing historical events and event sequences necessarily involves (temporarily) blocking the future.

The future finds expression in the past in more mundane ways as well. The meaning of an event is also changeable by virtue of a by-product of the historians’ craft—discovery. Historians may discover new events, new relations between previously known events, or new relations between previously known and previously unknown events. Such discoveries have the capacity

to change beginnings and ends and, therefore, the specific meaning of events. It may also be that one day in the future we could discover signs in the past that all events and event sequences are not as we now imagine. Paranoiacs and conspiracy theorists, of course, think they have already discovered such signs.

The fact that it is *possible* for the meaning of events or event sequences to change does not mean that we should abandon the attempt to develop a strategy for casing event sequences. First, while discovery or the future may activate some events, most events are never so fortunate. Only the lucky cat has nine lives. Whatever meaning most events have is likely fixed completely within a single, specific event sequence itself fixed within larger, more complex event sequences. Put another way, neither the discovery of new events nor unknown future occurrences are likely to alter in any way the sequence of events that “dead” events are embedded in; consequently, their meaning is also fixed.⁵

Still, some events have already, and some more may, become embedded in new event sequences following discovery or the occurrence of events in their future. Thus, we can imagine a distribution of events defined with respect to their probability of activation, “fluidity of meaning,” or susceptibility to being conditioned by the future. If we can array events with respect to their probability of being conditioned by the future, it follows that event sequences are also characterized by such a distribution. Consequently, congeries of densely interrelated event sequences (what we will ultimately define as a *case*) are also subject to the same distribution, though some are more likely to change than others.

This makes intuitive sense and is confirmed by the judgment that historians use. Recall the loose criteria proposed by William Sewell: Confidence comes with time. Some cases are more robust to the future than others. The Bronze Age as a case is probably pretty robust. So are most others. It is hard to imagine—now—what realistic future event could meaningfully activate the sequence of events composing, for example, the Christianizing of the West.⁶ The case seems dead enough. In contrast, it is not hard to imagine—now—what future event could meaningfully activate (or has meaningfully activated) the sequence of events composing the impeachment of Andrew Johnson. We cannot affix (forever) a single meaning to events embedded within sequences, or event sequences embedded in populations of other event

sequences. We can nonetheless try to assess what kinds of events, event sequences, and sets of interrelated event sequences are likely to be conditioned by future events. In simple terms, some events, event sequences, and cases are dead. Some events and event sequences are subject to radical revision. We can confidently talk about the meaning of dead events. Our confidence falls with those events likely to be hot potatoes. The practical problem is knowing which events, event sequences, and cases are hot potatoes and which are not.

Sewell solves the problem of casing by definition, ultimately relying on analysts' judgment: easy for history long past, less so for more recent history. Sewell has the right instinct. The problem of casing rests on controlling the future, for future events may transform the meanings of past events in unanticipated ways. Control over the future is easier when it is long in the past. Casing is not so problematic for events that happened long ago, so presumably one can know what things mean just by waiting history out.⁷ We are not so patient. There is more at stake than our patience. Interesting analytic problems appear once the problem of finding ends and beginnings to event sequences becomes a central focus. What kind of events are case breakers, that is, events whose activation by the future transforms the cases in which they are embedded? What proportion of events are case breakers? Is case breaking a structural feature of an event (e.g., the product of position in a sequence of events), or a feature of the content of events? If the latter, are specific contents more or less likely to occupy different positions? We propose answers to these questions which, given our current method and strategy for representing historical event sequences, are inaccessible to us.

Strong Theory and Thin History

The stronger the theory, the thinner the history—a truism that is revealed most clearly when one sets out to represent history as a network of events connected by flows of causation. Historical accounts of events, especially those proffered by social science historians, tend to have a uniform appearance. They start with a relatively dense cluster of interrelated events. These typically macrolevel events (fiscal crisis, agrarian crisis, crisis in confidence/legitimacy, for example) flow into a narrow stream of specific microlevel events. Multiple pathways pour into a single thin line of interconnected

Figure 1 Sewell's (1996) account of the collapse of the ancien régime

events. A thin pathway (sparsely connected, with very little redundancy, few cycles, etc.) moves through time, ultimately inducing a pivotal event that is characterized by high out-degree, impacting multiple event sequences and providing (typically) the boundary of the “case.”

Sewell's (1996) article on the collapse of the ancien régime provides a useful example. It is a careful and subtle article, suggesting a more complex vision than the more standard literature. For our purposes it can be considered a gold standard article, because it won a prize. Figure 1 provides a graphic representation of the structure of Sewell's account. Nodes are specific events mentioned in his article; edges are links between events (causal or logical) implicit or explicit in his account. Time moves in general from left to right. The storming of the Bastille is event #60. It is a rich account but still exhibits the general structure of social science history accounts. The image is of historical process as a sand clock, with thick causal richness at the start, often thought of as a conjuncture of specific path-dependent event sequences (here, the confluence of fiscal crisis, agrarian crisis, and a crisis of legitimacy); thin narrative pathways in the middle (the neck); and dif-

fuse broad outcomes at the boundary of the case. The bottleneck regions are where causal dynamics are observed; hence, they appear especially subject to butterfly effects.

Theory involves denying data. Thin narrative accounts are the product of specific theories that direct the historian to identify some events as salient and to deny other events as not salient. History involves selection of events to interconnect into a narrative.⁸ To have a theory requires that we know the end of the story so that we can direct the selection of events. This is the problem. How are we to know the beginning and end if they alone tell us what the events mean?

Rather than focus directly on the selection of events, all we want to do now is consider the implicit theory of history as characterized by thin lines without independent pathways connecting causes and events. An irony is that with strong theory we are soon driven to contemplation of butterfly effects as driving history, or worse, history of the “for want of a horse” variety. No doubt, contingency plays a role in history, but it cannot play an overwhelming role. We need to develop a method for doing history that simultaneously reveals event structures that restrict the possibilities of butterfly effects and identifies which events and relations between events are subject to such effects. At least, this is our goal.

In the Sewell narrative, there are many critical points through which only one path flows. Butterfly effects would be pronounced if a small perturbation had the consequence of deleting (or adding) a node or line between events. If the event or link were absent, could we really imagine that the ancien régime would not fall? The problem is not parsimony of explanation per se. The problem is too few sets of eyes. Many parsimonious accounts traversing the same field from different end points can generate a population with a dense event structure.

Social Networks and Historical Social Science

Over the past decade, a series of influential articles and studies on substantively important historical topics—from the organization of the Medici to Ottoman state building and beyond to the Paris Commune—have been published (Padgett and Ansell 1993; Gould 1995; Barkey and Van Rossen 1997). Network imagery and methods provide insight into specific mechanisms and

processes by focusing on the middle range, above isolated individuals yet below whole social formations. These studies have provided new ways to operationalize identity (versus interest) as a foundation for understanding action (see also Bearman and Stovel forthcoming); they have provided new insight into the role that social relations play in structuring, and blocking, action, and more abstractly, they have provided a new language for describing the dense, interrelated, often knotted and cyclical levels of social relations, symbolic constructions, and practices (seen as flows in a network) that compose tangible social structures in historical and contemporary settings.

These notable achievements have not come without costs. The detailed reconstruction of social structure, defined with respect to pattern across multiple relations, necessary for network analysis has often led to a heightened commitment to highly particular explanations and a reluctance to abstract structure *per se* away from specific contexts. Consequently, much of the work in historical social science that uses networks looks *prosopographical*—an approach to relational data that is limited because it is unable to provide an analytic scaffolding for meaningful comparison across cases with respect to interpretable structural parameters. On the other hand, the emphasis on context has been a useful palliative to counter a more disturbing trend in social science history: the idea that rational choice models can serve an explanatory, as opposed to heuristic, function. It is ironic that a method (structural network analysis) designed for comparison across contexts celebrates particularity as the principal barrier to a theory that denies the salience of all contexts (despite protestation to the contrary).⁹

Equally ironic is the strange marriage between relational and contingency theorists. Like many odd marriages, this one seems to be based on insufficient experience. As with networks, contingency has been an important “discovery” for historical social scientists and currently serves as the principal challenge to older models in historical social science that focus on the macrolevel determinants of social change without sufficient attention to (social, relational, symbolic, etc.) mechanisms.¹⁰ For the inexperienced, networks provide a useful imagery for representing contingency. The principal metaphors are drawn from the fact that social network observations, like historical observations, are tied and interdependent. In social networks and in history there is the sense that the fact of interdependence means that subtle change can concatenate wildly through a system and cumulate into unantici-

pated historical and/or structural change (Emirbayer and Goodwin 1994). It is an attractive idea: social structures as sensitive to butterfly effects. But it is likely wrong. Tangible social structures *build on* and depend on local fluidity and disruption for stability (White 1992; Tilly 1999).¹¹

Robust structures absorb fluidity at the microlevel by virtue of specific structural features that “exploit” interdependence. Network data on a population are locally dense, yet globally sparse, often cyclic, knotted, and characterized by a redundancy of ties.¹² Social structures share these features with historical structures. Most historians would agree that historical data are locally dense and knotted. Aside from radical revisionists, most historians would also agree that historical data exhibit tie redundancy, the idea that there are multiple independent pathways through which causal effects flow. Cycles in historical data appear when future events condition past events, drawing out of the past new relations to other events.

In social networks, local density, knottiness, redundancy, and cyclicity give rise to the complex social structures that organize the relational world. While analytically separable, they entail each other. Cyclicity gives rise to redundancy, redundancy gives rise to local density, and density gives rise to knots, generating macrolevel cohesive properties from a host of independent microprocesses. Our interest here is to show that event structures behave the same way. We demonstrate that actual event structures arising from historical data have a similar structure, one in which order appears at the aggregate level, a product of microlevel fluidity. Consequently, representations of event structures as thin narratives, and consequently subject to butterfly effects, are largely mistaken.¹³

Generating a Population of Events from Intercalating Narratives

In order to make headway, the first step is to generate data structures that work. The real problem in conventional historical accounts is that the end determines the beginning and hence the elements to be arrayed in the narrative. Different ends tell different stories. To case an event, which may be in multiple interrelated sub-sequences, we need a population of events around which we can draw a beginning and an end and hence arrive at meaning. The most immediate need is to find data structures that allow us to build a

population of events. Two distinct strategies are possible: short-path snowball sampling and intercalating narratives. The principal idea of short-path snowball sampling is to start with a large sample of events and use snowball sampling techniques to generate a population of events. A variety of sampling strategies for networks (see Granovetter 1977 and Frank 1978 for first steps) can be deployed to build populations of historical events.¹⁴

In this article we illustrate the second strategy, intercalating narratives, to demonstrate our method for casing. The data we use are life stories. Like historical accounts, life stories presume an end (a standpoint). Telling stories involves arraying elements selected from a rich and inexhaustible plate of cultural goods—people, places, things, events, ideas, and so on—into narrative sequences that are oriented toward a particular end in such a way as to be a plot. The end allows the author to select from an endless sea of events just those events he or she sees as important (on the basis of a theory) for the story to be revealed.¹⁵ But life stories, in contrast to formal histories, have features that make them ideal for our illustrative goal, the most important of which is a weak theoretical structure.

In this article we use 14 life stories from Chinese villagers whose experiences encompassed agrarian revolt in the countryside, counterrevolution, a revolution, and then the encoding of a revolutionary regime into an institutional framework. The context is a small village in northern China, and the story is about massive structural (and individual) change. The stories are taken from *Report from a Chinese Village* (Myrdal 1965). The book contains a collection of life stories of the villagers of Liu Ling village, in northern China near Yenan. Jan Myrdal conducted interviews there in 1961. Liu Ling village is no different from the other small villages in China, with one exception: it was involved in the Communist revolution at an early date. The stories in the book tell of that revolution and of what happened since then.¹⁶

Figure 2 provides a graph representation of two of the life stories we use. By treating events as nodes and relations between events as arcs, we transform narrative sequences of elements into networks. By representing complex event sequences as networks, we are able to observe and measure structural features of narratives that might otherwise be difficult to see.

In these graphs, elements of the narrative life story are treated as nodes connected by narrative clauses, represented by arcs. A narrative clause is a clause that is temporally ordered in such a way that moving it involves chang-

Figure 2 Narrative networks

Panel A: Li Hsiu-tang

Panel B: Pai Yu-teh

ing the meaning of the sub-sequence in which it is embedded. Free clauses, by contrast, can be moved without changing the meaning of a sub-sequence or the narrative as a whole. Stories contain both free and narrative clauses (Labov 1972; Bearman and Stovel forthcoming; Franzosi 1999). We code only narrative clauses as arcs, linking one event (or element) to another over time. The elements (nodes) of the narratives are heterogeneous in scope and range, ranging from greeting conquering troops with tea, to a staged battle between the Koumintang (KMT) and the Communists.¹⁷ The former event tied the landowners' sons to the KMT; the latter resulted in an imaginary defeat of the Communists. The idea behind this mirage was to trick the KMT leadership into thinking the Communists had been crushed by local KMT forces so that both forces could resist the Japanese.

In Figure 2, narrative time moves from the top of the page to the bottom. The left-right axis is not substantively interpretable. Narrative depth is represented by the number of arcs connecting events. In this instance, for example, the two events at the bottom of panel B have a narrative depth of 17—that is, there are 17 steps from the bottom to a starting event at the top of the graph. An obvious characteristic of these stories is that they are structurally very different from the stories of professional historians. They have many disconnected elements. Events are mentioned but are not necessarily tied. Across sub-sequences, it is impossible to walk from the early events to later events without a break. This is never the case with a professional historical narrative. Not surprisingly, life stories are denser and more complex than conventional historical narratives. They tend to have deep narrative flow. They are more complex because ordinary people are not trained as theorists. Therefore, they have trouble denying data. They have deep narrative flow because ordinary people often organize stories around fate, which pulls the present into the distant past.¹⁸

Like people, the life stories we work with exhibit a lot of heterogeneity. Some accounts are thin (panel A), whereas others are thick and convoluted (panel B). Each of these stories has a different end point. The narrators are standing in different places. The end of the stories involve different outcomes. The narrators are also standing in different positions in the village with respect to position and kinship relations. Figure 3 reports the kinship relations among the 239 residents of Liu Ling, a village composed of a domi-

Figure 3 Kinship relations in Liu Ling

nant lineage (with 84 interrelated individuals), a number of small households, married couples, and single individuals.

The fact that they are standing in different places directs the selection of the elements that they choose to account for their end. By analogy, one might consider a set of professional accounts of the same sequence of events, each standing in a different position.¹⁹ All of the stories cover the same village and village events over the same time, and consequently, the field they traverse, and the events they refer to, overlap considerably. We exploit this overlap by intercalating stories to generate a population of interrelated events, which provides a new data structure and consequently points to new strategies for analysis. These new directions are taken up in the following section.

Making and Testing a Case

Between 1920 and 1950, China was transformed. Reform, revolution, and warfare wracked the countryside. No lives were untouched, and a whole

Figure 4 A brief history of a tidal pool

social structure was unearthed. Our data arise from one of thousands of villages in northern China. They are about events in this village and their connection to distant events occurring in other villages and cities and countries, the character and context of which were likely unimaginable to the villagers who lived in Liu Ling, which has the flavor of a small tidal pool at the edge of a great sea (of events). The general story of Liu Ling during this period, “A Brief History of a Tidal Pool,” is easy enough to recount, and certainly this is what historians often do—take multiple viewpoints to relate the basic picture. We report this history in a traditional manner and graphically represent a reduced form of it as a network in Figure 4.²⁰

A Brief History of a Tidal Pool: Liu Ling
during the Revolution and Beyond

The Chinese Communist Revolution began early in the northern provinces. Liu Ling was among the first villages to fall under the spell of Communist propaganda. For as long as the oldest villager can remember, life had been hard under the universally cruel landowners. Liu Ling village was no exception. During the famine of 1928, one of the landowners there, Li Yu-tse, stockpiled hordes of grain while his tenants ate grass. Throughout the 1930s, subversive Communist agents disguised as donkey drivers and peddlers carefully targeted the poorest but most respected peasants. The cruelty of the local landlords gave the propagandists ample opportunities, and small-scale guerrilla activity began in the Yen-an region of China during this period. Over time, the guerrillas were increasingly successful. Landowners began to withdraw into fortifications in the hills and refused to venture into their own villages at night. The Communist Eighth Route Army supported the guerrilla

effort, supplying arms and ammunition. Over time, the Communists became bolder and seized the holdings of several landowners, forcing them to flee to Yen-an.

In April 1935, the guerrilla activity came to a head with the Communist blockade of Yen-an. The siege created shortages of food and fuel inside the city. Soon afterward, land reforms were initiated in the surrounding countryside. There were, of course, periodic setbacks, as the KMT forces would raid villages near the city. Sometimes these raids were the occasion for pitched battles with the Communists, who were often victorious due to the poor morale of the KMT troops. Finally, in the autumn of 1936, the siege of Yen-an and developments on the eastern front forced the KMT to withdraw from the city. The Eighth Route Army marched into Yen-an, red flags flying.

The fledgling Communist enterprises in the countryside that were initiated during the blockade, such as citizen militias and agricultural cooperatives, now flourished. Thus began a fruitful Communist spring. It was not until a decade later that war returned to the Yen-an area. In 1947, Mao Tse-tung, anticipating the return of the KMT, sent a message to Yen-an. His words were repeated to a crowd in the city: "Keep Yen-an, lose Yen-an, give up Yen-an, win Yen-an." This caused some understandable confusion among the people. In the end the Communist leadership convinced the citizens of Yen-an that the Communist withdrawal would be only temporary. Confusion and disbelief turned into complacency, and preparations for a KMT occupation (burying corn, hiding livestock, etc.) were initiated only days before the arrival of General Hu Tsung-nan's forces. When the Communists completed their withdrawal and the KMT marched into Yen-an, one of General Hu Tsung-nan's units swept through Liu Ling.

These troops were greeted with boiling water for tea by two sons of landowners but were met with suspicion by the rest of the village. On this day began a long year and a half of pillage and plunder. The landowners' sons were immediately taken prisoner but later became intelligence operatives. Caves were destroyed, crops burnt, women raped, and all food confiscated. Many men left for the hills to re-form guerrilla bands, which quickly began harassing much larger KMT units. When victorious, the Communists were careful with POWs, who received better treatment in the Communists' custody than at the hands of their own officers, resulting in widespread desertion

among the KMT. Eventually, defeats by the Communists and circumstances elsewhere in the country forced General Hu Tsung-nan to withdraw from Yen-an in 1948. The Red Army returned.

So began a long period of rebuilding and reestablishing Communist rule. KMT agents, like Li Hsiu-tang (one of the landlords' sons who brought tea to the troops), were sent to prison and reeducated or, in extreme cases, executed. Land reform was finalized and labor exchange programs established. In the early 1950s, cooperative agriculture expanded, involving greater institutionalization of Communist labor principles. Liu Ling formed a higher-order cooperative in the mid-1950s, called the East Shines Red Higher Agricultural Cooperative, which became the Liu Ling People's Commune during the Great Leap Forward of the late 1950s.

Event Populations, Components, and Bicomponents

Our problem, as identified at the start, is to develop a method for casing interrelated event sequences. In order to make a case, we first need a population of events and information about their relation. The second step is to draw a boundary on the nodes in the graph. The problem (and solution) is known as the boundary-specification problem (Wasserman and Faust 1994). Drawing on an old tradition in the social network literature, we can isolate cases by defining a partition on the population of events. Standard clustering techniques are not appropriate for our problem, however, since arcs connecting dense regions of a graph (bridge nodes) might well play an important role in the narrative sequence we are trying to capture. Instead, we adopt a new strategy: identifying all bicomponents on the population. A component of a graph is a maximal connected subgraph. A maximal subgraph is one that cannot be made larger and still retain the properties that there is a path between all pairs of nodes in the subgraph and that there is no path between a node in the component and a node not in the component. A bicomponent is a component where all nodes are connected by at least two different independent paths and where the addition of a node requires that it is connected to two nodes in the subgraph.

The central idea is that a case, seen as a set of interconnected events produced by multiple intercalated narratives, must have the property of at least

Figure 5 All events from Liu Ling

a bicomponent. A bicomponent is not necessarily a case; it is a *candidate* for a case. We define cases as bicomponents that are robust to discovery or future activation.

Figure 5 reports all of the events mentioned in the 14 histories of the Chinese villagers we work with, intercalated to form a single graph. Almost 2,000 unique events are mentioned, and each event is represented by a circle. Events that are in more than one narrative are shaded. Narrative time moves from the top to the bottom of the page. As in Figure 2, events are connected by arcs. In some regions of the graph, where events and their relations are especially dense, arcs are invisible. Events that are tied to one another by arcs in these dense regions appear to overlap in the graph. Events to the left side of the figure are embedded in event sequences that are not tied to events on the right side of the figure. There is no way to get from the left-side events to the right-side events. This is our population of events. Of course, there are millions of events not present. They might belong to some other history (for example, Marco Polo's travels), but not this history. But some of the events that are present look like they don't belong to this history (whatever it turns out to be) either; no pathway connects them to other events. Happenings without relations are just happenings. Their relations (if any) with other events not in our population may make them part of history, but not the history of the case we are working on.

Figure 6 identifies and represents the major component. Note that we have moved from 1,995 events, many of which were not connected with any other events, to a smaller set of roughly 1,476 events, all of which were clustered together on the right-hand side of Figure 5. As in Figure 5, narrative time moves from the top to the bottom of the page, overlapping events are connected by invisible arcs, and events shared across multiple narratives are shaded. One could consider a component a case. The substantive problem is that it is too fragile. The deletion of any number of single arcs or nodes (causal relations or events) would result in a partition of the component into multiple discreet subgraphs. Our strategy is to define a candidate case more strictly, as a bicomponent, insisting that all events be connected by at least two independent pathways, and to test its robustness to the future. The largest bicomponent contains 493 events. Figure 7 represents the structure of this bicomponent, following the template used in earlier figures. Figure 7 highlights events shared across multiple narratives. This is the candidate case.

Figure 6 Largest component in Liu Ling

Blocking the Future

In order to know what an event means, one has to embed it in a sequence of interrelated events, which are in turn embedded in larger sequences that compose a case. Some cases are more robust than others. Robust cases are composed of elements which even if activated by the future (or by discovery)

Figure 7 Largest bicomponent, with shared events

don't change the case. In order to know what an event means, one has to know how dead it is or, alternatively, whether its activation breaks the case it is in, thereby drawing it into another case. Ultimately, only the real future can break or make cases, and even then one is always trapped by the uncertainty of the next day. But it is possible to assess case robustness by simulat-

Figure 8 Case resilience to perturbation

ing the effect of the future. The by-products are both an assessment of case robustness and an inventory of events arrayed with respect to the probability that they will be case breakers. Figure 8 reports the robustness of our candidate case, its resilience to both minor and major perturbation. The criteria we use is the Rand statistic, which reports the extent of classification agreement when a randomly selected pair of elements (in this instance, events) are classified in the same way (either belonging to the same cluster, or belonging to different clusters) across two partitions of a matrix. The adjusted statistic corrects for chance overlap (Morey and Agresti 1984: Eq. 9) and reports the agreement between two subgraphs beyond chance expectation.

The left side of Figure 8 reports the extent of agreement between the initial events that compose the initial bicomponent ($n = 479$) and the events that compose a second bicomponent potentially altered by the random addition of from 1 to 10 new edges to 1 or more of the 1,995 events that compose the event universe of Liu Ling. In other words, we add some number of random lines to connect previously disconnected events in Liu Ling. Adding edges changes the structure of the original graph (much like the discovery of a new “fact” might connect two events previously thought to be disconnected). We then reduce the new graph to its largest bicomponent and compare the bicomponent from the original graph to the new bicomponent. For each case, we run the same simulation 500 times, assessing the effect of adding 1, 2, 3, . . . 10 edges. The dark horizontal line reports the median effect; the shaded crosshatch reports the interquartile range. Tailing away from the shaded areas are dots that report the extreme effects of adding edges.

It should be immediately obvious that the case is robust to the impact of adding one edge. In the average instance, there is *no* change. In the worst-case scenario, adding a single line results in agreement between the two candidate cases that is 93% greater than expected by chance. Butterfly effects (a subtle change in one area that concatenates through an interconnected system to transform the global structure) are possible but exceedingly rare. A similar pattern is observed for the addition of two or three new relations. Things break down a bit with more and more radical alterations of the original graph. By the time 10 new lines are added, the overlap between the two candidate cases falls to 90% greater than expected by chance. The scope of change is significant, much like the discovery of a new archive: multiple addi-

tions would lead to (re)connecting elements of the underlying data structure, thereby potentially changing their meaning by changing the case in which they are embedded. The simultaneous alteration of multiple causal relations can have a deep multiplier effect. Case instability results from specific combinations (conjunctions) of multiple, simultaneous changes to the underlying data.

The effect of deleting relationships (which is another way of thinking about deleting nodes) is much less pronounced. Even in extreme cases, deleting 10 edges and thus potentially up to 20 (or 1%) nodes, the two candidate cases remain remarkably similar. Here, the contrast between our case and traditional historical narratives (or even the component we identify earlier) is marked. These findings are not artifactual, and they provide insight into the structure of a case.

If one were to delete an edge from a minimally connected bicomponent, the result would be a partition of the component into subgraphs and, hence, significantly lower classification agreement than we observe. The robustness of the case to deletion implies that the bicomponent is composed of multiple dense clusters and that the events that compose each cluster are linked by more than two independent pathways. This structure is closer to that of social structure writ large. The local density of real event structures protects cases from collapsing from perturbations that have the effect of deleting causal relationships between historical events.

Case Breakers

Cases may vary with respect to their robustness to the future. For cases that collapse under subtle pressure (by adding or deleting one or a few lines), one could have little confidence in the meanings ascribed to an event. With cases that are robust to the future, the meaning of the events that compose the case are fixed. It follows that if others followed the same research strategy, they would reveal the same case. Consequently, they would agree on the meaning of the event. This strikes us as a useful contribution.

Just as useful is a by-product of case assessment: an inventory of events arrayed with respect to their probability of breaking the case. This array would allow historical social scientists to learn about the structural characteristics of events that have the potential (if activated) to touch off case-

breaking effects. From the tails in both panels of Figure 8, it is clear that in some instances, adding or subtracting one edge can break the case. These are pivotal events. Pivotal events may be induced in ways not already implied by the proximal cohesion of initial event clusters. One mechanism (differentiation) is that an early event cluster connects multiple subsequent event clusters, in each case through multiple independent paths. A second mechanism (convergence) is that separate early event clusters connect to the same subsequent event clusters, in each case through multiple independent paths. Various combinations of differentiation may also be visible. In the first case (differentiation), what looks like a unitary event cluster splits into multiple event clusters. In the second case (convergence), we observe the reverse kind of structure (e-mail to author, 8 February 1999).

One simple strategy for identifying high-impact edges/nodes is to loop over each edge (or pair of nodes) one at a time, delete or add it, and calculate an adjusted Rand statistic for the resulting bicomponents. This generates a systematic potential impact score for each edge, under the assumption that it could be deleted (or added between nodes) by some future event. At the boundaries of our case lie smaller, relatively dense event clusters. For example, one cluster contains the history of the faux battle between the Communists and the KMT. Whether or not events that lie on the boundary of cases are pivotal depends on the structure of the smaller event clusters that, like moons, are suspended on the periphery of the focal case. In this instance, pivotal events are exclusively located within the semidense regions of the bicomponent.

The Tidal Pool Revisited

The method we propose is intended to assist, if not replace, judgment and to provide a mechanism for testing judgment-based cases. Our application of a traditional narrative strategy generated the “brief history of a tidal pool.” We now explore the overlap between events in the tidal pool and the bicomponent we propose as the real case. Figure 9 represents this overlap. As in Figure 7, the major bicomponent ($n = 479$ events) is shown. Shaded circles represent events in the tidal pool narrative. The bicomponent includes all tidal pool events but contains an additional set of 146 events. These events are evenly distributed across the whole structure. They provide the necessary

Figure 9 Tidal pool events within the largest bicomponent.

structural glue holding the bicomponent together. Removing them breaks the bicomponent into separate disjoint subgraphs. Our judgment method missed them—for example, the critical structural role that the temporary alliance between the Communists and KMT played in the future of the village. We may be bad historians, but if we are right about our method, the best

historians will arrive at the bicomponent. Weaker social science historians like us might do better to start there.

Discussion

Networks have contributed greatly to our substantive understanding of particular historical contexts and events. This article, initially conceived of as a review of the ways that networks have been helpful for history, has veered off into a new direction: exploiting network methods for doing history. By focusing on networks as useful for the method of historical social science, new solutions to old problems have appeared. The deepest problem is what events mean. The central idea of this article is that the meaning of events is conditional on their position in a sequence of events and that, hence, the central problem for historical social science is casing event sequences in order to induce beginnings and ends. Old solutions to casing are all around. They rest on knowing the end, having a theory to guide the selection of events back toward some beginning. The structure of history appears as a sand clock. All of the tangible causal energy is locked into thin behavioral streams that appear subject to all sorts of contingency. It takes little vision to see that, like nested Russian dolls, the inside of one history provides the outside skein for another. At each remove, what appears globally sparse is revealed to be locally dense, and vice versa.

Network methods provide a way to exploit this fractal characteristic of event structures, if we can reveal them. We illustrate a simple strategy for generating and revealing dense event structures as a new unit of analysis. The strategy we illustrate is the intercalation of multiple stories. More sophisticated, and ultimately more pliable, sampling strategies could be used as well. The historical event structures that our method produces are characterized by cyclicity, redundancy, and local density. Because they are structures (as opposed to lines), they have meaningful parameters. They conform to our intuitive understanding of a case as something that envelopes events within a boundary, by virtue either of similar structural principles organizing relations between elements or of deep structuration through memory or cultural encoding. They also conform to our intuitive understanding of how history unfolds as the result of multiple sources operating through multiple pathways at multiple levels of observation. Contingency, while possible, is re-

vealed to be constrained by event structures that absorb events of the present and the future.

An enduring problem in social science history is how to do history and social science at the same time. History demands that we reveal the meaning of events. Social science demands that we abstract from context to yield pattern. This abstraction must remain meaningful, so sensitivity to context is critical. Networks have always provided substantive sensitivity. It is our sense that knowing sensitivity to context comes from knowing the right case. And here new network methods, applied to the practice of social science history, may have much to offer. An article on blocking the future would be remiss not to notice that there is much more to be done.

Notes

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- 1 There are clearly parallel developments in studies of interaction sequences, where the meaning of an event—for example, an exchange sequence—is given only by the events subsequent to it (Bearman 1997). Eric Leifer (1988) provides a useful imagery

with respect to interaction sequences. While there may be long periods in which a role structure does not emerge between interacting individuals, once a role structure appears, the meaning of past (and future) events or exchanges is fixed. By analogy, we are interested in a method for identifying role structures in historical event sequences.

- 2 One popular idea is that historians are historians because they discover facts. This is mistaken. Imagine if historians had access to all the facts that ever were, just as they happened. Arthur Danto (1985) shows that even if such an ideal chronicle of events existed, the historians' craft (and problematic) would remain unchanged. In order to be historians, historians need to write narrative sentences. An ideal chronicle of events recorded when they happened just as they happened would not in any way help historians.
- 3 A gift given after a gift received means something different than a gift given before a gift received. Danto (1985) notes, for example, that Kant "complained bitterly" about the realignment of the past history of philosophy, which created philosophical predecessors for his novel insights, thereby making them (and him) less novel. Many academics have this sense as well. Examples of this kind are inexhaustible.
- 4 In the history of the Indian wars of the West, the Battle of Wounded Knee was but one of many small inconclusive skirmishes. If we could just imagine taking it out of the event sequences that compose the history of Indian wars, we would not miss much. However, one can easily recognize that the battle might have been important (or could well become important) as the consequence of some future event now unknown to us. Our interest, as developed further, is in providing a meaningful assessment of this probability.
- 5 Most events are dead. Whatever proportion they make of the whole is not particularly important. However, it must be huge. Consider a simple narrative sentence proposed by Danto (1985): "On Christmas day 1642, Isaac Newton, the father of modern physics, was born." This sentence could only have been written after modern physics was born. Billions of births, trips, accidents, deaths, and so on make up the event universe—all of which might one day be activated by a narrative sentence. What possible sentences could we write in the future about all the births that day to mothers whose sons and daughters at that moment had the same chance of making history? What future events will give birth to these pasts? Most pasts will never have a second opportunity. As I write, I can imagine events of the past flying through a figurative event horizon and disappearing forever. The dreams of parents lost, but not to history.
- 6 It is not hard to come up with an unrealistic potential case breaker for any "dead" case, of course. In this case, approaching the second millennium, imagine how our understanding of the process might be shaped by the Second Coming of Christ.
- 7 Time does not provide complete protection. Imagine how our interpretation (in 2300) of the Christianizing of the West would change should the Church of Latter-

Day Saints be able to sustain a growth rate of 40% per decade (Stark 1996)—which is perhaps as unlikely as the Second Coming.

- 8 A good story is parsimonious, but parsimony in representation generates as a by-product a distorted view of the likely real density of historical events. The trick is to generate a population of events from multiple parsimonious accounts.
- 9 Rational choice modelers would deny this by pointing to how their models embed context (such as values, goods, costs, etc.) into actors' decision frameworks. But the fact that all contexts are equally easy to embed into the model gives the ghost away.
- 10 To stretch a weak metaphor, relational theorists have argued persuasively that the action is in the potholes, not the big highways of macrolevel historical forces. Because actual action dynamics are seen to shape historical outcomes, each element of the observed event sequence, often seen as the outcome of unique conjunctions of events and relations, has a contingent flavor.
- 11 We can only observe social structures that are robust. Nonrobust social structures don't last long enough to observe. A popular idiom explains what makes structures robust. Love, like a tree, can weather storms better if it bends. Consider, for example, caste systems. The robust macrostructure is the product of constant reordering of degrees of ritual purity fought out in different ways in thousands of different villages, themselves strung together through subcaste kinship networks (Marriot 1968). Similar dynamics have been documented for corporate interlocks (Palmer 1984) and complex kinship systems (White et al. 1999; Bearman 1997).
- 12 There are many more similarities. One similarity, which we exploit subsequently, is that the characteristics of global social networks can be meaningfully ascertained by sampling local networks, an argument that is often implicit in historical narratives.
- 13 In observed social structures, the absence of independence means that subtle changes on one relation *can* have unanticipated effects on another relation. It is likewise with history. Consider the dilemma, documented by David Lowenthal (1985), faced by time-travelers, who discover that their arrival in the past has changed the past and, thus, their future—leaving them trapped in the past, because they no longer exist in the future. However, such experiences seem extremely unlikely.
- 14 An empirical illustration of the first strategy is developed in an article available on request from the senior author.
- 15 Authors of life stories want their stories to be believable and to make sense. To make sense, a life story must have limits. Limits are provided by the end, by the events that are thinkable, and by motive, the rhetoric that allows events to be concatenated in time. Without an end, life stories cannot make sense (Burke 1945).
- 16 One problematic feature of the stories is that Myrdal directed the interviews with an eye toward publication, thereby truncating redundant narrative and (presumably) editing out redundancy in the printed version. Consequently, our models of event structures developed from the overlap of narrative elements are likely sparser than they would otherwise be, suggesting that an “unedited” case would exhibit greater

local event density and robustness than we are able to show. Since the bias works to our disadvantage, and our interest is in illustrating the method, we ignore it. One interesting point is that our analysis of the case brings into relief the close set of connections between the revolutionary period and the introduction of communes. This point is unanticipated in Myrdal's work. Of the 20-plus stories and story fragments, we selected the longest stories for this illustration. A full enumeration of all events in all stories would by definition make the case we consider denser as well.

- 17 All events can be chopped up into smaller and smaller fragments of both behavior and time—for example, a “smile” event can be reduced to a series of synapse firings and muscle movements. Charles Tilly has suggested that by allowing for event heterogeneity, we simply push the judgment problem back into a problem of event coding. In our case, we consider this possibility unlikely, since simple rules can be used to define elements as events as they are linked by narrative clauses in sentences. While we did not formally test for intercoder reliability, agreement on events and arcs was extremely high.
- 18 Fate as motive is chance operating in conjunction with a human agent. Fate as motive appears mystical, for experience is perceived as mystical when a chance event becomes “representative of the individual,” when a sequence of events follows exactly the pattern desired (Burke 1945).
- 19 These positions may be schematic or temporal. For the latter, consider, for example, a history of the Battle of Wounded Knee written before 1973 versus a history of the Battle of Wounded Knee written after 1973. For the former, imagine a feminist history, a socialist history, a Whig history, and so on.
- 20 The tidal pool narrative has 347 events in it. This reduction to 31 events follows the general strategy developed in Bearman and Stovel's article (forthcoming) for betweenness reduction: eliminating nodes and relations that stand between other nodes only in otherwise dense subclusters.

References

- Abbott, Andrew (1988) “Transcending general linear reality.” *Sociological Theory* 6: 169–86.
- (1992) “From causes to events: Notes on narrative positivism.” *Sociological Methods and Research* 20: 428–55.
- Barkey, Karen, and Ronan Van Rossen (1997) “Networks of contention: Villages and regional structure in the seventeenth-century Ottoman Empire.” *American Journal of Sociology* 102(5): 1345–82.
- Bearman, Peter (1993) *Relations into Rhetorics*. ASA Rose Monograph Series. New Brunswick, NJ: Rutgers University Press.
- (1997) “Generalized exchange.” *American Journal of Sociology* 102(5): 1383–1415.

- (1999) *Blocking the Future*. Unpublished manuscript.
- Bearman, Peter, and Katherine Stovel (forthcoming) "Becoming a Nazi: A model for narrative networks." *Poetics*.
- Brudner, Lilyan, and Douglas White (1997) "Class, property, and structural endogamy: Visualizing networked histories." *Theory and Society* 25: 161–208.
- Burke, Kenneth (1945) *A Grammar of Motive*. New York: Prentice Hall.
- Danto, Arthur C. (1985) *Narration and Knowledge*. New York: Columbia University Press.
- Emirbayer, M., and J. Goodwin (1994) "Network analysis, culture, and the problem of agency." *American Journal of Sociology* 99: 1411–54.
- Frank, Ove (1978) "Sampling and estimation in large social networks." *Social Networks* 1: 91–101.
- Franzosi, Roberto (1999) *From Words to Numbers*. Unpublished manuscript.
- Gould, Roger V. (1995) *Insurgent Identities: Class, Community, and Protest in Paris from 1848 to the Commune*. Chicago: University of Chicago Press.
- (1996) "Patron-client ties, state centralization, and the Whiskey Rebellion." *American Journal of Sociology* 102(5): 400–429.
- Granovetter, Mark (1977) "Network sampling: Some first steps." *American Journal of Sociology* 81(6): 1287–1303.
- Griffin, Larry (1992) "Temporality, events, and explanation in historical sociology: An introduction." *Sociological Methods and Research* 20: 403–27.
- Labov, William (1972) *Language in the Inner City*. Philadelphia: University of Pennsylvania Press.
- Leifer, Eric (1988) "Interaction preludes to role settings." *American Sociological Review* 53(6): 865–78.
- Lowenthal, David (1985) *The Past Is a Foreign Country*. Cambridge: Cambridge University Press.
- Marriot, McKim (1968) "Caste ranking and food transactions, a matrix analysis," in Milton Singer and Bernhard S. Cohn (eds.) *Structure and Change in Indian Society*. Chicago: Aldine: 63–89.
- Morey, R., and Alan Agresti (1984) "The measurement of classification agreement: An adjustment to the Rand statistic for chance agreement." *Educational and Psychological Measurement* 44: 33–37.
- Myrdal, Jan (1965) *Report from a Chinese Village*. New York: Pantheon Books.
- Padgett, John, and Christopher Ansell (1993) "Robust action and the rise of the Medici, 1400–1434." *American Journal of Sociology* 98: 1259–1319.
- Palmer, David (1984) "Broken ties: Interlocking directorates and intercorporate coordination." *Administrative Science Quarterly* 28: 40–55.
- Rosenthal, Naomi et al. (1987) "Social movements and network analysis: A case study of nineteenth-century women's reform in New York State." *American Journal of Sociology* 90: 1022–54.

- Sewell, William H. (1996) "Historical events as transformation of structures: Inventing revolution at the Bastille." *Theory and Society* 25(6): 841–81.
- Stark, Rodney (1996) *The Rise of Christianity: A Sociologist Reconsiders History*. Princeton, NJ: Princeton University Press.
- Stovel, Katherine (1994) "The structure of lynching: Temporal pattern and spatial variation in the Deep South, 1882–1930." Unpublished manuscript.
- Tilly, Charles (1999) *Durable Inequality*. Berkeley: University of California Press.
- Traugott, Mark (1985) *Armies of the Poor: Determinants of Working-Class Participation in the Parisian Insurrection of 1948*. Princeton, NJ: Princeton University Press.
- Wasserman, Stanley, and Katherine Faust (1994) *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.
- White, Douglas, Michael Schnegg, Lilyan Brudner, and Hugo Nutini (1999) "Status groups and structural endogamy: Compadrazgo in rural Tlaxcala, Mexico." Unpublished manuscript.
- White, Harrison (1992) *Identity and Control*. Princeton, NJ: Princeton University Press.