

# Storied spaces: The human equivalent of complex adaptive systems

June 30, 2008 · Practitioner

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Baskin K, Baskin K. Storied spaces: The human equivalent of complex adaptive systems. Emergence: Complexity and Organization. 2008 Jun 30 [last modified: 2016 Nov 30]. Edition 1. doi: 10.1002/emerg.10.17357.1e99e51e66ccce5f2df543fe1ad8860e.

## Abstract

## Introduction

On a flight into El Paso in 2006, two voices behind me, belonging to women in their early 40s, sounded like a couple of executives doing a corporate marketing exercise. They might have been asking, “So, if we increase gasoline prices three cents a gallon, how will that impact demand?” But no, they were talking about *The Book of Revelations*—the Apocalypse, the Rapture, and ... how the war in Iraq fit in.

At first, I experienced an all-too-brief flush of superiority. After all, they were mixing two utterly different worlds—a nearly 2,000-year-old Christian myth and a very real event, taking place as they spoke. Unlike me, I thought, they were living in a mythic world. But then I remembered a conversation I had with evolutionary biologist Jack Cohen in 2003. We don’t experience life, he told me. We experience the stories we tell to explain what happens to us. Suddenly, my feeling of superiority melted away, and I realized that I was much more like those two women than I wanted to believe. All of us, including you dear reader, experience life as a space defined by the stories we’ve accepted to explain the events that have happened, and continue to happen, around us.

In this essay, I want to examine the nature of such “storied space.” From my point of view, we human animals experience the world in terms of the stories that we believe tell us what “reality” is, stories that we ourselves co-create as we interact with others in our various social environments—families, organizations, professions, etc.—each of which functions as its own storied spaces. My purpose, then, is to explore the possibility that these storied spaces function as the human equivalent of complexity’s complex adaptive systems. To do so, I shall analyze four issues:

- The function of storytelling in the world described in complexity thinking;
- Storied space as the social ecosystem by which we humans have adapted to our world, whose dynamics are driven by the interaction between two types of stories—narrative, by which people describe the past, and antenarrative, by which they try to describe the present;
- Two organizational examples of the dance that arises as people respond to that interaction and our knowledge emerges from the dance;
- Some of the implications of this conception of social environments as storied spaces, especially for organizational managers and consultants.

The one perception I hope the reader will come away with is that every story we humans create to explain our world, even the most accurate and helpful in our lives, is *partial*. No story can be the *whole* story, The Truth. As a result, I’m acutely aware of a self-referential irony—that I am creating my own story about our use of stories to co-create our social worlds, a story which, in my own words, must be partial. So I offer this essay to you not as The Truth, but, rather, as my partial, not-quite-humble contribution to the ongoing discussion of social systems as complex entities.

## Complexity and internal storytelling

When I was 25, I was furious with my mother and father for “parenting” me so badly. At the time, it was a very satisfying explanation for many of my life problems, but, eventually, I realized how oversimplified this linear explanation was. After all, if my parents were responsible for *my* difficulties in dealing with life, then *their* parents were responsible for those of my parents;

my grandparents' parents were responsible for their difficulties; and the buck passed on, until I would have to blame about a tenth of the Jewish population of Central Europe. My parents' behaviors had also been shaped by any number of other factors—from their parents' being immigrants to the Great Depression and World War II; from the ideas of Newton and, then, those of Einstein to American Capitalism in the 20th Century and the polio epidemic of the 1950s. I could go on and on. What had been a satisfying, simple story of my parents ruining my life was becoming a bewilderingly complex tapestry involving millions of people. Add to all this the multiple self-reinforcing feedback loops, blurring the distinction between cause and effect, and I was left with the world of complexity studies, where any event can be enmeshed with almost any other event *and* where new, unexpected things are continually emerging, much more like Chinese philosophy's world of "inherent causality" than that the cause-and-effect world of traditional Western science. (For a fuller examination of the similarities between Chinese philosophy and complexity thinking, see Baskin, 2007a).

Given such a world, dominated by interconnection, multiple causality, positive feedback loops, and emergence, the key challenge *any* complex system faces is "knowing" what to do to adapt to any situation. In living systems, as Plotkin (1993) puts it, knowledge is "the relationship between the organization of *any* part of a living creature's body and particular aspects of order in the world outside that creature" (author's italics). He adds that living things adapt through their knowledge, thereby surviving. In the course of evolution, such adaptive structures have become increasingly varied. Bacteria have proteins that catch passing food molecules and drag them inside. Some flowers mimic the sexual parts of bees so those bees will fertilize them. Multi-cellular organisms eventually developed nervous systems, spinal chords and the brain, from which mind emerged.

Mind and conscious learning distinguish human life and seem to make human social systems different from the complex adaptive systems of complexity studies, as Stacey (2001) notes. For me, the critical difference is the ability of human beings to tell stories, to imagine new futures, act on those stories, and change the world so that they can realize such futures. How critical is this ability? Fisher (1987) suggests that human beings are essentially story tellers, *Homo narrans*. Stewart and Cohen argue that the ability to tell the stories was so central to *Homo sapiens'* evolution that we should be called *Pan narrans*, the storytelling ape (Pratchett et al., 2002). I agree that this ability to tell stories is mankind's key survival strategy, but for an additional reason. Stories, it seems to me, enable us to reduce, internally, the complexity of the world around us in order to understand it enough to choose appropriate actions in response to what we are experiencing. This reduction of complexity, however, occurs only at the level of individuals. As Bahktin (1981) notes, we often incorporate misunderstandings of what others say and do in our storying of events. So, in our interaction with others, our storying of events, whose purpose is to reduce complexity for us, often ends up increasing complexity in our social environment. Boje's (1995) conception of the organization as Tamara, a house where people in different "rooms" story their common experiences differently and must then negotiate a shared reality, is an excellent example of human complexity.

What, then, do I mean by a story? In creating a story, the teller chooses and orders events for inclusion or exclusion, putting them in sequence, and indicating cause-and-effect relationships. (Such stories can be fictional or constructed from life as we experience it. For the purposes of this essay, I am ignoring fictional stories.) Each of us does this *unconsciously* hundreds, maybe thousands of times every day, as we interpret our world in order to respond. While storytelling may be highly self-conscious when performed for others, internal storying appears to be *pre-conscious*. Through the choices any of us make, the story becomes, as Bateson (1979) put it, a "little knot" of relevance, providing the context with which we create meaning. Similarly, for Kaufmann (2000), stories are "how we tell ourselves what happened and its significance." Thus, stories enable us to reduce the bewildering complexity of the external world to comprehensibility. Feyerabend (1993) even defines scientific knowledge as "an ever increasing *ocean of mutually incompatible alternatives*, each single theory, each fairy-tale, each myth that is part of the collection forcing the other into greater articulation..." (author's italics). But stories are *always* reductions, and we can construct apparently incompatible stories from the same events. For Cohen (2003), this ability to create apparently contradictory meanings from the same reality is a central quality of all complex systems. Meaning emerges from the storyteller's particular choosing and sequencing of events. (See also Weick, 1995 or Boje, 2001.)

In this sort of personal, internal storytelling, we seem to be creating the human equivalent of the "schemas" that Gell-Mann (1994) discusses in explaining how complex adaptive systems learn. Such schemas summarize previous data in order that the systems understand present data, determine appropriate behavior, and predict what the results of that behavior might be. These "real world" results act as feedback, "selection pressures," on competing schemas, until one or more become dominant. Similarly, stories simplify the swirl of events in our environment (Gell-Mann refers to this task as "compression"), enabling us to choose behavior and predict how others will respond. These stories, by which we capture events around us, much like Boje's "antenarrative" (see below), are open to revision when their predictions are inaccurate. The stories that survive this human equivalent of Gell-Mann's "selection pressures" become the dominant narratives by which we live.

Much of the literature on the subject of storytelling—White and Epston (1990) in therapy, for example, or Weick (1995) in organizations—discusses it in terms of narrative "sensemaking," structuring events in order to make them sensible with a view toward past events that already make sense. While this may sound like my conception, the personal, internal storying I am talking about seems to be more fundamental. Human beings, I am convinced, transform events around them into stories unconsciously, *before* the attempt to make sense of them. Such storying is, for us, a biological imperative in a confusingly complex world. In Stewart and Cohen's words, "Our minds are too limited to grasp the world for what it is" (Pratchett, et al., 2002). Moreover, we tell stories, not just to make sense of the world, but more importantly to help us *discover the actions we must take in order to survive*. Human beings are born knowing how to suck milk from their mothers' breasts. However, we have

to learn how to gather, grow, or hunt our food; how to bring up our children; how to build our shelters. Stories enable people to perform all these activities essential for survival by distinguishing noise from information and then transforming information into the knowledge they need to survive in a continually changing world. This is the power of storytelling.

## Storied spaces

Actually, it is only one of the powers of storytelling. Once we humans begin telling stories to others something fascinating happens: By negotiating our stories at various levels of group experience—the family/small group, organization, market/profession, nation, religion, and civilization—we shape the world that we experience, creating a self-reinforcing feedback loop that enables us to define our stories as the whole story, The Truth. At all times and places, people in the thrall of such stories are able to justify almost any act. What the Crusaders of the 12th and 13th Centuries, Torquemada’s Inquisition, and today’s Islamists have done to fulfill the stories of their “true” religions, the Germans and Japanese could do to fulfill their “true” national stories in World War II. People could commit these atrocities because, as human beings, they did not experience the world and events around them *except as interpreted through the storied space they co-created* to explain their lives.

The human ability to kill others, against whom we have no personal animosity, and do so on a terrifyingly large scale, *because we have accepted a story as The Truth*, may be the most dramatic example of how what we know—that is, what we accept as true beyond doubt—often depends on the stories negotiated in our social environments. Others, however, are so mundane that we never think about this relationship. For instance, the information that the Sun appears most mornings on one side of the sky and disappears on the other has generated a variety of knowledge. At various times people have known that Apollo drives his chariot across the sky, that the Sun rotates around the Earth, or that the Earth rotates around the Sun. What determines their knowledge about this fact is whether they accepted the stories of Greek mythology, the Bible, or the Big Bang, respectively. For the most part, what anyone “knows” about any information appears to depend largely on the narrative, socially negotiated stories through which he or she processes that information. In the terms of this essay, our knowledge and experience of life depends largely on the storied spaces that we have co-created.

This “greater” storied space appears to be an intensely complex nested network of less inclusive storied spaces that function as the human equivalent of complexity study’s complex adaptive systems. Such storied spaces form an intricate network of stories, knowing, and meaning, as powerful a constraint on our behavior, individually and collectively, as our physical environment, perhaps more so. This nested network of storied spaces includes the categories listed in Table 1

All of these storied spaces are swirling, dynamic environments, much as Dervin’s process of sense-making (2003) or Boje’s Tamara (1995) describes them—the interactions grounded in different people telling different stories about the same events—a process whose products are forged in the inevitable conflict that occurs when people, with their varied functions, desires and experiences, live and work together. Moreover, this network is powerfully complex because we can belong to

Table 1

<i>Storied Spaces Categories</i>		
<b>Storied space</b>	<b>Adaptive behavior</b>	<b>Narrative</b>
Small group/family	Dynamics	How we act together
Organization/community	Culture	How people in the group do things together
Market/profession	Discourse	How we perform specific tasks
Nation	Culture	How we behave together to survive
Religion/philosophy/science	Episteme	How we know

so many different storied spaces—a family of origin and one’s own family, a work group or two, a religious congregation, a political party, sports teams, the list goes on and on. Often, elements of some of these storied spaces can contradict those of others, as when I moved, about 30 years ago, from being a liberal member of academia to writing corporate public relations for an oil company.

The dynamics of such storied spaces arise is the interaction of two very different types of stories, which reflect Gell-Mann’s theory (1994) of how complex adaptive systems learn—that is, come to *know* about their environments. Gell-Mann suggested that complex adaptive systems learn through the way they process information. That is, they condense experience into “schemas,” respond to new information by predicting from those schemas, observe the results, and either select effective schemas or generate new ones (learn). The first type of story is the dominant narrative, the fixed accounts of past events, the historically grounded, control-oriented retellings, whose function in storied spaces is to keep our behavior congruent with ways

that have always worked, much like complexity's attractors. One can think of an attractor's life cycle as depicted in Figure 1.

The stable state of any entity—from a pot of water to a rain forest ecosystem—is formed in the phase transition, where the entity's components explore their environment to discover which behaviors enable them to survive. When they find those behaviors, their interaction determines the attractor of their entity's stable state—that is, the limited number of all possible behaviors that become characteristic of it. Thus, water can be gas, liquid or solid, depending on its environment, but only one at a time. The stable state will adapt to changes in its environment until the point where its components become so interdependent that the system becomes unable to adapt—Salthe (1993) calls this "senescence"—and the system subsumes changes in the environment. Eventually, changes in the environment becomes so great that the system can no longer survive—its "bifurcation point"—and the system must either dissipate or go into another phase transition. This is essentially the pattern described by Gould (2002) as "punctuated equilibrium."

In any storied space, the dominant narrative resembles Gell-Mann's schemas, the models of the world that people accept as "true" and that drive the equivalent of attractors in human social systems. I have elsewhere examined (Baskin, 2007b) narrative in these terms as illustrated in Foucault's theory of the evolution of Western *episteme* and *discourse*. In a more personal example, my parents accepted, as part of their dominant narrative, that to succeed I would have to graduate college, and made significant sacrifices to help me do so. When, before the beginning of my sophomore year, I suggested taking a semester off, they objected and convinced me to continue college uninterrupted.

# Possible Behavior

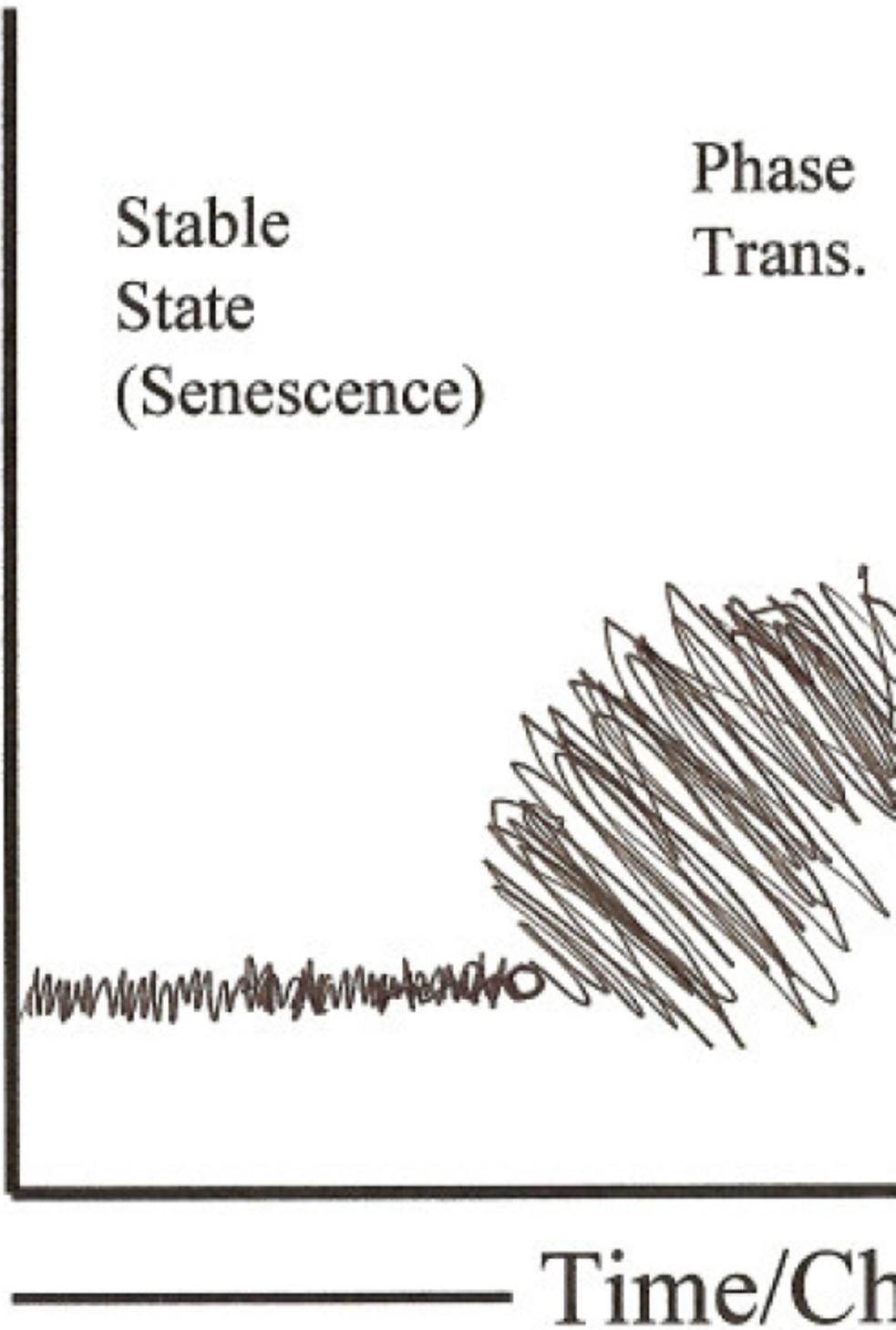


Fig. 1: Figure 1

*The Life-Cycle of an Attractor*

On the other hand, by the time my son went to college, I had accepted the narrative that college would be a waste of time if he wasn't committed to it. (It helped that, unlike my parents, I knew about Bill Gates, Harvard dropout.) And when my son dropped out, for lack of interest, after his freshman year, I applauded, even though I wasn't sure why he had chosen to drop out. My mother, on the other hand, was appalled.

The tentative stories I told myself about my son's problems with college exemplify the second type of story, what Boje (2001) calls "antenarrative." (Boje uses this term because this type of story both comes before, Latin *ante*, narrative forms and because it is a bet, like an ante in poker, that it's possible to create meaning from an event.) Antenarrative is the flexible, ongoing attempt to explain what is currently happening, resembling the feedback of Gell-Mann's model, with which complex adaptive systems must compare their models so that they can learn as their environments change. In storied space, antenarrative provides

flexible feedback to people about recent happenings that may call for behaviors quite different from those driven by their storied space's narratives. As Boje (2001) notes, traditional analysis of storytelling, starting with Aristotle, has focused on narrative. However, it is only through considering the interplay between the narratives and antenarratives in any storied space that we can come to understand its dynamics and, especially, its evolution.

What makes human social systems so complex is the dynamics that emerge as people behave as agents in an intricate nested network of storied spaces. For contrast, consider the dynamics of evolution in a natural ecosystem, the African savannah, for example. DNA is the biological equivalent of a dominant narrative, driving any animal's historically based attractor. Mutations on the molecular level in the DNA of, say, a tiger then act much like a biological antenarrative, enabling the tiger to adapt. If such a mutation increases the speed of the tiger and allows the tiger to hunt more successfully, that mutation is likely to be selected and, in time, all the tigers in the ecosystem are likely to become faster. That change will drive mutations in the species the tigers prey on. Those species that don't adapt may be hunted to extinction. Changes in those other species may also drive other adaptations across the ecosystem. In this way, the biological antenarrative of mutation in one species can drive changes in the DNA of many species and even shift the attractor of the ecosystem as a whole. This kind of coevolution enables species throughout the ecosystem to survive until the ecosystem reaches a point of punctuated equilibrium, the attractor for the ecosystem falls apart, and species across the ecosystem enter phase transition.

Humans, on the other hand, live in many small groups—families, work groups, sports teams, and club groups—which also exist in many organizations—businesses, religious congregations, political parties. Each of these organizations, in turn, must adapt to the markets and *discourses* in which they exist. And all of this is part of a national culture. Every one of these human systems has a dominant narrative that shapes the behaviors of all the people within them. As a result, each person must internalize a variety of small group dynamics and organizational cultures. Moreover, each person is continually creating antenarratives so that he or she can interpret events as they happen. Sometimes, these antenarratives fit neatly into existing dominant narratives. This is what Weick (1995) means by sensemaking. However, in other situations, events demand that people behave in ways that are not defined in their dominant narratives. If the dominant narratives do not offer ways for people to test antenarrative perceptions, as shaped, for instance, by their work group storied spaces, that do not fit with those narratives, then behavior is likely to become what is called “dysfunctional.” Here I agree with family therapist Lynn Hoffman (2002). The word “dysfunctional,” with its implication of illness, is misleading, because such behavior is not sickness, but *maladaptation*.

As long as the storied space in which a small group or organization exists remains in its stable-state attractor, such maladaptation is generally not dangerous. However, once a government or business, for instance, moves into phase transition, a dominant narrative that offers no way for people to enact their antenarratives can become dysfunctional and face extinction, as much as the tiger prey that cannot adapt to the tiger's increased speed.

To develop a deeper understanding of the dynamics of storied space and its relationship to how humans develop knowledge, I want to turn now to the example of organizations as storied spaces. In particular, I want to illustrate these dynamics in two organizations, both of which evolved recognizing the importance of technological antenarratives—Xerox and 3M.

## The dynamics of storied space in two organizations

If one views organizations as evolving storied spaces, they should be largely formed by dominant narratives (Gell-Mann's schema as organizational cultures), developed in its organization's phase transition (see Figure 1). Organizational culture should largely shape the behavior of its individuals, which also reflects several levels of storied space—work groups, departments, divisions, etc. In addition, organizations should function within the dominant narratives of their markets—such as oil, auto makers, and healthcare—and a variety of professions—accounting, marketing, and quality control, for instance. Because individuals in their work groups are continually providing antenarrative input, such organizations should be able to evolve through the dynamic interaction of their dominant narratives and antenarrative feedback, as their environments shift, *depending on manager's ability to listen to those antenarratives and enable their people to enact them so that they will learn what new products and services will succeed—that is, develop new organizational knowledge*

To test this conception of organization, I would like to contrast two organizations—AT&T and 3M. Both companies are so well known that most Americans identify them by their initials, rather than their full names, American Telephone and Telegraph and Minnesota Mining and Manufacturing. The success of both depended on technological innovation. Over their histories, these two companies boasted a history of highly successful inventions—from transistors to solar voltaic cells and the Unix operating system at AT&T; from water-proof sandpaper to Scotchguard fabric protector and Post-it Notes at 3M. Yet, while the inventions from AT&T have been more technologically important and created the potential for far more value than those of 3M, it is 3M that has continued to evolve and adapt over the last 30 years, while AT&T repeatedly stumbled, eventually being acquired by SBC in 2005.

If the theory of organizations as one example of storied spaces presented in this essay is valid, it should offer a compelling explanation of why these two companies have performed as they did and why 3M was so much more effective in transforming its technological innovations into organizational knowledge. Such a consideration must examine: how the phase transition in which each company formed implied its dominant narrative/culture; how that narrative drove an attitude toward innovation as

enacted technological antenarrative; and how changes in international markets, which became evident in the 1970s, drove 3M's continuing evolution and AT&T's ultimate failure.

## AT&T

In 1878, two years after he'd demonstrated the first telephone, Alexander Graham Bell and his financiers tried to sell rights to his new invention to Western Union for \$100,000. When Western Union refused, they created a company, initially National Bell Telephone Company, to market telephone service. In 1880, it became American Bell Telephone Company, and in 1885, it created a new company, American Telephone and Telegraph Company to provide long-distance service across the country. On the next to last day of 1899, AT&T bought American Bell for legal reasons just in time for the beginning of 1900.

For our purposes, and following the pattern depicted in Figure 1, the phase transition in which AT&T was formed lasted from 1878 to 1907, when company President Theodore Vail articulated his vision as "One Policy, One System, Universal Service." While this organizational narrative emphasized the vision of the person at the top of the organization (Bell & Vail), it also recognized the critical importance of technological innovation, as one would expect. As early as 1881, the company had purchased a controlling share of Western Electric Co. in order to manufacture its own equipment. Then, in 1913, AT&T bought Lee DeForest's patents for the vacuum tube. By 1918, the company's annual report boasted that it "owned, controlled or was licensed under" 4,424 U.S. patents, issued or pending (Fagen, 1975).

By the early 1920s, "within the Bell System, there was a visionary group of technical executives who foresaw the growth of a highly complex system and the need for a ... theoretical approach based on analysis and measurement" (Fagen, 1975). This recognition would lead to the forming of Bell Labs in 1925, where a remarkable collection scientists and engineers were free to work on the basic research that resulted in a difficult-to-believe list of potential products, including the first working facsimile machine (1925), an electronic speech synthesizer (1937), the transistor (1947), solar voltaic cells (1954), a functioning laser (1964), the LED (1962), the Unix operating system (1967), and digital cellphone technology (1980). Almost as remarkable as this list of products is the inability of AT&T to profit from many of them. AT&T sold the license for making transistors to Sony in 1955 for only \$50,000 (Riordan & Hoddeson, 1998). An estimate of how much Sony has profited from this investment over the last 50 years would probably run in the order of magnitude of \$100 billion.

Why was AT&T unable to profit from some of the most important inventions of the 20th century? The theory of storied spaces developed here offers a convincing explanation. AT&T's dominant narrative emerged from its beginnings from Bell's technological vision and Vail's business vision. This narrative recognized the critical importance of technological innovation and developed Bell Labs to provide it. What the narrative did not recognize was that technological innovation could act as a research equivalent of antenarrative; it could introduce "stories" that would enable the company to develop new types of knowledge that would enable it to adapt to the changes in its markets. Rather, because the dominant narrative insisted that senior management could pick and choose the technologies that the company needed, AT&T provided no way for its researchers and engineers to enact their antenarratives as viable products that the company could incorporate. Moreover, with nearly half a century as one of the nation's most successful companies, AT&T had little reason to do so. As a result, the corporate dominant narrative and its antenarratives could exist side by side without anyone testing whether these antenarratives could be incorporated as new knowledge to make the dominant narrative more powerful, and no one had to.

The stories one hears about working at AT&T reflect this dominant narrative. When I was working at Bell Atlantic, one of the "Baby Bells" resulting from AT&T's 1984 divestiture, in the early 1990s, I spoke with many veterans of the old Bell System. They all talked fondly of their experience. Mama Bell, they all agreed, took care of its own. You did what was asked of you and you were taken care of. The idea of taking risks was entirely alien.

Starting in the 1970s, however, technological innovation began to accelerate, and the land line telephones of AT&T were no longer the only communications game in town. Starting with the introduction of microwave communications, which would lead to the creation of MCI Communications Corporation, AT&T divested its local service in 1984, retaining its long-distance service. Faced with increasing competition, its senior management made a series of catastrophic mistakes, such as the purchase of NCR in 1991 to enter the market for personal computers, even though the Bell Labs had invented UNIX operating system nearly 20 years earlier. By 2005, what was left of this once great company was purchased by SBC, the victim of a storied space that kept company employees from integrating some of the most valuable technological antenarrative of the 20th century.

## 3M

Unlike AT&T, Minnesota Mining and Manufacturing began as a business that wasn't quite sure what its market should be. Founded in 1902 to take advantage of the discovery of corundum, a strong abrasive, the company "kept stumbling along," as the official history puts it (Minnesota Mining and Manufacturing Company, 1977), for about 20 years, until its president, Richard McKnight, got a letter from Francis Okie in Philadelphia, asking for samples of all of 3M's abrasives. Fascinated, McKnight contacted Okie and discovered that he was trying to invent a water proof sandpaper. In 1922, Okie came out to St. Paul to work on his invention with the employees at 3M. The resulting product, "Wetordry" sandpaper, proved ideal for finishing auto paint

jobs, right at the time when the American auto industry was taking off. By 1926, it had become 3M's first major success. (For a fuller discussion of this story, see Baskin, 1998.)

This period (1902-1926) was the phase transition in which the dominant narrative of 3M's storied space emerged. Like AT&T, 3M's success was technology based; McKnight had started up its first laboratory around 1914. But unlike AT&T, 3M's first success came to it from the outside. Okie's idea for water proof sandpaper was a technological antenarrative that 3M encouraged him to enact, and, not surprisingly, McKnight recognized that it was the individual inventor, enabled in pursuing his ideas, who could help the company develop new organizational knowledge with which to meet emerging customer needs. As a result, McKnight created the company's 15 Percent Rule, which still encourages technical employees to spend as much as 15 percent of their time pursuing their own ideas. Other company programs gave these employees institutionalized ways of getting access to the resources they need in these efforts, and the company's communication network helps them connect with other employees whose assistance they need. Once they create their products, employees can take advantage of a management review system that enables the company to manufacture and market them. Such inventors are often promoted. Among the most successful of the products developed through the 15 Percent Rule are masking tape in the 1930s, Scotchgard fabric protector in the 1950s, and Post-it Notes in the 1970s (Baskin, 1998).

Not surprisingly, 3M's dominant narrative is also reflected in a variety of stories its employees tell. Only, unlike those at AT&T, 3M's stories are about people taking risks, sometimes risks that seem foolish, and succeeding because of them. One of former CEO Lew Lehr's favorites concerns an employee who *knew* he had a winner for the company. After several warnings from his manager, the employee continued working on his idea and was fired. However, he was so devoted to the idea that he continued working on it, without pay, in an unused office. Eventually, he began to succeed, was rehired, and, after the product became a big winner for the company, was promoted to vice-president. Such a story would be unimaginable in the storied space of AT&T.

In effect, 3M's dominant narrative of innovation enables the company to create a series of minor phase transitions in its 15 Percent Rule technological antenarratives. The projects that emerge from this rule introduce perceptions of changes in the market environment, which, in turn, allow the company to adapt in an ongoing manner. Doing so is undoubtedly costly. According to Art Fry, who invented Post-it Notes, it can take "5,000 to 6,000 raw ideas to find one successful business" (Hindo, 2007). Moreover, the exploratory behavior that characterizes any phase transition makes it impossible to innovate in a highly efficient way. Extensive trial and error is essential. On the other hand, the institutionalized expectations that people will enact their technological antenarratives so that they can be guided to the market have kept 3M from experiencing the invent-and-overlook syndrome that Bell Labs demonstrated.

With its storied space continually driving employees to test new ideas to meet customer needs, 3M was much better positioned than AT&T to prosper in the post-1970s period of technological acceleration. From 1985-1995, 3M was consistently on *Forbes Magazine's* Most Admired Company list. This isn't to say that the company had a free ride. The growth of international competition in the '70s and '80s forced the company to become more financially careful, and several of the old-timers I've spoken with sounded very disappointed. Then, in the late 1990s, 3M made some management mistakes, so much so that its stock missed the boom of that period. At the end of 2000, the company hired James McNerney, a manager in the GE tradition, as CEO. He introduced some much needed cost-cutting and instituted Six Sigma. As a result, McNerney helped the company's operating margins to jump from 17 percent in 2001 to 23 percent in 2005. At the same time, innovation slowed so that the percentage of sales from new products, less than five years old, dropped from one-third to one-quarter. McNerney left in 2004 and was followed as CEO by 3M veteran George Buckley, who has made a variety of changes to spur innovation again (Hindo, 2007).

In the end, both AT&T and 3M were deeply affected by the market shifts of the last 30-some years. However, having a dominant narrative that *invited* technological antenarratives and then provided systems for enacting them and creating new organizational knowledge gave 3M an enormous advantage. An organizational storied space thus open to antenarrative provides a powerful explanation of the difference in the profitability that these two organizations were able to derive from their significant programs of technological development, and, perhaps, the way 3M remains a viable corporation while AT&T has become little more than the name for another organization.

## Implications for further study

Of course, not all antenarrative is technological. As I've show elsewhere (Baskin, 2005a, 2005b), organizational storytelling offers a window to issues ranging from identifying conflicts to opportunities for motivating employees to make further contributions. These antenarratives can also point toward issues in finance, marketing, the success of all sorts of corporate programs, but only *if management makes a commitment to listen*. Moreover, if this theory of storied spaces as the human equivalent of CASs is valid, then many of the implications of this analysis should be applicable to other human groupings and, therefore, worth serious examination. Among those implications, three seem central:

*Dynamics.* All storied spaces generate behavior that reflects the interplay between their historically grounded dominant narratives and antenarratives by which individuals express emerging events in the environment. No storied space can exist without both. The identity of any group, organization, profession or nation is expressed in its dominant narrative, the story of what people in it must do, as they have in the past, for it to survive. Dominant narratives drive the human equivalent of complexity's attractors. Antenarratives, on the other hand, enable people to perceive and act on emerging events, as those perceptions are shaped by the circumstances of the storied spaces to which they belong. The multiplicity of viewpoint in storied spaces, such as organizations or nations, offers the possibility of a complexity of perception equal to the complexity of current environments. When possible, people will fit their antenarratives into the existing dominant narrative. The test of any storied space's ability to adapt is its members' ability to recognize antenarratives that do not fit in with the dominant narrative and then make appropriate shifts in their dominant narrative.

- *Knowledge generation.* In such polyphonic (Bakhtin, 1981) storytelling environments, knowledge evolves, as stories are enacted and create the expected results, from guesses at the meaning of events in antenarrative, through the higher degree of sureness in narrative and, finally, to the relative certainty of dominant narrative, which I earlier (Baskin, 2005b) referred to as "myth." The ability of any storied space to take advantage of such knowledge in order to adapt successfully to changes in the environment depends to a high degree on that space's openness to relatively new knowledge. Such new knowledge can become more readily available in storied spaces where the dominant narrative encourages people throughout it to spread and enact their antenarratives. In this way, AT&T could be highly successful during a period of relative stability, when its relatively "closed" dominant narrative encouraged people at the top of the organization to judge which technical antenarratives were needed to respond to markets; yet the company faltered in the last quarter of the 20<sup>th</sup> century when markets became more chaotic. In such chaotic environments, 3M could be more successful because its more "open" dominant narrative encouraged employees to enact their technical narratives. Similarly, Western nations with relatively free elections and press have been able to respond more successfully to emerging dangers, such as industrial pollution, than nations such as China and Russia, where both the political system and media are more stringently controlled.
- *Leadership.* One reason open dominant narratives are essential in more chaotic environments is the universal temptation to believe that highly successful dominant narratives are *the whole story*. As noted elsewhere (Baskin, 2005a), the human desire for certainty in an uncertain world consistently drives people to mistake their dominant narratives for The Truth. The temptation to make this equation is strongest among those who lead any storied space. Surrounded by their peers in a cabinet or office of the CEO, such leaders receive enormous rewards, hold significant amounts of power, and are often praised beyond their accomplishments. As I noted previously (Baskin, 2005a, 2005b), senior executives have the least reason to doubt either their narratives or antenarratives. In addition, the vast majority of literature on storytelling in organizations focuses on *telling* stories. Yet the richness of information and knowledge available in the antenarrative polyphony of any storied space is extremely valuable, especially in a chaotic period like our own. As a result, this theory of storied spaces suggests that leadership in our current environment should include a significant component of listening. After all, when leaders *don't* listen, as Pres. George W. Bush didn't listen to his generals' advice to go into Iraq with overwhelming force, the results can be catastrophic.

If this theory is valid, the three issues listed above are only a beginning. Examining organizations and professions, families and nations, markets and religions, as storied spaces is an enormous task. In a time, however, when our world appears to be changing to a state that is already significantly different from what many of us grew up with, the theory is an effort well worth the effort, even if only to demonstrate where it goes wrong.

## References

1. Bakhtin, M.M. (1981). "Discourses in the novel," in *The Dialogic Imagination: Four Essays* By M.M. Bakhtin, M. Holquist (ed.), ISBN 9780292715349.
2. Baskin, K. (1998). *Corporate DNA: Learning from Life*, ISBN 9780750698443.
3. Baskin, K. (2005a). "Story telling and the complex epistemology of organizations," in K. Richardson (ed.) *Managing the Complex: Philosophy, Theory and Applications*, ISBN 9781593113186. 331-344.
4. Baskin, K. (2005b). "Complexity, stories and knowing," *Emergence: Complexity & Organization*, ISSN 1521-3250, 7(2): 32-40.
5. Baskin, K. (2007a). "Ever the 'twain shall meet," *Chinese Management Studies*, ISSN 1750-614X, 1(1): 57-68.
6. Baskin, K. (2007b). "Foucault, complexity, and myth: Toward a complexity-based approach to social evolution (a.k.a. history)," in *Explorations in Complexity Thinking: Pre-proceedings of the 3rd International Workshop on Complexity and*

- Philosophy, K.A. Richardson and P. Cilliers (eds.), ISBN 9780979168819, pp. 1-13.
7. Bateson, G. (1979). *Mind and Nature: A Necessary Unity*, ISBN 9780553137248.
  8. Boje, D.M. (1995). "Stories of the storytelling organization: A postmodern analysis of Disney as 'Tamara-land,'" *Academy of Management Journal*, ISSN 0001-4273, 38(4): 997-1035. (Or see <http://cbae.nmsu.edu/?dboje/papers/DisneyTamaraland.html>.)
  9. Boje, D.M. (2001). *Narrative Methods for Organizational and Communication Research*, ISBN 9780761965879.
  10. Cohen, J. (2003). "Why is negentropy, like Phlogiston, a privative?" *International Nonlinear Sciences Conference*, Vienna, Feb. 9, 2003.
  11. Dervin, B., Foreman-Wernet, L. and Lauterback, E. (eds.) (2003). *Sense-Making Methodology Reader: Selected Writings of Brenda Dervin*, ISBN 9781572735095.
  12. Fagen, M.D. (ed.) (1975). *A History of Engineering and Science in the Bell System: National Service in War and Peace (1925-1975)*, ISBN 9780932764003.
  13. Feyerabend, P. (1993). *Against Method*, ISBN 9780860916468.
  14. Fisher, W.R. (1987). *Human Communication as Narration: Toward a Philosophy of Reason, Value, and Action*, ISBN 9780872496248.
  15. Gould, S.J. (2002). *The Structure of Evolutionary Theory*, ISBN 9780674006133.
  16. Gell-Mann, M. (1994). *The Quark and the Jaguar: Adventures in the Simple and Complex*, ISBN 9780716727255.
  17. Hindo, B. (2007). "At 3M, a struggle between efficiency and creativity," *BusinessWeek*, June 11, [http://www.businessweek.com/magazine/content/07\\_24/b4038406.htm](http://www.businessweek.com/magazine/content/07_24/b4038406.htm).
  18. Hoffman, L. (2002). *Family Therapy: An Intimate History*, ISBN 9780393703801.
  19. Kaufmann, S. (2000). *Investigations*, ISBN 9780195121049.
  20. Minnesota Mining and Manufacturing Company (1977). *Our Story So Far: Notes from the First 75 Years of 3M Company*, ISBN 9780960142415.
  21. Plotkin, H. (1993). *Darwin Machines and the Nature of Knowledge*, ISBN 9780674192812.
  22. Pratchett, T., Stewart, I. and Cohen, J. (2002). *The Science of Discworld II: The Globe*, ISBN 9780091882730.
  23. Riordan, M. and Hoddeson, L. (1998). *Crystal Fire: The Invention of the Transistor and the Birth of the Information Age*, ISBN 9780393318517.
  24. Salthe, S.W. (1993). *Development and Evolution: Complexity and Change in Biology*, ISBN 9780262193351.
  25. Stacey, R.D. (2001). *Complex Responsive Processes in Organizations: Learning and Knowledge Creation*, ISBN 9780415249195.
  26. Weick, K.E. (1995). *Sensemaking in Organizations*, ISBN 9780803971776.
  27. White, M. and Epston, D. (1990). *Narrative Means to Therapeutic Ends*, ISBN 9780393700985.