

Alternative Approaches for Studying Organizational Change

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Abstract

Scholars hold different views about whether organizations consist of things or processes and about variance or process methods for conducting research. By combining these two dimensions, we develop a typology of four approaches for studying organizational change. Although the four approaches may be viewed as opposing or competing views, we see them as being complementary. Each approach focuses on different questions and provides a different--but partial--understanding of organizational change. We argue that coordinating the pluralistic insights from the four approaches provides a richer understanding of organization change than any one approach provides by itself.

Keywords: organization change, variance theory, process theory, organization ontology, research methods, time

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Introduction

Most scholars agree that organizational change is a central and important topic to organization studies. However, they disagree on the meaning of organization change and how to study it. This paper traces these disagreements to different ontological views that scholars hold about whether organizations consist of things or processes and different epistemologies about variance or process methods for conducting research. By combining these two dimensions, we develop a typology of four approaches for studying organizational change. Although the four approaches have been treated as opposing or competing views, we see them as being complementary. Each approach provides a different – but partial – understanding of organizational change. We argue that coordinating the pluralistic insights from the four approaches provides a richer understanding of organization change than any one approach provides by itself.

Ontological Views of Organizations as Things and Organizing as Processes

A fundamental issue that influences how we look at change is whether we view organizations as consisting of things or processes (Tsoukas and Chia 2002). Rescher (1996) traces this distinction back in antiquity to the differing philosophies of Democritus and Heraclitus. Democritus pictured all of nature as composed of stable material substance or things that changed only in their positioning in space and time. Here the identity or substance of things do not change, only their development and adaptation in relation with other dimensions and properties. In contrast, Heraclitus, viewed reality, not as a constellation of *things*, but one of *processes*. Heraclitus argued that substantializing nature into enduring things (substances) is a fallacy because they are produced by varied

and fluctuating activities. “Process is fundamental: The river is not an object but an ever-changing flow; the sun is not a thing, but a flaming fire. Everything in nature is a matter of process, of activity, of change” (Rescher 1996: 10).

More recent literature in the 19th and 20th centuries might lead to the conclusion that Democritus won the debate since most philosophers and scientists emphasized the stabilities and fixities characteristic of the world’s structure of lawful order. Rescher (1996) points out that a notable exception was evident in the pragmatic and processual philosophies of C.S. Peirce (1839-1914), William James (1842-1910), Henri Bergson (1859-1941), John Dewey (1859-1952) and Alfred North Whitehead (1861-1947). They viewed reality as a process and regarded time, change, and creativity as representing the most fundamental facts for understanding the world.

The building blocks of reality, as envisioned in Whitehead’s classic *Process and Reality*, are not substances at all but “actual occasions” – processual units rather than “things” of some sort – with human experience affording their best amalgam. Even as in conscious experience humans *apprehend* what goes on about them, so these actual activities “prehend” what goes on in their environment in a way that encompasses a low-grade mode of emotion, consciousness, and purpose. (Rescher 1996: 20)

To Whitehead (1929), “nature is a process,” like the Heraclitean doctrine that “all things flow,” contrary to the Democritan view that nature consists in changeable interrelations among stable, unchanging units of existence.

Although expressed in different terms, the distinction between viewing reality as consisting of things or processes is deeply embedded in current literature on organization studies. Compare, for example, the views of organization studies proposed by Whetten (2005) and Tsoukas (2005). Whetten views organizations as things or social actors, and argues that “organizational scholars should be experts on organizations, a peculiar type of social entity, and organizational settings, a peculiar type of social context” (p. 13). Following Heath and Sitkin (2001), Whetten calls upon scholars to study uniquely organizational subjects – those “Big-O concepts,” such as the identity, structure, culture, performance that are central to successful organizational enterprise. He argues that organizations should be studied as nouns (social entities), rather than as verbs (social processes).

Whetten notes that while valuable insights have been obtained from Weick’s (1979) view of organizing, there are four negative implications of treating the “organizational” in organizational studies as an incidental, inconsequential modifier. Whetten argues that viewing the “O” in “OS” as a verb rather than a noun poses a threat to the identity of organization studies, the validity of studies in organizations, and the coherence of studies of organizations. He states that it also fosters overly simplistic explanations and overly general conclusions. Whetten (2005: 4) recognizes that “one’s ontological view of ‘things organizational’ shapes one’s views of each and every organizational thing.”

Proponents of the militant view of organizing (O should be incidental to OS) argue that “organization” is a vacuous, often misleading, reified conception of social action. It is deemed to be a vacuous concept because

it is irrelevant for the study of the essential features of organization behavior (e.g., acts and interacts, attributions and justifications, sense-making and sense-giving). (Whetten, 2005: 2)

Tsoukas (2005) makes the distinction between organizations as things or nouns from organizing as a verb or process in terms of *strong* and *weak* forms of organization change. To encapsulate this distinction we quote at some length from the “Call for Papers” by Chia and Langley (2004) for the First *Organization Studies* Summer Workshop:

“The “weak” view treats processes as important but ultimately reducible to the action of things, while the “strong” view deems actions and things to be instantiations of process-complexes. The first perspective appears dominant in much of organizational and social scientific research, and tends to be pragmatic, empirically grounded, and analytical in orientation. The latter perspective has been primarily conceptual, strongly informed by strands of process philosophy, theology and the humanities at large, following especially the lead of philosophers such as James, Whitehead, Bergson, and Deleuze.

For example, in organizational research, even when it is accepted that processes are critical to the understanding of organizational life, it is very tempting to reduce them to “things” that can be described as variables (e.g., decision processes are more or less “rational,” more or less “political,” more or less “bureaucratic”), or as static states that can be compared (before and after; phase 1, 2, 3, etc.). By contrast, for those

adhering to the “strong” view, processes are thought real, whilst substances, entities, and things are secondary conceptual abstractions.

According to such a perspective, movement, change, and becoming need to be construed not as secondary, but as the *sine qua non* of organizational life. While the first perspective helps us observe and empirically research process, the latter enable us to appreciate the *sui generis* nature of process. Each one has its own strengths and weaknesses”.

Despite the implication in these paragraphs that the “weak” versus “strong” view of change is one of perspective, we believe that the true value of this important distinction lies in its grounding in an ontological claim. Tsoukas (2005) contrasts two versions of the social world, one *a world made of things in which processes represent change in things*, and the other *a world of processes in which things are reifications of processes*. This is a critical ontological distinction about the essential nature of organizations, and challenges us to move past the traditional view that regards organizations as a noun, consisting of social entities and things, and to consider an alternative representation of organizing as a verb in a world on ongoing change and flux.

Tsoukas and Chia (2002) articulate a view of organizational change that takes process seriously and counterposes it to much current thinking on organizational change. They base their argument on process philosophers who have been challenging us to do this since before the turn of the twentieth century (Rescher 1996). Yet social science in general and organizational studies in particular have been slow to embrace this alternative ontology.

Implicit within the quoted paragraphs is another theme, namely that the “strong” process view is truer to the essential meaning of change than the “weak” view. Rather than making such a judgment and foreclosing alternative epistemologies (discussed below), we believe it is important to look past the adjectives to the ontologies they reflect. On the one hand we have a viewpoint and associated theories that *presuppose that an organization is a social entity or structure (a thing or a noun) which retains its identity while changing from one state to another over time.* For example, an organization recognizing the need for a strategic decision starts in the identification phase and once it has diagnosed its situation and the problems it faces, it then moves into a development phase in which it searches for solutions and adapts them to its situation, following which it moves into a selection phase in which it screens options, selects its best course of action and authorizes the organization to proceed (Mintzberg et al. 1976). In this view, an organization is always something in some particular state or phase of a process; there is always something there.

On the other hand we have a viewpoint and associated theories that *presuppose that organizations are composed only of organizing processes.* On this view an organization is simply a reification of a set of processes which maintain the organization by continuously structuring it and maintaining its boundaries in a field of other processes that are continuously breaking down the organization and its boundaries. In this view stability and change are explained in the same terms: stability is due to processes that maintain the organization so that it can be reified as the same thing by some observer(s), while change occurs when the processes operate in a manner that is reified by observer(s) as changing the organization. In both instances, stability or change are judgments, not

real things, because the organization is a process that is continuously being constituted and reconstituted (Rescher 1996). For example, structural views of information technology in organizations (Orlikowski and Robey 1991; DeSanctis and Poole 1994) argue that technologies and organizations continuously restructure one another as technologies are implemented. As Tsoukas and Chia (2002) note, this perspective regards change as the basic constituent of organizations.

Variance and Process Epistemologies

Two definitions of change are often used in organization studies: (1) an observed difference over time in an organizational entity on selected dimensions, and (2) a narrative describing a sequence of events on how development and change unfold (Poole et al. 2000). When the first definition is used, change is typically studied with a “variance theory” (Mohr 1982) methodology, where change is represented as a dependent variable that is explained with a set of independent variables that statistically explain variations in the dependent variable of change. The second meaning of change takes an event-driven approach that is often associated with a “process theory” explanation of the temporal order and sequence in which change events occur based on a story or historical narrative (Abbott 1988; Pentland 1999; Poole et al. 2000; Tsoukas 2005). In this usage, the issue of “how change unfolds” is addressed by narrating the temporal sequence of events that unfold in an institutional arrangement.

Mohr’s (1982) distinction between variance and process methods has been quite influential in organizational studies. However, Mohr advanced a rather restrictive, mechanistic view of variance and process theories. Others have advanced broader

interpretations of variance and process representations of social action (Abell, 1987). Abbott (1984; 1990; 2001) compared stochastic and narrative explanations in sociology. Polkinghorne (1988) presents a general introduction to theories of narrative in the human sciences in which he highlights the differences between narrative explanation and traditional causal analysis in the social science. Barnett and Carroll (1995) distinguish between the “content” and “process” of change. Content refers to what actually changes in an organizational entity, while process examines how the change occurs. Content studies tend to focus on the antecedents and consequences of organizational change, while process studies examine the sequence of events over time as change unfolds in an organizational entity. Poole et al. (2000) elaborate and discuss narrative process and causal variance theorizing. They point out the different assumptions, implicit or explicit, that scholars make when they adopt each approach to explain organizational change.

The common thread running through these works is the difference between scientific explanations cast in terms of independent variables causing changes in a dependent variable, and explanations that tell a narrative or story about how a sequence of events unfolds to produce a given outcome. We will refer to these divergent explanations as *variance* and *process* methods, respectively. They represent different epistemologies to the study of change and development.

Variance methods seek explanations of continuous change driven by deterministic causation, with independent variables acting upon and causing changes in dependent variables. Consider an alternative to the variance approach. History conceives of the past in terms of successions of events. Successions are explained by historical process narratives that indicate the significance of the events and the forces--human and

otherwise--that influenced them. While some causal forces operate continuously, others influence the sequence of events only at particular points in time (Poole et al. 2000).

An example of the variance method of research on organizational change is a study by Schoonhoven, et al. (1990). They applied event-history analysis to examine differences in the speed with which new ventures in the U.S. semiconductor industry ship their first products for revenues. Schoonhoven et al. found that the speed of shipping the first products (the dependent variable) was significantly predicted by firms with: (1) lower levels of technological innovation, (2) lower monthly expenditures, (3) a founding organization structure that included both manufacturing and marketing positions, (4) more competitors in the marketplace, and (5) their foundation in the Silicon Valley region (the independent variables).

In contrast, Gersick (1994) provides an example of a process method of organization change undertaken to understand the development of a company startup. She developed a grounded theory of how a start-up company regulates its development strategy over time. Gersick analyzed key decisions, events and strategies in this start-up over time based on monthly interviews with start-up leaders and venture capitalists and board meeting observations. Gersick found two forms of temporal pacing that regulate momentum and change in an organization's strategy. One form of pacing is time-based, with reorientations initiated at temporal milestones, the other is event-based, with actions initiated when the right event occurred. These two pacing types fostered systematically different patterns of momentum and change in the new start-up.

As the study by Schoonhoven et al. (2000) illustrates, the variance method explains change in terms of relationships among independent variables and dependent

variables, while the study by Gersick (1994) exemplifies a process method that explains how a sequence of events unfolds over time. The two methods yield quite different conceptualizations of change and imply different standards for judging research on change and innovation. Table 1 provides a summary comparison of the two methods based on the discussion in Poole et al. (2000).

---Insert Table 1 about here.---

The variance method focuses on variables that represent the important aspects or attributes of the subject under study. Explanations take the form of causal statements or models that incorporate these variables (e.g., X causes Y which causes Z). An implicit goal of variance research is to establish the conditions necessary to bring about an outcome. Variance research employs experimental and survey research designs, grounded in the general linear model that underlies most common statistical methods, including ANOVA, regression, factor analysis, and structural equation modeling. A key criterion for assessing variance theories is their generality, which refers to the range of cases, phenomena, or situations the causal explanation applies to.

Several different types of studies of organizational change and innovation follow the variance method. Probably the most common type of variance study treats change as a *variable* such as rate of innovation (Rogers 2004), or depth of change (Harrison 1970). The goal of these studies is to explain and/or predict the occurrence and magnitude of change or the effects of change on other variables. The methodologies employed in these studies range from relatively straightforward laboratory (Mathieu et al. 2000) and survey (Morrison 1993) designs to sophisticated time series and event history models (Mayer and Tuma 1990).

Some studies treat change as the *context* for other causal processes. They do not study change but instead take change as the frame around which other phenomena occur. The object of these studies is to develop and test cause-effect relationships within a changing context or to test theories of individual units' reactions to change in higher level units. A study of how individual hospitals respond to changes in institutional practices in the medical field by Goodrich and Salancik (1996) is one example of this type of research.

An increasingly popular method is to study change at *multiple* levels of analysis (Dansereau et al. 1999; Garud and Kumaraswamy 2005). Some studies in this group focus on the effects of change in a variable at one level of analysis on variables at other levels, for example, how transformational leadership styles influence work units and create collectives in organizations over time (Avolio and Bass 1995). Methods for conducting multi-level analysis include hierarchical linear modeling, within-and-between analysis, and interdependency analysis (Kashy and Kenny 1999; Klein and Koslowski 2000).

Variance methods have been the dominant approach in studies of organizational change, innovation, and entrepreneurship. As discussed later in this paper, variance methods play an important role in studying organizational change. But as Poole et al. (2000: 29) point out,

While the variance approach offers good explanations of continuous change driven by deterministic causation, this is a very limited way to conceptualize change and development. It overlooks many critical and interesting aspects of change processes. However, because most

organizational scholars have been taught a version of social science that depends on variance methods, and because methods for narrative research are not well developed, researchers tend to conceptualize process problems in variance terms. One can see the "law of the hammer" in operation here: Give a child a hammer, and everything seems made to be hit; give a social scientist variables and the general linear model and everything seems made to be factored, regressed, and fit.

Process Methods tend to be more complex than variance explanations due to the complexity of events, the need to account for temporal connections among events, different time scales in the same process, and the dynamic nature of processes. Process explanations may include:

1. an account of how one event leads to and influences subsequent events (e.g., events of type A have a .7 probability of being succeeded by events of type B and a .3 probability of being succeeded by events of type C),
2. an explication of the overall pattern that generates the series (e.g., the process develops in three stages or recurrent cycles of A, B, and C), or
3. both (in which case the microlevel explanation and overall pattern should be linked).

Process theories may incorporate several different types of effects into their explanations including critical events and turning points, contextual influence, formative patterns that give overall direction to the change, and causal factors that influence the sequencing of events. Poole et al. (2000) argue that process explanations incorporate

three of Aristotle's four causes, adding formal and final causation to the efficient causation that is the basis of causal explanation in variance research.¹

Process research employs eclectic designs that identify or reconstruct the process through direct observation, archival analysis, or multiple case studies. Analysis of process data requires methods that (1) can identify and test temporal linkages between events and also overall temporal patterns (Poole et al. 2000) and (2) can cope with the multiple time scales that often occur in processes (where some events extend for years, other events embedded in them run for shorter periods, and others embedded within these run for even shorter periods (Langley 1999). Whereas the great majority of variance research follows hypothetico-deductive procedures, process research employs a mixture of approaches. Most often process studies derive theory from observation, but in some cases they test hypothesized models of the change process. In others they use abduction or retroduction (Peirce 1955), whereby theories are used to guide observation that further

¹ Aristotle distinguished four causes of why change occurs--material, formal, efficient, and final. Respectively, they indicate that from which something was made (material cause), the pattern by which it is made (formal cause), that from which comes the immediate origin of movement or rest (efficient cause), and the end for which it is made (final cause) (Ross 1949; Aristotle 1941). Social science is most explicitly concerned with efficient cause, tending to downplay other sources of change. Mohr (1982) explains, "An efficient cause is a force that is conceived as acting on a unit of analysis (person, organization, and so on) to make it what it is in terms of the outcome variable (morale, effectiveness, and so on) or change it from what it was. It may be thought of a push-type causality" (1982: 40). For example, organizational rewards encouraging innovative behavior, top management team support, and an entrepreneurial climate act on an individual to increase the likelihood that person will initiate a new corporate venture. Each necessary and sufficient cause in a variance theory is assumed to function in the manner of an efficient cause. Other types of causality, such as final causality that posits that phenomena are influenced by the ends to which they are tending, are not regarded as valid generative mechanisms. McKelvey (2004) provides a related case and discussion of the inclusion of all four Aristotelean causes in organizational research.

specifies the theories (Poole et al. 2000: 115-117); indeed, in-depth studies of processes may employ two or even all three of these approaches (e.g., Van de Ven et al. 1999; Bartel and Garud 2004). As a result, both qualitative and quantitative approaches are used in process research (see Langley 1999; Poole et al. 2000 for a description of process methods).

Both variance and process methods strive for generality, but with a process method, generalization depends on *versatility*, “the degree to which it can encompass a broad domain of developmental patterns without modification of its essential character” (Poole et al. 2000: 43). A versatile process explanation can “stretch” or “shrink” to fit specific cases that may differ in their tempo and time span. For instance, the punctuated equilibrium model of organizational change (Gersick 1991; Tushman and Romanelli 1985) is highly versatile because it can be applied to processes that take a week, to processes that take years, and to a wide range of different processes, including organizational change, group development, and the evolution of technology.

Van de Ven (1992), Langley (1999) and Poole et al. (2000) identify several different types of change and innovation studies that follow the process method. They range along a rough continuum from highly interpretive to quantitative studies. Some of the most influential work in organizational studies has taken the form of *narrative histories* that tell the story of a process in detail (e.g., Bartunek 1984; Bartel and Garud 2004; and Pettigrew 1985). These rich accounts have multiple interwoven themes and as Langley (1999) notes, their very density may make deriving parsimonious theories something of a challenge.

A more focused method is the *multiple case study* (Leonard-Barton 1990). These studies are designed to compare and contrast through intensive qualitative analysis a limited number of cases that “either (a) predict similar results (a literal replication) or (b) produce contrary results but for predictable reasons (a theoretical replication)” (Yin 1984: 48-49). These studies often use various methods of summarization and display to draw meaning from their cases, such as visual mapping (Langley and Truax 1994; Mintzberg et al. 1976; Quinn 1980; Van de Ven and Grazman 1999), matrix displays (Kuhn and Poole 2000; Miles and Huberman 1994), and comparisons of extracts and digests of events (Leonard-Barton 1990). The accounts yielded by multiple case studies are typically quite rich, though not as detailed as narrative histories, and they often have a more compact and explicit theoretical focus than do narrative histories.

As these examples illustrate, process research is capable of tapping aspects of processes that variance research cannot. However, the process method has its own limitations. Conducting process studies is very labor intensive and typically involves the collection of large amounts of multifaceted data so that the researcher is in danger of what Pettigrew (1990) has termed “data asphyxiation.” As described above, processes are often quite complex, so developing process explanations and discerning patterns in process data is a difficult undertaking. The depth of process data and complexity of processes tends to limit the number of cases that can be collected, thereby limiting confidence in the generalizability of the conclusions of process research.

The complexity of process research has led to several efforts to offer heuristics and systems to aid the researcher in tackling process studies. Langley (1999) offers an insightful and readable guide to approaches to building theories of processes. Poole et al.

(2000; Van de Ven and Poole 1995) lay out four archetypal theories of change processes and describe how these can be identified in process data and how more complex process theories can be built from these simple motors. Pentland (1999) describes how narrative analysis can be used to build process theories. Poole et al. (2000) discuss various methods of studying processes and methods for quantitative analysis uniquely adapted to process research.

Field studies of organizational change are often undertaken for the purpose of developing a *process theory of change*. Tsoukas and Hatch (2001) point out the difficulties in doing this. A process theory needs to go beyond a surface description to penetrate the logic behind observed temporal progressions. This explanation should identify the generative mechanisms that cause observed events to happen in the real world, and the particular circumstances or contingencies when these causal mechanisms operate (Harre and Madden 1975; Tsoukas 1989).

As we move from surface observations toward a process theory, we move from description to explanation. Explanation requires a *story*, and stories can be understood as process theories (Czarniawska 1998; Pentland 1999). In narrative theory the story is an abstract conceptual model; it identifies the generative mechanisms at work. At a minimum this story must describe a progression or sequence of events. In narrative theory, however, the “story” includes a great deal more than just event sequence. In particular, a process theory should include the following features in the story (Pentland 1999: 712-713):

1. *Sequence in time.* A narrative should include a clear beginning, middle, and end. . . . Chronology is a central organizing device. The events or actions referred to in a narrative are understood to happen in a sequence.
2. *Focal actor or actors.* Narratives are always about someone or something. . . . There is a protagonist and, frequently, an antagonist as well. The characters may not be developed or even identified by name, but, along with sequence, they provide a thread that ties the events in a narrative together.
3. *Identifiable narrative voice.* A narrative is something that someone tells (Bal 1985), so there should always be an identifiable voice doing the narrating. That voice reflects a specific point of view (Rimmon-Kenan 1983)...
4. *“Canonical” or evaluative frame of reference.* Narratives carry meaning and cultural value because they encode, implicitly or explicitly, standards against which actions of the characters can be judged. . . . But even without any explicit moral, narratives embody a sense of what is right and wrong, appropriate or inappropriate, and so on. . . .
5. *Other indicators of content or context.* Narrative texts typically contain more than just the bare events. In particular, they contain a variety of textual devices that are used to indicate time, place, attributes of the characters, attributes of the context, and so on. These indicators do not advance the plot, but they provide information that may be essential to the interpretation of the events (e.g., knowing that the scene is a wedding changes the significance of the utterance “I do”).

Developing a process theory that embodies these features requires considerable ingenuity and creativity in applying narrative methods to process data in systematic and replicable ways as required of social science. Becoming a skillful process researcher requires repeated use and practice of these methods.

A Typology of Approaches for Studying Change.

We now combine the foregoing discussion of alternative organizational ontologies and epistemologies to suggest a typology of four approaches for studying organizational change. The four approaches in the typology, illustrated in Figure 1, result from viewing the ontology of organizations as consisting of things or processes and epistemologies of variance or process methods for studying organizational change. Approaches I and II adopt variance and process methods, respectively, to study change in an organizational entity that is viewed as a real social actor with an enduring identity. Approaches III and IV adopt variance and process methods, respectively, to study processes of organizing. The typology provides a repertoire of ways to study organizational change. We now discuss the differences and similarities among the four approaches, as well as their strengths and weaknesses in addressing various research questions about organizational change. When related and combined, we believe the four approaches provide a richer understanding of complex organizational dynamics than can be obtained from one approach alone.

-- Insert Figure 1 about here. --

Approach I: Variance Study of Change in Organization

Approach I studies change in an organizational entity with a variance methodology. It is particularly well-suited for examining research questions such as what are the causes or correlates of change in organizations? This approach treats change in an organizational entity as a dependent variable and explains it as a function of independent variables. Studies which explain adoption of an innovation as a function of innovation characteristics such as trialability, comparative advantage, and observability (Rogers 2004) are examples of this type of study.

A variance method is useful for studying the causes or correlates of organizational change in two important respects. First, variance research methods offer good pictures of the mechanisms that drive a process and are well-suited for testing hypotheses related to mechanisms. Second, the variance method is useful for the study of changes that run rapidly on a human scale, such as individual or group level changes (e.g., social identity formation or change in cognitive structures). While these changes may unfold as in Approach II, they operate so quickly that they can be studied effectively with variance methods that assume homogeneous, immediate causality.

To utilize quantitative statistical methods, Approach I assumes that causality in the system is “well-behaved.” This involves assumptions (a) that causes flow from larger units to smaller ones but not vice versa (e.g., the organization can affect its members, but a single member’s behavior cannot affect the organization), and (b) that causal factors operate homogeneously across cases and on approximately the same time scale (Abbott 1988). These assumptions do not seem particularly restrictive within the variance framework. However, they rule out the influence of some factors including critical

events, multiple causes operating unevenly in different parts of the organization and at different points in time, causes operating across greatly different time scales, and sequences of events that chain together to lead up to some outcome. Such are the subject of history or biography, not structural equation models.

Approach I studies treat time as a *medium* in explanations of organization change. It adopts a *Newtonian* perspective of classical physics of time. This perspective assumes time is a linear continuum divisible into uniform units that are all equivalent to each other. Time is independent of the objects and people who experience it. Time can be measured objectively and is reversible since it is simply an abstract dimension. In Approach I, a researcher adopting the Newtonian view of time would regard time as a neutral, abstract medium external to subjects and organizations who measure it with a clock. Time is treated as a transparent background for other phenomena that are the primary focus of the investigation. Temporal metrics imposed on this medium are used to generate units for longitudinal analysis and scales for establishing duration and change versus stability. Such metrics vary in precision from fine, evenly-spaced units required for time series analysis, to the more granular and approximate units of case studies and ethnographies. While metrics may seem more pertinent to measurement, the multiple types of metrics implicated in the study of change and innovation makes this an important theoretical issue, as Zaheer et al. (1999) discuss.

Like each of the four approaches, variance studies of changes in organizations have their limitations. Poole et al. (2000) point out that it is difficult to study the activities or steps in which change and innovation unfold using variance methods. While some methodologies for the study of processes have been applied in variance research

(e.g., Davison et al. 1980; Davison et al. 1978; Poole and Roth 1989a; 1989b), they require researchers to abstract variables from the process data, which forces them to study the process once removed (at least). As a result, Approach I makes it difficult to study important questions of how the change comes about. Behind most variance theories is a process-based “story” about the relationships among variables that give the theories coherence. However, it is difficult to test or study the narrative with a variance method.

Approach II: Process Study of Change in Organizations

Approach II adopts a process methodology to study these kinds of research questions of how change unfolds in organizational entities. It conceptualizes change as a succession of events, stages, cycles, or states in the development or growth of an organization. Approach II corresponds to one interpretation of the “weak” process approach described by Tsoukas (2005), Chia and Langley (2004), and to the position described by Rescher (1996: 2) in which substance has priority over process.

For example, Nutt’s (2002) transactional model of strategic decision making defines six stages of decision making—signals, intentions, concept development, detailing, evaluation, and installation. The decision maker takes various actions to enact each stage, from stating needs and opportunities to defining intentions or taking a set of options to evaluation. Nutt derived a typology of strategic decision processes which represented different patterns of movement through the six phases, and these types were used as independent variables to explain effectiveness of strategic decision making. Some qualitative studies of organizational processes have also taken Approach II. Mintzberg et al. (1976)’s famous study of strategic decision making is firmly in this camp

as is Leonard-Barton's multiple case study of innovation. Both subdivide their subject into meaningful states and track process in terms of a succession of states. In Leonard-Barton's study, effectiveness rankings were also made for each case and related back to the description of the process.

A long-standing research tradition conceptualizes process in terms of a sequence of phases or stages (Bales and Strodtbeck 1951; Barley 1986; Fisher 1970; Langley and Truax 1994; Poole 1981). *Phasic analysis* attempts to identify the coherent periods of activity through which a process unfolds. The most common type of explanation that employs phases is the life cycle model (Cameron and Whetten 1983; Greiner 1972; Lacoursiere 1980), but other types of theories also view processes in terms of phases (Poole 1983; Saberwhal and Robey 1993). Poole et al. (2000) discuss several methods, both qualitative and quantitative, used for the identification of phases and the testing of phase sequence hypotheses. Phase theories attempt to encapsulate the essentials of rich process data in a simpler account of stepwise development or typical activities.

Approach II studies adopt a *transaction* view of time by focusing on the temporal occurrence of significant events. This view regards time as "divisible, but differentiated, with certain points serving as 'critical values' (e.g., birth, metamorphosis, cell division, etc.)" (McGrath and Kelly 1986: 33). The observer is critical in determining these key points. Therefore, time is dependent on the observers operating within it. Significant events are determined not by a uniform measure with respect to a background that can be unitized mathematically but by what the observer notices or believes is significant. The flow of time is irreversible and temporal succession is seen as a developmental process. A researcher adopting the transactional view of time would measure it by identifying

events critical or significant to subjects. In some cases this is done “from the outside” by the researcher who defines the critical events, which may be major turning points (e.g., an organizational crisis or a performance evaluation) or more commonplace events (e.g., each interaction the employee has with her manager or each statement made by a group member during a decision making discussion). In other cases this is done “from the inside” by having change participants indicate which events are significant to them, as Van de Ven et al. (1999) did when they interviewed members of innovation teams, asking them to identify significant events. Each occurrence of the critical or significant event demarcates a time unit in the transactional view.

Approach III: Process Study of Organizing

Approach III corresponds to the “strong” process approach described by Tsoukas (2005), Chia and Langley (2004), and the Heraclitean version of process philosophy discussed by Rescher (1996). It presumes the world is composed of processes and applies the process research approach. It examines questions like how do processes of sensemaking, conflict resolution, protests, or making a living unfold over time? Associated with this approach is an internal consistency argument: processes are all there is, and only research that adopts the processual perspective is suited for the study of processes. As Tsoukas (2001) notes, most studies using Approach III are conceptual in nature, but there have been some empirical studies. Research on the social construction of science and technology applies this approach in studies of the emergence and impacts of new technologies in scientific inquiry and society at large (Garud and Ahlstrom 1997; Ruttan 2001).

Pickering (1995) analyzes scientific discoveries in terms of the matter, instruments, and human activities which constitute them. His action-network analysis defines different types of agency—human, material, and disciplinary—that must achieve mutual accommodation in scientific practice to stabilize scientific “facts.” The stabilizations that he describes are always temporary and contingent on a specific confluence of agencies in practice. Other research that employs Approach III includes studies of the structuration of information technology (Chae and Poole in press; Orlikowski and Robey 1991; Poole and DeSanctis 1992), applications of actor network theory to organizational information systems (Monteiro and Hanseth 1995) and studies of institutional change that adopt structurational and new social movement theory approaches (Van de Ven and Hargrave 2005).

Research in Approach III faces an irony in that its representation, interpretation, and explanation of processes must always reify the processes—which are evanescent and in flux—in words and diagrams fixed statically to the page. A double irony stems from the justification for this approach: that a processual world should be studied only through processual methods, since those methods are filtered through static representations of the process. As Tsoukas and Chia (2002) argue, accommodating ourselves to Approach III means that we must truly learn to think in different terms than our largely substance-based educations have prepared us to. Weick (1979) provides a good starting point for developing a process understanding of organizing, sensemaking, and related processes. Van Maanen (1995) suggests that useful insights can also be gained from ethnomethodologists who create a vocabulary and grammar for expressing things in processual terms (which, among other things, led them to excessive use of present

participle and gerundive phrases, and to awkward expressions such as “doing social life”).

In Approach III, time may enter into theories by way of *temporal predispositions* of people, organizations, and cultures. Time is a fundamental medium of social life and a key referent in the social world. Individuals, groups, organizations, and cultures develop predispositions in their perceptions of, reactions to, and use of time. Several types of predispositions have been incorporated into theories of change and innovation.

Individual level predispositions include time urgency (Waller et al. 2001), temporal orientation (past, present, future) (Waller et al. 2001; Zimbardo and Boyd 1999), and interaction tempo (Warner 1988). Organizational predispositions include temporal orientation (Lawrence and Lorsch 1967) and pace (Perlow et al. 2002). Cultural predispositions include monochronic versus polychronic time (Hall 1983), present versus future time orientations (Jones 1988), and pace (Levine 1988).

Time may also be *socially constructed* and reflect a view of time in the *dominant culture* or context in which the study is conducted. In Approach III studies, time may be so intimately bound together with change and innovation that it is also useful to consider how it might be constructed during the process. Orlikowski and Yates (2002: 684) present an interesting perspective on how structuring processes in organizations can be used to construct “a variety of temporal structures which in turn shape the temporal rhythm and form of their ongoing practices.” Such structures include schedules, project plans, deadlines, and temporal closures (see also, Yakura 2002). A researcher working with this perspective on time would use socially meaningful metrics such as the calendar,

which measures time in equal units that are socially meaningful to the participants involved in the process being studied.

Approach IV: Variance Study of Organizing

Approach IV studies investigate processes through *quantitative analysis* of an event series. This strategy (a) specifies indicators or variables that characterize attributes of events, (b) codes events to assign values to these variables, and (c) analyzes the resulting time series to examine questions about the sequence, pattern, or structure an unfolding process.

For example, Romanelli and Tushman (1994) concluded that a “punctuated equilibrium process” best captures the process pattern observed from analyzing coded variables from a documentary database comprised of newspaper articles, annual reports and the like to study patterns of change in the microcomputer industry. Quantitative process analyses utilize a range of techniques, including Markov analysis, multivariate time series techniques, event history analysis, and nonlinear systems analysis, to uncover and test for properties of series of events and the mechanisms that drive the process. In some cases these studies draw substantial samples (e.g., Nutt 1984; Poole and Roth 1989a; 1989b) but other studies focus on one or two cases with a large number of events and analyze the event series in detail (Garud and Van de Ven 1992; Van de Ven and Polley 1992). Quantitative analysis attempts to bring the rigor and system of variance research to the study of processes.

Approach IV presumes a process ontology and applies a variance perspective to study it. This corresponds to another interpretation of “weak” process and to the

Empedoclean view of process described by Rescher (1996). Approach IV studies have the potential to extract ourselves from the dilemma described in Approach III. At least two different varieties of Approach IV can be delineated. The first entails an empirical investigation into the structure of an evolving process, while the second adopts mathematical modeling and simulation techniques to unravel the process.

Empirical investigations involve defining variables that capture characteristics of processes themselves, such as their rate of change, their complexity, or modes of structuration [e.g., DeSanctis and Poole's concepts of faithful appropriation (DeSanctis and Poole 1994) or appropriation style (Poole et al. 2000)]. These variables then become dependent and independent variables that are related to other variables. It is important to emphasize the difference between these studies and those that take Approach II: the latter define variables that describe states changed as part of the process, whereas Approach IV studies define variables that describe the nature of the process (e.g., the speed at which it operates).

Dooley and Van de Ven (1999) provide an example of using empirical methods to identify the pattern in a time series of observed events. Given our current state of knowledge of statistics and mathematics, they note that an observed event time series may reflect one of four different dynamic patterns: periodic (or stable equilibria), chaotic (strange attractors), colored noise (that can be plotted as a negative power law characteristic of a punctuated equilibrium process) and truly random (white noise) dynamic patterns. These different patterns require different explanatory models that vary in the number of causal factors (dimensionality) and the nature of interaction between these causal factors. Low dimensional causal systems yield periodic and chaotic

dynamics, while high dimensional causal systems are reflected in pink and white noise random dynamics. Periodic and white noise dynamics stem from systems where causal factors act independently or in a linear fashion, while chaotic and pink noise systems reflect configurations where causal factors act interdependently in a nonlinear fashion. Thus, given a diagnosis of an observed time series of change events, we can determine what kind of process model is appropriate for explaining the change dynamics. While it is generally known that linear deterministic models (such as regression analysis) are appropriate for explaining periodic cycles or stable equilibria, and stochastic or probability models should be used to explain white noise random processes, relatively few organizational scholars have explored nonlinear dynamic models needed to explain chaotic and colored noise patterns.

If one concludes that the event time series of an observed change process exhibits a nonlinear dynamic pattern (e.g., either chaotic or pink noise patterns), then one must decide how to model the underlying process. Currently, the most influential model for explaining nonlinear dynamic systems in organization studies is Stuart Kaufmann's (1993) theory of complex adaptive systems (CAS). CAS emphasizes the importance of self organization and local action in producing aggregate system outcomes in contrast to traditional theories of central design and control (Dooley 2004). The interaction of elements in a system can produce surprising, emergent behavior that can be modeled in terms of fitness landscapes. The fitness landscape, a concept originally developed in evolutionary biology by Sewell Wright (1932), has been formalized by Kaufmann (1993), and applied to studies of organizational adaptation by Levinthal (1997), McKelvey (1999; 2004), Siggelkow (2001), and Rivkin (2000), among others.

Models such as these have the potential to help us derive implications of processes that cannot adequately be described verbally. Just as the calculus lets us represent physical motion and change in ways that transcend verbal expression, so models may be able to capture processes more accurately than we can in verbal theories. Some may object that representation of processes in empirical time series and mathematical models overly “variabilizes” them (Tsoukas and Hatch 2001). However, these models have the advantage of being able to generate insights into processes that are so complex that it is impossible for the theorists to qualitatively think through how the constructs interact.

In Approach IV studies, time serves as a *variable* of the change process. The role of time as a medium is directly related to its role as a variable because the same metrics applied in the study of other phenomena can be used to transform time into an independent, dependent, or moderating variable. When time is an independent variable, the duration or passage of time is a factor in change. When time is a dependent variable, the duration or passage of time is used as an indicator of key events. Event history analyses of organizational failure rates (see Baum and Rao 2004), for example, predict length of time for failure with various factors that explain organizational demise. When time is a moderating variable, the causal effects of other independent variables are assumed to change as a function of time. For example, Agarwal et al. (2002) report evidence that as an industry matures, the relationships between order of entry and density and firm survival change.

Concluding Discussion

This paper reviewed the things and processes of organization change. Tracing back as they do to pre-Socratic antiquity, these concepts reflect different and enduring ontologies for studying organization change. We also examined two basic epistemologies of variance or process methods for conducting research. By combining these two dimensions, we introduced a typology of four approaches for studying organizational change. Although the four approaches may be viewed as opposing or competing views, we see them as being complementary. Each approach focuses on different questions and provides a different--but partial--understanding of organizational change. We argue in this concluding section that coordinating the pluralistic insights from the four approaches provides a richer understanding of organization change than any one approach provides by itself.

But before making this argument, it is important to note that regardless of what approach one adopts, time is a fundamental issue that confronts all scholars of organizational change. To understand a change process it is critical to understand how it unfolds over time and how time and timing affects them. Perhaps because time is the backdrop of life's events and therefore taken for granted, or perhaps because of the difficulty of the subject, it has been largely neglected in organizational scholarship. Recent work, however, has made some advances.

Time is the "ether" of change. We judge that change has occurred against a background of time. We use metrics on this background to assess when changes occur, the rate of change, and the extent of change, as well as to establish the opposite of change, stability. As important as time is to the study of organization change, until

recently it has remained as obscure as the ether of classical physics. While we are far from understanding the full import of time in research on change and innovation, several frameworks and studies of time and its role in organizations have been advanced (Ancona et al. 2001; Barkema et al. 2002; Goodman et al. 2001; McGrath and Kelly 1986; McGrath and Rotchford 1983). These highlight several key issues: What is the nature of time? What is its role in theories of change and innovation? How do we best represent time in our theories and research? As the ageless debate between Democritus and Heraclitus suggests, we do not presume to provide answers that adequately resolve these questions about time or to suggest one should view change as things or processes. However, the timing of things and processes are inextricably related and hence, must be discussed as a constellation of core concepts for understanding organization change.

We noted that the four approaches for studying organizational change adopt different perspectives of time. The Newtonian conception of time is most likely to be associated with Approach I, which regards time as a background or medium for processes rather than an active part of the theory itself. Approach II adopts a transactional view of the temporal occurrence of key events. Here, time is when events occur. Approach III adopts a more socially constructed view of time that fits the dominant culture and context of the emergent process being examined. This approach reflects the temporal orientations of the key players in the processes examined. These people construct their own systems for the measurement of time and use them in social worlds composed of significant junctures, goals, and milestones. Finally, Approach IV often incorporates time as a variable in studies of organizing processes. Here the temporal interval that is chosen is crucial and often reflects different process patterns in an observed sequence of

events. In other words, the temporal interval we use often produces the process patterns we see.

These views of time are not mutually exclusive. A theory may incorporate several temporal elements. For instance, the important role of rhythms—recurrent cycles of behavior—in individual, group, and social processes (Warner 1988) can be studied employing rhythm as an independent, dependent, or moderating variable, as a predisposition construct, or as a social construction, and sometimes more than one of these. There are also relationships among different temporal constructs. For example, individual and cultural predispositions toward time will influence the social construction process. Multiple temporal elements are involved in most instances of organization change. This is so not just because of the substantive role that time plays in theories of change and innovation, but also because of the complex way in which time enters into human activity. As particularly interesting human activities, building theories and conducting research involve multiple temporal elements as well.

One objection that seems likely to be made both by hard core quantitative researchers and dedicated qualitative scholars is the argument for methodological purity; namely, that variance research is most appropriate for a static worldview, while process research is most appropriate for a processual worldview. However, the presumption in favor of Approaches I and III is based on an assumption that that there is objectively one right way to do research—the way that matches the nature of the phenomenon. A reflexive assessment of our own inquiries over the years (Poole and Van de Ven 1989, 2004; Poole et al. 2000; Van de Ven and Poole 1995; Van de Ven et al. 1999; 2000) leads us to recognize that research itself is a social construction whereby the world is

represented in various ways--some leaner, some richer. What Leonardo da Vinci (Reti 1974: 300) wrote about his machines can equally apply to our theories and research:

Oh investigator, do not flatter yourself that you know the things nature performs for herself, but rejoice in knowing the purpose of those things designed by your own mind.

In our view, the blindness is to regard one form of representation as superior to all others, and thereby deprive ourselves of insights that other forms of research can yield.

This conclusion is reasonable in light of contemporary views in the philosophy of science. Since the demise of the received view of positivism and logical empiricism in the philosophy of science, it is now widely recognized that scientific knowledge cannot be known to be objective and true in an absolute sense (Suppe 1977: 649). Rather, from an evolutionary realist perspective², there is a real world of changing organizations out there independent of what we think, but our attempts to understand it are severely limited and can only be approximated. For example, Giere (1999: 77) states

² Baum and Rowley (2002: 20, 21) observe that “Organization theorists have *never* been positivists. . . Organization theorists of all orientations appear, instead, to practice a logic-in-use that is primarily ‘scientific realist,’ which is the most widely accepted epistemology among current philosophers (Azevedo 1997; Suppe 1977; 1989).” Realism is the thesis that a real world exists “out there” independent of what we think, but our attempts to know it are limited and can only be known through a socially constructed language system (Zald 1995). All facts, observations, and data are theory laden and embedded in language. As a consequence, “All knowledge is presumptive” (Campbell 1988: 487). No form of inquiry can be value-free and impartial; instead each model and perspective is value-full. That being the case, any given conceptual model is a partial representation of reality reflecting the perspective and interests of the model builder. A researcher must therefore be critically reflexive, stating clearly whose point of view and interests are served in a model proposed to represent reality (Van Maanen 1995). This critical realism should be distinguished from “relativism,” which holds that truth-testing is problematic because the external world does not exist beyond that which is perceived and socially constructed by individuals and cultures. Relativists argue that truth is relative to a specific paradigm, and competing paradigms are considered to be incommensurable because each possesses its own language and logic (Baum and Rowley 2002: 21).

Imagine the universe as having a definite structure, but exceedingly complex, so complex that no models humans can devise could ever capture more than limited aspects of the total complexity. Nevertheless, some ways of constructing models of the world do provide resources for capturing some aspects of the world more or less well than others.

“In the absence of unambiguous foundational truth in the social sciences, the only sensible way forward can be conscious pluralism” (Pettigrew 2001: S62). Researchers construct models that represent or map intended aspects of the world and compare them with rival plausible alternative models (Azevedo 2002; McKelvey 1997). Our research knowledge of organizational change processes advances by comparing the relative contributions and perspectives provided by different models, such as those based on variance and process approaches. As Azevedo (1997) discusses, it is through the coordination of multiple models and perspectives that robust features of reality can be distinguished from those features of reality that are merely a function of a single model or framework. A research finding, principle, or process is judged to be robust when it appears invariant (or in common) across at least two (and preferably more) independent contexts, models or theories. A pluralist approach of comparing multiple plausible models of reality is therefore essential for developing objective scientific knowledge. Campbell (1988: 389) adds that the models that better fit the problems they were intended to solve are selected by users, and the gradual winnowing down of plausible rival models or hypotheses by the scholarly community produce an evolutionary conception of the growth of scientific knowledge.

Rather than arguing that the four approaches are mutually exclusive, the relevant question is how might they be combined to yield a more holistic appreciation of complex organizational dynamics. One strategy is to conduct both variance and process studies of the same organizational phenomenon viewed as both a noun and a verb. This, of course, requires obtaining commensurable data in order to gain the benefits from each approach. Saberwhal and Robey (1995) conduct such a study and show how the results of variance and process analyses can be interleaved to illuminate the process (See, Poole and Rothe 1989a; 1989b for another example of this approach). Even better, however, would be to find a way to combine elements of the four approaches in a single analysis.

The four approaches offer a rich array of possibilities for studying organizational change. The best approach for a particular study depends on the type of questions addressed, the researchers' assumptions about the nature of organizations and methodological predispositions, as well as the data they have access to. Nevertheless, a thorough understanding of the buzzing, blooming, and confusing dynamics often observed in organizational changes probably require the use of multiple approaches for understanding organizational change.

References

Abbott, Andrew

1984 'Event sequence and event duration: Colligation and measurement'. *Historical Methods* 17: 192-204.

Abbott, Andrew

1988 'Transcending general linear reality'. *Sociological Theory* 6: 169-186.

Abbott, Andrew

1990 'Conceptions of time and events in social science methods: Causal and narrative approaches'. *Historical Methods* 23: 140-150.

Abbott, Andrew

2001 *Time matters: On theory and method*. Chicago: University of Chicago Press.

Abell, Peter

1987 'The syntax of social life: The theory and method of comparative narratives'.
Oxford: Clarendon Press.

Agarwal, R., M. B. Sarkar, and R. Echambad

2002 'The conditioning effect of time on firm survival: An industry life cycle approach'.
Academy of Management Journal 45: 971-994.

Ancona, Deborah., G. A. Okhuysen, and L. A. Perlow

2001 'Taking time to integrate temporal research'. *Academy of Management Review* 26:
512-529.

Aristotle

1941 *The basic words of Aristotle* in R. McKeon (ed). New York: Random House.

Avolio, B. J., and B.M. Bass

1995 'Individualized consideration viewed at multiple levels of analysis: A multi-level
framework for examining the influence of transformational leadership'.
Leadership Quarterly 6: 199-218.

Azevedo, J.

1997 *Mapping reality: An evolutionary realist methodology for the natural and social
sciences*. Albany, NY: State University of New York Press.

Azevedo, J.

2002 'Updating organizational epistemology' in *Companion to organization*. J. Baum
(ed), 715-732. New York: Oxford Univ. Press.

Bal, M.

1985 'Narratology: Introduction to the theory of narrative'. Toronto: University of
Toronto Press.

- Bales, R. F., and F. L. Strodbeck
 1951 'Phases in group problem solving'. *Journal of Abnormal and Social Psychology* 46: 485-495.
- Barkema, H. G., J. A. C. Baum, and E. A. Mannix
 2002 'Special research forum: A new time'. *Academy of Management Journal* 45/5.
- Barley, S. R.
 1986 Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly* 31: 78-108.
- Barnett, W. P., and G. R. Carroll
 1995 'Modeling internal organizational change'. *Annual Review of Sociology* 21: 217-236.
- Bartel, C. A., and Ragu Garud
 2004 *The role of narratives in sustaining organizational innovation*. New York University, Stern School of Business working paper.
- Bartunek, J.
 1984 'Changing interpretive schemes and organizational restructuring: The example of a religious order'. *Administrative Science Quarterly* 29: 355-372.
- Baum, Joel A. C., and H. Rao
 2004 'Evolutionary dynamics of organizational populations and communities' in *Handbook of organizational change and innovation*. M. S. Poole and A. H. Van de Ven (eds), 212-258. New York: Oxford University Press.
- Baum, Joel A. C., and T. J. Rowley
 2002 'Companion to organizations: An introduction' in *Companion to organizations*. J. A. C. Baum (ed), 8-34. New York: Oxford Univ. Press.
- Cameron, K., and D. Whetten
 1983 'Models of the organizational life cycle: Applications to higher education'. *Review of Higher Education* 6: 269-299.
- Campbell, D. T.
 1988 *Methodology and epistemology for social science: Selected papers*. (E. S. Overman, (ed). Chicago: University of Chicago Press.
- Chae, B., and M. S. Poole
 In Press 'The surface of emergence in systems development: Agency, institutions, and large scale information systems'. *European Journal of Information Systems*.
- Chia, R. and Ann Langley

- 2004 The First Organization Studies Summer Workshop on Theorizing Process in Organizational Research. June 12-13, 2005, Santorini, Greece: Call for Papers. http://www.egosnet.org/journal/os_summer_workshop.html
- Czarniawska, Barbara.
- 1998 *A narrative approach to organization studies*. Thousand Oaks, CA: Sage Publications.
- Dansereau, F., F. J. Yammarino, and J. C. Kohles
- 1999 'Multiple levels of analysis from a longitudinal perspective: Some implications for theory building'. *Academy of Management Review* 24: 346-357.
- Davison, M. L., P. M. King, K. S. Kitchener, and C. A. Parker
- 1980 'The stage sequence concept in cognitive and social development'. *Developmental Psychology* 6: 121-131.
- Davison, M. L., S. Robbins, and D. B. Swanson
- 1978 'Stage structure in objective moral judgments'. *Developmental Psychology* 14: 137-146.
- DeSanctis, G., and M. Scott Poole
- 1994 'Capturing the complexity in advanced technology use: Adaptive structuration theory'. *Organization Science* 5: 121-147.
- Dooley, K.
- 2004 'Complexity science models of organizational change and innovation' in *Handbook of organizational change and innovation*. M. S. Poole and A. H. Van de Ven (eds), 324-373. New York: Oxford University Press.
- Dooley, K. and A. Van de Ven
- 1999 'Explaining complex organizational dynamics'. *Organization Science* 10/3: 358-372.
- Fisher, B. A.
- 1970 'Decision emergence: Phases in group decision making'. *Speech Monographs* 37: 53-66.
- Garud, R., and D. Ahlstrom
- 1997 'Technology assessment: A socio-cognitive perspective'. *Journal of Engineering and Technology Management* 14: 25-48.
- Garud, R., and A. Kumaraswamy
- 2005 'Vicious and virtuous circles in the management of knowledge: The case of Infosys Technologies'. *MIS Quarterly* 29/1: 9-33.
- Garud, R., and A. H. Van de Ven
- 1992 'An empirical evaluation of the internal corporate venturing process'. *Strategic Management Journal* 13 (Summer).

- Gersick, C. J.
 1991 'Revolutionary change theories: A multilevel exploration of the punctuated equilibrium paradigm'. *Academy of Management Review* 16/1: 10-36.
- Gersick, C. J.
 1994 'Pacing strategic change: The case of a new venture'. *Academy of Management Journal* 37/1: 9-45.
- Giere, Ronald N.
 1999 *Science without laws*. Chicago: University of Chicago Press.
- Goodman, P. S., D. Ancona, B. S. Lawrence, and M. Tushman.
 2001 'Special topic forum on time and organizational research'. *Academy of Management Review* 26/4.
- Goodrich, E., and G. Salancik
 1996 'Organizational discretion in responding to institutional practices: Hospitals and caesarean births'. *Administrative Science Quarterly* 41: 1-28.
- Greiner, L.
 1972 'Evolution and revolution as organizations grow'. *Harvard Business Review* 165-174.
- Hall, E. T.
 1983 *The dance of life: The other dimension of time*. Garden City, NY: Anchor Press/Doubleday.
- Hargrave, Tim, and Andrew H. Van de Ven\
 2005 'A collective action model of institutional innovation'. *Academy of Management Review*, forthcoming.
- Harre, R., and E. A. Madden
 1975 *Causal powers*. Totowa, NJ: Littlefield Adams.
- Harrison, R.
 1970 'Choosing the depth of organizational intervention'. *Journal of Applied Behavioral Science* 6: 182-202.
- Heath, C. and Sim Sitkin
 2001 'Big-B versus Big-O: What is organizational about organizational behavior?' *Journal of Organizational Behavior* 22: 53-58.
- Jones, J. M.
 1988 'Cultural differences in temporal perspectives: Instrumental and expressive behaviors in time' in *The social psychology of time*. J. M. McGrath (ed), 21-38. Newbury Park, CA: Sage.
- Kashy, D. A., and D. A. Kenny

- 1999 'The analysis of data from dyads and groups' in *Handbook of research methods in social psychology*. H. T. Reis and C. M. Judd (eds), 451-477. London: Cambridge University Press.
- Klein, K. J., and S. W. J. Koslowski
- 2000 *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions*. San Francisco: Jossey-Bass.
- Kaufmann, Stuart
- 1993 *The origins of order*. New York: Oxford Univ. Press.
- Kuhn, T., and M. Scott Poole
- 2000 'Do conflict management styles affect group decision-making? Evidence from a longitudinal field study'. *Human Communication Research* 26: 558-590.
- Lacoursiere, R. B.
- 1980 *The life cycle of groups: Group developmental stage theory*. New York: Human Sciences Press.
- Langley, A.
- 1999 'Strategies for theorizing from process data'. *Academy of Management Review* 24: 691-710.
- Langley, A., and J. Truax
- 1994 'A process study of new technology adoption in smaller manufacturing firms'. *Journal of Management Studies* 31: 619-652.
- Lawrence, P. W., and J. W. Lorsch
- 1967 *Organization and environment*. Boston: Harvard University Press.
- Leonard-Barton, D.
- 1990 'A dual methodology for case studies: Synergistic use of a longitudinal single site with replicated multiple sites'. *Organization Science* 1: 248-266.
- Levine, R. V.
- 1988 'The pace of life across cultures' in *The social psychology of time*. J. M. McGrath (ed), 39-60. Newbury Park, CA: Sage.
- Levinthal, Daniel
- 1997 'Adaptation on rugged landscapes'. *Management Science* 43/7: 934-950.
- Mathieu, J. G., T. S. Heffner, G. F. Goodwin, E. Salas, and J. Cannon-Bowers
- 2000 'The influence of shared mental models on team process and performance'. *Journal of Applied Psychology* 85: 273-283.
- Mayer, K. U., and N. B. Tuma

- 1990 *Event history analysis in life course research*. Madison, WI: University of Wisconsin Press.
- McGrath, J. M., and J. R. Kelly
- 1986 *Time and human interaction: Toward a social psychology of time*. New York: Guilford.
- McGrath, J. M., and N. Rotchford
- 1983 'Time and behavior in organizations' in *Research in organizational behavior*. L. Cummings and B. Staw (eds), Vol. 5, 57-101. Greenwich, CT: JAI Press.
- McKelvey, B.
- 1997 'Quasi-natural organization science'. *Organization Science* 8: 352-380.
- 1999 'Avoiding complexity catastrophe in coevolutionary pockets: Strategies for rugged landscapes'. *Organization Science* 10/3: 294-321.
- 2004 'Toward a complexity science of entrepreneurship'. *Journal of Business Venturing* 19: 313-342.
- Miles, M., and A. M. Huberman
- 1994 *Qualitative data analysis*. Newbury Park, CA: Sage.
- Mintzberg, H., D. Raisinghani, and A. Theoret
- 1976 'The structure of 'unstructured' decision processes'. *Administrative Science Quarterly* 21: 246-275.
- Mohr, L.
- 1982 *Explaining organizational behavior*. San Francisco: Jossey-Bass.
- Monteiro, E., and O. Hanseth
- 1995 'Social shaping of information infrastructure: On being specific about the technology' in *Information Technology and Changes in Organization Work*. W. J. Orlikowski, G. Walsham, M. R. Jones and J. I. DeGross (eds), 325-343. London: Chapman & Hall.
- Morrison, E. W.
- 1993 'Longitudinal study of the effects of information seeking on newcomer socialization'. *Journal of Applied Psychology* 78: 173-183.
- Nutt, Paul
- 1984 'Types of organizational decision processes'. *Administrative Science Quarterly* 29: 414-450.
- Nutt, Paul
- 2002 *Why decisions fail: Avoiding the blunders and traps that lead to debacles*. San Francisco: Berrett-Koehler Publishers.
- Orlikowski, W. J., and J. Yates

- 2002 'It's about time: Temporal structuring in organizations'. *Organization Science* 13: 684-700.
- Orlikowski, W.J., and Robey, D.
1991 'Information technology and the structuring of organizations'. *Information Systems Research* 2: 143-169.
- Peirce, C. S.
1955 *Philosophical writings of Peirce* (J. Buchler, ed). New York: Dover.
- Pentland, Brian
1999 'Building process theory with narrative: From description to explanation'. *Academy of Management Review* 24: 711-724.
- Perlow, L. A., G. A. Okhuysen, and N. P. Repenning
2002 'The speed trap: Exploring the relationship between decision making and temporal context'. *Academy of Management Journal* 45: 931-955.
- Pettigrew, Andrew
1985 *The awakening giant: Continuity and change at ICI*. Oxford, UK: Basil Blackwell.
1990 'Longitudinal field research on change: Theory and practice'. *Organization Science* 1: 267-292.
2001 'Management research after modernism'. *British Journal of Management* 12/Special Issue: S61-S70.
- Pickering, A.
1995 *The mangle of practice*. Chicago: The University of Chicago Press.
- Polkinghorne, D. E.
1988 'Narrative knowing and the human sciences'. Albany, NY: SUNY Press.
- Poole, M. Scott
1981 'Decision development in small groups I: A test of two models'. *Communication Monographs* 48: 1-24.
- Poole, M. Scott
1983 'Decision development in small groups, III: A multiple sequence model of group decision development'. *Communication Monographs* 50: 321-341.
- Poole, M. Scott, and DeSanctis, G.
1992 'Microlevel structuration in computer-supported group decision-making'. *Human Communication Research* 19, 5-49.
- Poole, M. Scott, and J. Roth
1989a 'Decision development in small groups IV: A typology of decision paths'. *Human Communication Research* 15: 323-356.
- Poole, M. Scott, and J. Roth

- 1989b 'Decision development in small groups V: Test of a contingency model'. *Human Communication Research* 15: 549-589.
- Poole, M. Scott, and Andrew H. Van de Ven
- 1989 'Using paradox to build management and organization theories'. *Academy of Management Review* 15/3: 562-578.
- Poole, M. Scott, and Andrew H. Van de Ven
- 2004 *Handbook of organizational change and innovation*. New York: Oxford University Press.
- Poole, M. Scott, Andrew H. Van de Ven, Kevin Dooley, and M. E. Holmes
- 2000 *Organizational change and innovation processes: Theory and methods for research*. New York: Oxford University Press.
- Quinn, J. B.
- 1980 *Strategies for change: Logical incrementalism*. Homewood, IL: Irwin.
- Rescher, N.
- 1996 *Process Metaphysics: An introduction to process philosophy*. Albany, NY: State University of New York Press.
- Reti, L.
- 1974 *The unknown Leonardo*. New York: McGraw-Hill.
- Rimmon-Kenan, S.
- 1983 *Narrative fiction: Contemporary poetics*. London: Routledge
- Rivkin, Jan
- 2000 'Imitation of complex strategies'. *Management Science* 46: 824-844
- Rogers, E.
- 2004 *Diffusion of innovations*, 5th edn. New York: Free Press.
- Romanelli, Elaine, and Michael Tushman
- 1994 'Organizational transformation as punctuated equilibrium: An empirical test'. *Academy of Management Journal* 37: 1141-1166.
- Ross, D.
- 1949 *Aristotle*. London: Methuen.
- Ruttan, Vernon
- 2001 *Technology, growth, and development: An induced innovation perspective*. New York: Oxford University Press.
- Saberwhal, R., and D. Robey
- 1993 'An empirical taxonomy of implementation processes based on sequences of events in information system development'. *Organization Science* 4: 548-576.

Saberwhal, R., and D. Robey

1995 'Reconciling variance and process strategies for studying information system development'. *Information Systems Research* 6: 303-327.

Schoonhoven, C. B., K. M. Eisenhardt, and K. Lyman

1990 'Speeding products to market: Waiting time to first product introduction in new firms'. *Administrative Science Quarterly* 35/1: 177-207.

Siggelkow, Nicolaj

2001 'Change in the presence of fit: The rise, the fall, and the renaissance of Liz Claiborne'. *Academy of Management Journal* 44/4: 838-857.

Suppe, F.

1977 *The structure of scientific theories*, 2nd edn. Urbana, IL: University of Illinois Press.

Suppe, F.

1989 *The semantic conception of theories and scientific realism*. Urbana-Champaign, IL: University of Illinois Press.

Tsoukas, Haridimos

1989 'The validity of idiographic research explanations'. *Academy of Management Review* 14: 551-561.

Tsoukas, Haridimos

2001 'What does it mean to be sensitive to "process"?' Lyon, France: Keynote address at the *European Group of Organization Studies 17 Colloquium* (July 5-7).

Tsoukas, Haridimos

2005 *Complex knowledge: Studies in organizational epistemology*. Oxford, U.K.: Oxford University Press.

Tsoukas, Haridimos, and R. Chia

2002 'On organizational becoming: Rethinking organizational change'. *Organization Science* 13/5: 567-582.

Tsoukas, Haridimos and Mary Jo Hatch

2001 'Complex thinking, complex practice: The case for a narrative approach to organizational complexity'. *Human Relations* 54/8: 979-1013.

Tushman, Michael, and Elaine Romanelli

1985 'Organizational evolution: A metamorphosis model of convergence and reorientation' in *Research in organizational behavior*. B. Staw and L. Cummings (eds), Vol. 7, 171-222. Greenwich, CT: JAI Press.

Van de Ven, Andrew H.

1992 'Suggestions for studying strategy process: A research note'. *Strategic Management Journal* 13: 169-188.

- Van de Ven, Andrew H., and David N. Grazman
 1999 'Evolution in a nested hierarchy: A genealogy of Twin Cities health care organizations, 1853-1995' in *Variations in organizational science: In honor of Donald T. Campbell*. J. A. C. Baum and B. McKelvey (eds), 185-212. Thousand Oaks, CA: Sage.
- Van de Ven, Andrew H., and Douglas Polley
 1992 'Learning while innovating'. *Organization Science* 3: 92-116.
- Van de Ven, Andrew H., Douglas Polley, Ragu Garud, and S. Venkatraman
 1999 *The innovation journey*. New York: Oxford University Press.
- Van de Ven, Andrew H., Harold Angle, and M. Scott Poole,
 2000 *Research on the management of innovation: The Minnesota studies*. New York: Oxford University Press.
- Van de Ven, Andrew H., and M. Scott Poole
 1995 'Explaining development and change in organizations'. *Academy of Management Review* 20: 510-540.
- Van Maanen, John.
 1995 *Representation in ethnography*. Thousand Oaks, CA: Sage.
- Waller, M. J., J. M. Conte, C. B. Gibson, and M. A. Carpenter
 2001 'The effect of individual perceptions of deadlines on team performance'. *Academy of Management Review* 26: 586-600.
- Warner, R.
 1988 'Rhythm in social interaction' in *The social psychology of time*. J. E. McGrath (ed), 63-88. Newbury Park, CA: Sage.
- Weick
 1979 *The social psychology of organizing*, 2nd ed. Reading, MA: Addison-Wesley Publishing.
- Whetten, David
 2005 'On the meaning of *organizational* in organizational studies: The case of organizational identity'. *Journal of Management Inquiry*, forthcoming.
- Whitehead, A. N.
 1929 *Process and reality: An essay in cosmology*. New York: Macmillan.
- Wright, Sewell
 1932 'The roles of mutation, inbreeding, cross-breeding and selection of evolution'. *Proceedings XI International Congress of Genetics* 1: 356-366.
- Yakura, E.

2002 'Charting time: Timelines as temporal boundary objects'. *Academy of Management Journal* 45: 956-970.

Yin, R.

1984 *Case study research*. Beverly Hills, CA: Sage.

Zaheer, Sri, Stuart Albert, and Aks Zaheer

1999 'Time scales and organizational theory'. *Academy of Management Review* 24: 725-741.

Zald, M. N.

1995 'Progress and cumulation in the human sciences after the fall'. *Sociological Forum* 10/3: 455-479.

Zimbardo, P. G., and J. N. Boyd

1999 'Putting time in perspective: A valid, reliable, individual-differences metric'. *Journal of Personality and Social Psychology* 77: 1271-1288.

Figure 1. A Typology of Approaches for Studying Organizational Change

		Ontology An organization is represented as being:	
		A noun, a social actor, A real entity (“thing”)	A verb, a process of organizing, emergent flux
Epistemology (Method for studying change)	Variance method	Approach I Variance studies of change in organizational entities by causal analysis of independent variables that explain change in entity (dependent variable)?	Approach IV Variance studies of organizing by dynamic modeling of agent-based models or chaotic complex adaptive systems
	Process Narratives	Approach II Process studies of change in organizational entities narrating sequence of events, stages or cycles of change in the development of an entity	Approach III Process studies of organizing by narrating emergent actions and activities by which collective endeavors unfold

Table 1: Comparison of Variance and Process Approaches

VARIANCE APPROACH	PROCESS APPROACH
Fixed entities with varying attributes	Entities participate in events and may change over time
Explanations based on necessary and sufficient causality	Explanations based on necessary causality
Explanations based on efficient causality	Explanations based on final, formal, and efficient causality
Generality depends on uniformity across contexts	Generality depends on versatility across cases
Time ordering among independent variables is immaterial	Time ordering of independent events is critical
Emphasis on immediate causation	Explanations are layered and incorporate both immediate and distal causation
Attributes have a single meaning over time	Entities, attributes, events may change in meaning over time

From Poole et al. (2000)

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