

# Dealing with Unusual Experiences: A Narrative Perspective on Organizational Learning

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Experiences that do not fit squarely into known categories pose a challenge to notions of organizational learning that rely primarily on scientific or experiential approaches. Making sense of, responding to, and learning from such unusual experiences requires reflection and novel action by organizational actors. We argue that narrative development processes make this organizational learning possible. By developing narratives, organizational actors create situated understandings of unusual experiences, negotiate consensual meanings, and engage in coordinated actions. Through the accumulation of narratives about unusual experiences, an organization builds a memory with generative qualities. Specifically, through narratives, actors evoke memories of prior unusual experiences and how they were dealt with, and this generates new options for dealing with emerging unusual experiences. We outline a framework detailing how narrative development processes enable organizational learning from unusual experiences and conclude by summarizing how this approach differs from and yet builds upon scientific and experiential approaches to learning.

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Organizations operate in environments characterized by new markets, disruptive technologies, and transformational institutional change. Under these circumstances, organizations often encounter situations that bear little or no resemblance to the types of experiences that have occurred in the past. We refer to these situations as “unusual experiences.” How organizations deal with and learn from such experiences can have a significant impact on whether they survive and prosper.

Unusual experiences pose a challenge, however, to prominent approaches to organizational learning, particularly the scientific (cf. Kanigel 1997) and experiential approaches (cf. Arogya 1999, Dutton and Thomas 1984). These approaches construe learning as a progressive refinement of knowledge based on generating improved responses to known categories of experiences. When an experience has not been encountered before, however, and so does not fit into a known category of experience, it is not clear how an organization using these recognized approaches can deal with the experience and learn from it.

Yet developing ways to learn from unusual experiences is an integral part of organizing (Dunbar and Starbuck 2006, Lampel et al. 2009). Following Weick (1991), organizational learning from unusual experiences implies an ability not only to make sense of and respond to such experiences in real time, but also to

assimilate and use what has been learned from these experiences on an ongoing basis. For instance, organizations ought to learn from actual or near disasters in ways that help them reduce the possibility of future disasters or deal with them more effectively should they reoccur (Christianson et al. 2009, Weick and Roberts 1993, Weick and Sutcliffe 2001). Organizations dependent on innovation to survive need to continually improve how they deal with and learn from any new and unfolding innovation journey (Van de Ven et al. 1999). Organizations providing specialized services should be able to learn from the unique requirements posed by each client in ways that then help them meet the next client’s unique requirements (Garud et al. 2006). In other words, it should be possible for organizations to generate insights from their responses to unusual experiences in such a way that each encounter then informs the next encounter.

In this article, we develop a framework for organizational learning that addresses the nature of the learning that can unfold when organizations confront unusual experiences and outlines how organizations can then sustain such learning. Our central thesis is that organizational learning from unusual experiences must be a generative process. Specifically, learning must occur in such a way that, at any moment, past experiences of unusual experiences can be mobilized to shape but not determine responses to current and future unusual experiences. For

such a process to unfold, organizational learning must trigger reflection and novel action rather than responses determined by predefined templates.

We argue that narrative development processes make this type of organizational learning possible. Narratives are rich accounts of situations that portray the people, places, and artifacts involved in a structured manner with a beginning, middle, and an ending, and, through use of a plot, offer a particular point of view on a situation (Bruner 1986, Polkinghorne 1987). Prior research suggests that narratives provide organizational actors with a vital means for making sense of everyday work contexts (cf. Fisher 1984, Weick 1995). For example, narratives provide a way for people to share their professional knowledge with one another so as to collectively solve problems (Brown and Duguid 1991, Orr 1995) and to create a common ground for promoting coordinated action within organizations (Bartel and Garud 2009, Gundry and Rousseau 1994, Lave and Wenger 1991). We build on and extend this work to develop an organizational learning framework to address the phenomenon of unusual experiences.

To preview our arguments, we suggest that narrative development processes help organizational actors make sense of, respond to, and learn from unusual experiences in several ways. First, narrative development processes provide a way for actors to summarize and communicate their observations to each other and, in the process, collectively generate meaning around an unusual experience. Second, as they develop, narratives serve as triggers for action that set in motion responses to unusual experiences. Third, through the accumulation of narratives about unusual experiences, an organization builds a memory of such events that is generative. Specifically through narratives, actors evoke memories of prior unusual experiences and how they were dealt with, and this generates new options for dealing with emerging unusual experiences.

As a way to organize and present these arguments, we adapt and extend the framework describing narrative development proposed by Riessman (1993).<sup>1</sup> Riessman not only addressed how individuals attend to everyday experiences, but also how individuals communicate these experiences to others, how they are transcribed into texts, and eventually how they are analyzed and read. We build upon this framework to explore how organizational actors deal with unusual experiences through narrative development processes. Importantly, we extend Riessman's (1993) framework by exploring how the processes she identified trigger action in organizational settings and how the accumulation of narratives over time creates a generative organizational memory that is continually replenished by revisions to existing narratives and the creation of new narratives. Together, these processes constitute the foundation of our framework describing organizational learning from unusual experiences.

## Organizational Learning

Organizational scholars have always been interested in how organizational learning occurs. One approach can be traced to the advent of the scientific management movement last century (Kanigel 1997). By conducting controlled tests and experiments, scientific management attempted to generate knowledge about the principles underlying the causes of a given phenomenon (Garud 1997). Several scholars have conceptualized the knowledge that emerges from such an approach as being cumulative but within the confines of a specific overall "paradigm" (Constant 1980, Knorr-Cetina 1981, Kuhn 1970). This is because prior knowledge shapes the problems addressed, the instrumentation used, and the kinds of solutions found to particular categories of phenomena.

Another approach emphasizes experiential learning to generate knowledge about how to carry out an activity. At the individual level, learning occurs as people progressively refine their skills to deal with predetermined tasks or specific technologies through a process of learning by doing (Argote 1999, Arrow 1962, Dutton and Thomas 1984). At the group and organizational levels, learning occurs as routines are progressively refined to yield standard operating procedures to deal with categories of experiences that are expected to occur regularly over time (Nelson and Winter 1982). A stimulus-response pattern emerges when one uses this approach, as situations identified as representing a specific category of experience trigger a corresponding response protocol for handling it (Bowker and Star 1999).

The benefits of these learning approaches are manifest in improved responses to well-recognized situations. In particular, specific and known categories of experiences provide individuals and groups with an efficient means for identifying appropriate knowledge and historically effective responses (Bowker and Star 1999). Moreover, when actors evoke a category to characterize a given situation, it automatically implicates the physical artifacts (e.g., equipment, databases, and documents), work processes (e.g., analytic techniques and standard operating procedures), and people (e.g., expertise, power, and political clout) that are central to executing an appropriate response. Categories also aid communication and promote coordinated action among actors because they know and share the information summarized by an experience category (Dutton and Jackson 1987, Weick et al. 2005). Situations and events readily classified into established categories, therefore, evoke specific and consistent organizational responses.

How do the categories implicated in both of these learning approaches emerge? Actors form categories as they encounter phenomena that share common attributes (Rosch and Lloyd 1978). Acts of categorization are a form of pattern recognition; specifically, a perception of similarities and differences. Categorizations of real-time experience, for example, involve attribute comparisons between these experiences and various categories

to identify an appropriate match. Although categories become populated over time by experiences that are similar, the experiences within a category are not necessarily identical. Rather, categories have a radial structure (Weick et al. 2005) with experiences considered to typify a category having most or all of the attributes associated with the category, whereas other experiences lacking some key attributes are considered less typical. The more an experience is viewed as typical of a category, the more readily an organization can then productively rely on the knowledge associated with the category to inform an appropriate response.

Sometimes experiences possess attributes that span several categories or, alternatively, fit none (Hannan et al. 2007). We consider such experiences to be unusual. For such experiences, relying on knowledge associated with recognized categories and generated through experiential and scientific approaches to learning may not be appropriate. The Columbia shuttle flight STS-107 demonstrates the issue. The episode began when mission control was confronted with video suggesting foam had fallen on to the underwing of the shuttle (Dunbar and Garud 2008). Foam had fallen on most previous shuttle flights, but the falling foam that was depicted in a blurry photographic image of flight STS-107 was unusual to some engineers because it appeared to be larger than the foam that had fallen on earlier flights. Indeed, it was not clear whether this event should be categorized as a safety issue to be dealt with immediately or as a routine maintenance issue to be fixed after the shuttle returned to earth. Adopting a scientific approach, some of the NASA engineers wanted to carry out immediate tests and experiments to determine whether this falling foam incident posed a safety risk for the shuttle. They were handicapped, however, because in the past, even though foam had fallen repeatedly, the shuttle had not registered significant damage. Consequently, the risks posed by falling foam had become “normalized” at NASA (Vaughan 1996)—that is, although foam shedding had been considered an in-flight safety risk earlier in the shuttle flight program, it had later been recategorized to be an acceptable flight risk. Drawing on NASA’s past experiences, others at NASA who adopted an experiential approach to learning argued that there was no need to take further action. Ultimately, the group using a scientific approach failed to convince the others that there was an in-flight safety issue and nothing further was done before the ill-fated shuttle disintegrated upon its return to earth.

This example illustrates how organizational learning becomes problematic when actors rely on scientific and experiential approaches to make sense of and respond to unusual experiences. There is simply not enough time, awareness, or similar and available previous experiences to generate the knowledge needed to respond appropriately to an unusual experience in real time. Organizations that rely on a scientific approach, for example,

often fall victims to “normalization” (Vaughan 1996) and “superstitious learning” (Levitt and March 1988, Zollo 2009). The burden of proof falls on those actors who sense that an ongoing experience is unusual; they must offer compelling scientific evidence in real time to convincingly persuade others as to the nature and characteristics of the experience. A reliance on an experiential approach, in contrast, may mean that an unusual experience is simply not recognized as being a stimulus necessitating reflective action. Instead, ongoing performance continues as if nothing new has happened. Consequently, individuals get caught up in “competency traps” (Levitt and March 1988) and organizations develop “core rigidities” (Leonard-Barton 1992).

Is there a way for organizations to avoid normalizing unusual experiences or treating them in a routinized fashion and, instead, to treat them as triggers for reflective action that may inform current and future responses? Such learning becomes important in contemporary work environments as organizations and their members encounter unusual experiences on an ongoing basis. For instance, organizations, especially those whose mission it is to push the frontiers of knowledge (such as NASA), will likely encounter situations that cannot readily be categorized and yet may possess the potential for disaster. In a quest to harness organic growth through innovation, organizations will continually encounter experiences that do not fit earlier categories because innovations lie at the nexus of different knowledge domains (Van de Ven et al. 1999). Similarly, a shift to a service economy means that almost every client encounter is potentially unusual because clients have unique demands reflective of their particular contexts (Garud et al. 2006).

The broader point is that organizations, as they increasingly operate in an “open” rather than in a “closed” mode, will encounter experiences that are unusual with greater frequency. Because unusual experiences will often implicate seemingly unrelated phenomena, they may be seen as disjointed rather than connected events. Consequently, making sense of, responding to, and learning from unusual experiences requires that organizational actors not only find ways to identify these experiences but also imbue them with meaning (Tsoukas and Hatch 2001). This involves determining how each experience is similar to yet different from other past experiences and cultivating mechanisms to benefit from an organization’s prior experience base. As we argue in this article, narrative development processes serve as such as mechanism.

Several elements of interpretation are implicated in building a framework for organizational learning around unusual experiences. First, learning from unusual experiences cannot simply rely on stimulus–response mechanisms, but must also include reflection-in-action



processes (Schon 1983). Second, in addition to information processing to determine scientific causality, it must involve active sensemaking and enactment processes as actors engage with both the phenomenon and with one another (Brown and Duguid 1991, Daft and Weick 1984, Weick 1995). Third, learning cannot occur at just the individual or organizational levels but must involve both levels in a dynamic web of interconnected activity (Crossan et al. 1999, March and Simon 1993).

## Narratives as a Way to Learn from Unusual Experiences

We build upon a framework offered by Riessman (1993) to explore how narrative development processes can enable organizational actors to deal with and learn from unusual experiences. Specifically, Riessman (1993) identified five process steps people go through to make sense of *everyday experiences*: they (a) attend to experiences, (b) tell others about these experiences, (c) transcribe these experiences into texts, (d) analyze these texts to clarify what may be learned, and (e) have others read these texts across time and cultural settings. Although Riessman (1993) articulated these as discrete steps for expository purposes, they can unfold in more complex interrelated ways. In the sections below, we first outline Riessman's position on each of these subprocesses. Then, we adapt and extend her framework to explore how actors throughout an organization make sense of and learn from the *unusual experiences* that they confront.

### Riessman's Narrative Development Processes

Riessman (1993) argued that attending to specific facets of an experience marks the beginning of the process through which people make sense of events they encounter. Riessman (1993, p. 9) illustrated how someone attends to elements of experience by referring to a walk she took on a beach in Kerala, India. Given her interests, she attended mostly to the gendered nature of the work she observed on the beach. She noted how the men fished with nets and sold their catch to women, for example, and how the women bought the fish from the men and then took the fish to the market to sell. By selectively attending to details that were consistent with her interests in gendered work, Riessman (1993) begins to confer meaning to her beach experience.

Telling others about an experience is a second aspect of Riessman's (1993) framework. She illustrated this process by describing how she told her colleagues interested in gendered work about her walk on the beach. She told them what the day was like, why she took an early walk, what the people wore, what the men did, how they chanted, what the women wore, how they carried the fish to market in pails on their heads, and how she reacted to what she saw, etc. Because of their shared

understanding about the nature of gendered work and the issues associated with it, her friends expected her to talk about certain things and, as she told her story, they interrupted her, asked questions, and offered new insights. The resulting jointly developed account further described how gendered work manifested itself on the Kerala beach.

Riessman (1993, p. 11) then addressed the processes that unfold as a person transcribes his/her experience into a text. Transcription aims to capture the details of an experience. Inevitably, however, a transcript simplifies experience because it reflects an incomplete and selective reporting of event details. A text is not only a partial account, but it is also a record that becomes detached from the person(s) who actually experienced the event. Texts are sedimentations of the experience that inform others who have no link to the original event or to those who experienced it.

Analysis of an experience is yet another aspect that Riessman (1993) considers. Analysis of a text is performed with a particular focus in mind. Through analysis, a person edits and reinterprets what happened, reshaping the initial text according to particular analytic objectives. As a result, the analyzed and reformulated account may have a flow and a form that was lacking in the original telling or text.

Readers and reading are the final aspects of Riessman's (1993) framework. Reading processes address the ways in which readers actively construct and reconstruct meaning based on particular texts. Quoting Rabinow and Sullivan (1979, p. 12), Riessman (1993) noted how, despite a person's analytical efforts to create a text intended to appeal to a particular audience, such a text remains "open to several readings and several reconstructions" by others. Readers usually link text content back to their own experiences, for example, and in doing so they likely overlook some facets while emphasizing others. Through reading processes, readers develop text interpretations that are relevant to their own contexts.

### Narrative Development Processes to Deal with and Learn from Unusual Experiences

We adapt and extend Riessman's (1993) framework to explore how organizations and actors in organizations deal with and learn from unusual experiences (see Table 1). In organizational contexts, actors use provisional narratives to share and exchange ideas about unusual experiences they have observed. These eventually may lead to proper narratives as organizational actors gradually develop shared understandings and take coordinated action. Narrative texts that become embedded in an organization (e.g., they are formally recorded in company documents or are otherwise preserved within an organization) enable transmission and analysis of unusual experiences over time and across organizational units. With their accumulation, narratives provide an

**Table 1 Narrative Perspective on Organizational Learning from Unusual Experiences**

Narrative development processes	Mechanisms enabling organizational learning from unusual experiences
<ul style="list-style-type: none"> <li>• Attending to experiences<sup>a</sup></li> <li>• Telling others about these experiences<sup>a</sup></li> <li>• Transcribing these experiences into texts<sup>a</sup></li> <li>• Analyzing these texts<sup>a</sup></li> <li>• Reading these texts across time and in other cultural settings<sup>a</sup></li> <li>• Generating action</li> <li>• Sustaining organizational learning</li> </ul>	<ul style="list-style-type: none"> <li>• Generating tentative meaning by an organizational actor</li> <li>• Constructing shared meaning by multiple organizational actors</li> <li>• Preserving a holistic account and making it accessible to others in an organization</li> <li>• Identifying generative mechanisms in a narrative</li> <li>• Drawing contextualized inferences from a narrative through abductive processes</li> <li>• Triggering situated organizational action based on a narrative</li> <li>• Creating a generative memory of how unusual experiences should be handled through the creation of a narrative infrastructure</li> </ul>

<sup>a</sup>Adapted from Riessman's (1993) framework of narrative development. Although the processes are listed sequentially as discrete steps for expositional purposes, they may in fact overlap.

organization with a generative memory; that is, actors refer to past narratives of how an organization may or may not have dealt with other unusual experiences and, in the process, generate new solutions to address their current situation. These elements of organizational learning overlap as organizational actors access past narratives of unusual experiences to shape but not determine how future unusual experiences may be handled.

*Attending To.* How might organizational actors attend to unusual experiences through a narrative development process? Narrative development typically begins with emergent fragments of meaning as organizational actors facing an unusual situation make observations and share suppositions with one another about what may be going on (Boje 1991, Dewey 1997). Such a process might consider, for example, motives and causal connections that may explain particular details of an unusual experience (Gabriel 2000). Fragments of meaning formed around these details may begin to cohere into a provisional narrative (or “ante-narrative,” according to Boje 1991) that offers emergent speculation about what may be happening.

Provisional narratives also signify the beginning of new learning as organizational actors make novel connections and recognize new possibilities. This occurs as a function of two continually interrelated aspects of narrative development. First, organizational actors attend to the details associated with a particular unusual event, such as the people involved and the place and the time the event occurred, along with how these details

might be organized and sequenced (Bruner 1991). Second, organizational actors consider how these details might relate to plausible plots—conventional themes with which people in the organization readily identify. Plots enable people to see relations between experience details in the context of ongoing organizational activity (Bruner 1986, Gabriel 2000); that is, a plot can imply causal connections among elements of the experience that, in turn, may suggest additional relationships that could exist and might explain otherwise unrelated details (Dewey 1997, p. 193; Polkinghorne 1987, p. 143).

The challenge is to find a plot that lends coherence to and provides insights about the unusual experience that has occurred. Different plots make the same details comprehensible in different ways, even as salient details limit the plots that are considered plausible (Greimas 1987, Pentland 1999). By moving between salient details and plausible plots, individuals attend to unusual experiences in a holistic manner. This process generates an overall and integrated gestalt that gradually gives meaning to an experience (Taylor and Van Every 2000). As Gabriel (2000, p. 41) said, “story-work involves the transformation of everyday experience into meaningful stories. In doing so, the storytellers neither accept nor reject ‘reality.’ Instead they seek to mould it, shape it, and infuse it with meaning.” The property that allows the mutual definition of the whole and its parts in a narrative (Ricoeur 1984, Tsoukas and Hatch 2001) is also the property that enables organizational actors to gradually create meaning around unusual experiences.

*Telling.* Whereas attending to an unusual experience focuses on how organizational actors begin to make sense on their own, telling others about an unusual experience focuses on the social aspects of meaning generation (see also Boland and Tenkasi 1995, Gioia and Chittipidi 1991). Through the sharing of ideas, provisional narratives emerge, and common meaning and joint action become possibilities. More possibilities emerge as people from different organizational units with different backgrounds exchange ideas and observations about an unusual experience and provide additional inputs to a provisional narrative.

Storytelling is most effective when tellers and listeners share and interact within a setting where all have access to the cultural and historical contexts that guide local interpretations (Riessman 1993). A developing narrative contains cultural symbols that are drawn from the larger organizational discourse shared by organizational actors (Martin 1982), thereby establishing familiar touch points for all participants (Denning 2001, Lounsbury and Glynn 2001). Because narratives about an unusual experience also seek to depict something that is organizationally unique and distinctive, they attract the attention and curiosity of organizational actors (Bruner 1991, Czarniawska 1998). As Johnson (2002, p. 189) noted:

“Narrative has always been about the mix of invention and repetition; stories seem like stories because they follow rules that we’ve learned to recognize, but the stories that we most love are ones that surprise us in some way, they break rules in the telling. They are a mix of the familiar and the strange: too much of the former, and they seem stale, formulaic; too much of the latter, and they cease to be stories.”

Telling necessarily involves dialogue and conversation (Riessman 1993), and so organizational actors consider a narrative about an unusual experience from their own and others’ vantage points. They may ask questions, offer their own ideas and intuitions, and add to the emerging story by exploring alternatives and options relevant to their own situation. In this way, listeners become active coproducers of the developing narrative (Boje 1991, Sawyer 2003, Tsoukas 2009). As Gabriel (2000, p. 41) noted, “the story emerges as a collage from a complex intersubjective process.” Through emergent conversations, organizational actors collectively tell each other about and make sense of an unusual experience (Taylor and Van Every 2000). This type of process underlies Weick and Robert’s (1993) “heedful interrelating,” facilitating consensual understanding and real-time coordination as actors navigate an unusual experience. Real-time sensemaking occurs through the connections, reactions and responses that emerge as people tell and listen to narratives in conversations with each other (Hatch and Weick 1998, Weick 1995).

*Transcription into Texts.* Whereas telling others about an unusual experience involves the social aspects of meaning generation, transcription focuses on the creation of a text summarizing the meaning that emerged from such conversations. Decisions about what to include and omit in a text, like decisions about what to tell others, are informed by an organizational actor’s frame of reference—his/her identity, interests, and values about what is important. Thus, different actors can create different narrative texts to represent an unusual experience, with each text providing a partial account.

By offering a simplified but durable record, texts make it possible for wider audiences to draw insights from unusual experiences that otherwise would have remained locally situated (Phillips et al. 2004, Taylor and Van Every 2000). In this sense, texts serve as memory devices others can access and use over time (Walsh and Ungson 1991). But, the preservation of experiences through texts comes at a potential price. Specifically, as Riessman (1993) noted, a transcription process necessarily abstracts and simplifies the details of raw experience.

Such simplification and loss of detail are not of great concern when transcription uses a narrative form to capture unusual experiences in a holistic way. This is because neither surface details nor a deeper plot alone are critical to the process of generating meaning around

unusual experiences. Rather, meaning depends on the narrative that links the two levels. To make sense of surface-level details, one must grasp the underlying plot. But to grasp the underlying plot, one needs to understand the sequence of events that connects actors and actions. In moving between surface details and a plot, one interprets a narrative not in a modular but in a holistic manner (Ricoeur 1984, Tsoukas and Hatch 2001). Importantly, the implied plot informs people about how reasonable assumptions and expectations may be able to fill gaps in narrative details. The relationship between surface-level details and a deeper plot provides an emerging narrative coherence, enabling others to comprehend what occurred. At the same time, gaps in details accord narratives flexibility, allowing organizational actors to apply their own frames of reference (e.g., values, goals, and identities) to generate unique inferences (Taylor and Van Every 2000).

The coherence and flexibility that are implicit in narrative texts allow them to serve as “boundary objects” bridging the perceptual and practical differences that distinguish actors in organizations (Bartel and Garud 2009). Illustrating how a boundary object works, Star (1989) explained how even as a geographical map describes a physical territory, it allows different groups to draw inferences consistent with their interests, e.g., she suggested how in a particular mapped territory, biologists might be interested in life zones, whereas museum conservationists might be interested in animal trails. In a similar way, a narrative text describing an unusual experience can serve as a boundary object because it draws on organizational aspects known to all (e.g., structural arrangements, routines, and commonly held values) but then allows readers of the text to attend to the aspects of most interest to them. To the extent transcribed narratives are made widely available and become institutionalized in organizations (e.g., they are posted on company intranets or published in company documents), they may become especially potent as boundary objects because they will continually inform all parts of the organization. In sum, the coherence and flexibility of narrative texts is a mechanism that enables organizations to not only memorialize unusual experiences, but also gives other actors access to them in a way that enables their continuing use over time.

*Analysis of the Text.* Riessman (1993) introduced text analysis as an additional aspect of her framework. Riessman (1993) described the analysis process from the point of view of a researcher who analyzes a text that she developed to represent a conversation or interview with a research participant. In an organizational setting, a text analysis may be carried out by anyone and not necessarily by the person who transcribes his or her experience for the benefit of others. Irrespective of who carries out the analysis, such a process goes



beyond initial attributions of meaning and is, instead, a more deliberate construction that has a particular focus in mind, e.g., advancing an organizational goal or solving an organizational problem. Through text analysis, an organizational actor may suggest the generative mechanisms such as characteristics of the environment, organizational structures or processes, patterns of intergroup relations, etc. that might possibly underlie a narrative about an unusual experience (Greimas 1987; Pentland 1999; Tsoukas 1989, 1991). As an analysis identifies generative mechanisms, one considers the implications for subsequent action and for the handling of other situations.

As an example, consider a story recounted by Jack Welch that highlights a narrative and a subsequent analysis leading to the identification of a generative mechanism and organizational change at General Electric. Jack recalled a visit with one of his senior managers who told him he had just taken on a mentee. Jack asked what it meant “to take on a mentee.” His senior manager explained he had agreed to advise a junior person who now, to his surprise, was providing him with valuable counsel on new information technologies; that is, the mentee was teaching the mentor. On analyzing this narrative, Jack identified a deeper driving force at play—the elimination of the traditional hierarchical relationship. Jack recognized that this mechanism had implications for how he could bring about a cultural shift to reduce the steep status differences characteristic of the GE organization at that time. On his return to GE headquarters, he sent an e-mail instructing all managers to find themselves a mentee who they would not only advise but who, in turn, they could learn from.

As the Welch anecdote illustrates, as organizational actors make novel connections, discover new or emergent relationships, and infer possibilities not previously identified, an analysis of even a single narrative text about an unusual experience can promote learning and prompt action. It is also possible that an analysis in relation to the texts developed by other organizational actors depicting different accounts of the same unusual experience may yield a more nuanced perspective that informs subsequent action. Although implicit in the recounted Welch story, unusual experiences can often have different implications for different actors and so, often, multiple texts emerge reflecting alternative vantage points (Pinch and Bijker 1987). Each text provides a partial window for viewing the unusual experience. As they are analyzed together, these texts help elaborate the broader social context surrounding a situation and facilitate an overall understanding of the forces leading to an unusual experience so as to inform possible responses (see also March et al. 1991).

*Readers and Reading the Text.* Whereas analysis of a text focuses on the deliberate construction of meaning with the goal of identifying the generative mechanisms that propelled an unusual experience, the reading

of a text focuses on the generation of inferences that readers can apply to their own or other contexts. As Riessman (1993, p. 14) put it, texts and their analysis eventually reach the hands of other people, “who bring their own meanings to bear.” She suggested that “every text is plurivocal, open to several readings and to several reconstructions.” She concluded, “Collaboration is inevitable as the reader is an agent of the text.” This is consistent with Ricoeur’s (1984) view that a narrative text links the world of the author and the world of the reader. Organizational actors who read a text about an unusual experience do not understand it simply “as is.” Instead, they actively contextualize the narrative so that it fits in with their own organizational situations and their broader knowledge and experiences. This means that they apply their own frames of reference to assess and elaborate on the meaning of a narrative (Dewey 1997, p. 199).

As an example, consider an incident that unfolded in a software firm that assembles teams for specific clients. Team members had to be validated as technically qualified for the client’s tasks. An investigation revealed that slippage had occurred in the validation process and the staffing manager allegedly responsible was asked to resign. A newcomer who heard of this incident inferred that because the staffing manager had been asked to leave, the company was strongly committed to the integrity of its validation processes. A longer tenured employee who knew more about this particular situation and this manager’s other contributions to the company thought, in contrast, that the firing decision was simply an extreme reaction that had no further implications. This illustrates how individuals use their own frames of reference to infer different meanings from the same unusual experience.

Reading and discussing many texts describing different unusual experiences may be a process that itself helps individuals generate responses to the unusual experiences they face. Access to texts that describe different unusual experiences may, for example, activate an analogical comparison engine that individuals use to establish a range of possible links along with relationships to their own work settings (Thompson et al. 2000). Organizational actors, thus, may abstract learning from narrative texts as they focus on more and different unusual experiences.

The underlying generative learning process we are describing is neither inductive based on the recognition of recurring rules across similar cases, nor deductive based on the application of logical rules across similar cases. Rather, it is an abductive process (Peirce 1998), whereby individuals bring their own frames of reference to the reading of a narrative to identify possibilities relevant to their own situations (Bartel and Garud

2003, Czarniawska 2004). Narrative readers can simultaneously attend to present experiences, evoke memories of past experiences, and anticipate future experiences (Ricoeur 1984, Carr 1986, Tsoukas and Hatch 2001). Consequently, readers with different past experiences and future visions will draw different inferences from the same narrative.

*Generating Action.* We have discussed how narrative development processes actively generate new meaning. At the same time, narratives are a potent means of learning from prior unusual experiences precisely because, in stories, people interpret rather than simply reproduce the past as it was. Specifically, organizational actors conduct “thought experiments” (Ricoeur 1984) by projecting themselves into the narrative and asking, “What would I have done in this situation?” or “What would this mean for me?” By doing so, people create opportunities to generate new meanings that fit their local realities and contexts and, in turn, enable them to consider new actions (White 1987).

As people read narrative texts about unusual experiences, they continually translate their insights into actions relevant to their own situations (Patriotta 2003, Ricoeur 1984). Thus, both analysis and reading inform the actions organizational actors take. Through such processes, however, the person and the narrative may be transformed. People learn as their perspectives on their own work context change. A narrative also takes on a new form as actors elaborate and infuse elements with meanings to fit local situations; that is, narrative users often replace an original narrative text with a newly crafted and locally salient one. As Lave and Wenger (1991, p. 34) noted, “the generality of any form of knowledge always lies in the power to renegotiate the meaning of the past and future in constructing the meaning of present circumstances.” Learning from narratives about unusual experiences manifests itself in novel and situated actions that are informed by the past.

Such a learning process, comparable to what Tarde (1962) labels “generative imitation,” gives narratives the power to affect people’s knowledge of past experiences as well as the beliefs and actions they bring to current experiences (cf. Fazio and Zanna 1981, Green and Brock 2000). Individuals give meaning to events that unfolded in other settings in terms of the implications they have for local contexts and this triggers new action (Patriotta 2003). Denning (2001) suggested narratives serve as springboards, for example—points of departure for new approaches that people construct in their own minds, drawing on available narratives and then embedding these recounted events into their own experience. In sum, narratives enable reflection and action (Schon 1983) that promote learning through processes of generative imitation (Tarde 1962) rather than through processes of exact replication (e.g., Winter and Szulanski 2001).

*Sustaining Organizational Learning.* How does learning from narratives built around unusual experiences unfold at the organizational level? We elaborate three mechanisms. First, narratives preserve the complexities, political battles, and struggles that surround the emergence of meaning and the choice of action in the face of an unusual experience.<sup>2</sup> Consistent with Bruner’s (1991) notion of “narrative accrual,” the presence of several narratives of unusual experiences sets up an overall cultural context in an organization—a narrative infrastructure in Deuten and Rip’s (2000) terms, a “cultural toolkit” in Swidler’s (1986) terms, or an institutional memory in Douglas’ (1986) terms—that constitutes an overall perspective on how to deal with unusual experiences. A narrative infrastructure contributes to organizational knowledge not by accumulating reinforcing pieces of evidence to what is already known, but by enriching and deepening the mosaic of symbols and practices available to organizational actors, thereby increasing the range of options available to deal with unusual experiences.

As individuals draw on cultural resources to create their own narratives to guide their actions in organizational settings, they simultaneously add to an organization’s infrastructure in a way that is similar to a structuration process (Giddens 1979). This process unfolds as organizational actors use symbols and expressions widely recognized in a particular organizational context, e.g., referring to “value-added service” in a company like IBM. As organizational actors develop narratives that are at once similar to and yet different from one another (Barry and Elmes 1997), an organization’s narrative infrastructure is replenished and revitalized, offering a variety of ways to deal with unusual experiences.

Second, narratives enable organizational actors to incorporate unusual experiences into their own work perspectives. Individual interpretations and responses to unusual experiences are shaped by how they believe their organization would like them to react. As people encounter unusual situations during their daily work, narratives about prior unusual experiences preserved in an organization’s cultural infrastructure help them to sort out how these situations could be interpreted as representing, for example, contradictory goals, opposing expectations, or simply novel ideas. Accumulated narratives of unusual experiences help define organizational values and standards, and accepted and expected behavior (Boje 1991, Czarniawska 1998, Martin 1982). Narratives incorporated into an organization’s memory constitute an organization’s perspective and, as they are told and retold, they help organizational actors to position new unusual experiences appropriately within an organization’s broader cultural context (Douglas 1986).

Third, narratives about unusual experiences help an organization establish a “design approach” (Boland and Collopy 2004, Romme 2003) oriented toward detecting



problems and improving response strategies. As narratives about unusual experiences typically describe a disruption and then a restoration of an established order, each story draws attention not only to emergent problems but also to how they might be fixed. Furthermore, the multiplicity of meanings narratives generate result in different instantiations of a problem and therefore the creation of alternative solutions. Consequently, narratives promote an experimentation approach for dealing with unusual experiences that are confronted in day-to-day work.

In sum, as narratives of unusual experiences accumulate within an organization, they create a memory with generative capacities that can enhance organizational actor abilities to construct diverse interpretations of situations and to engage in relevant performances. Individuals may evoke different narratives to provide a rationale and a script to justify their new behaviors. Moreover, narratives may allow the amplification of ideas in a way that can mobilize resources across entire organizations. As a result, narratives about unusual experiences provide mechanisms whereby organizations can make sense of, react to, and learn from unusual experiences.

### An Illustration

We use observations from 3M Corporation to illustrate how narrative development processes contribute to organizational learning from unusual experiences. At 3M, it is usual to talk about, report, analyze and act upon innovation experiences that do not fit easily into known categories, and then to learn from these unusual situations for future occasions.<sup>3</sup> Dr. Coyne, the former senior vice president of 3M's research and development, was well aware of the contradictions implicit in an organization where learning from the unusual was considered usual and expected. As an introduction to his metanarrative on the various innovations at 3M over time, he noted:

A tradition of innovation is a curious thing. On the one hand, it seems almost contradictory—a stubborn, unchanging habit of embracing the new and surprising. On the other hand, it seems unnecessary: in a world marked by constant and accelerating change, surely everyone everywhere feels the need for new ways of thinking and working. I hope to convince you that a tradition of innovation is both possible and necessary. And I'll discuss how we have, for almost over a century, built such a tradition at 3M. (Coyne 1996)

### Learning About and from Narratives of

#### Post-it Notes®

To illustrate Coyne's point and to show how 3M uses narratives of innovation to sustain innovation, we offer excerpts on the development of Post-it Notes® (Lindhal 1988, Nayak and Kettingham 1986, Peters and Waterman 1982, 3M 1998). Spence Silver who stumbled upon a "glue that did not glue" recalled, for example, how he liked to cultivate unusual experiences:

I wanted to see what would happen if I put a lot of it into the reaction mixture. Before, we had used amounts that would correspond to conventional wisdom. I find that very satisfying, to perturb the structure slightly and just see what happens. I have a hard time talking people into doing that—people who are more highly trained. It's been my experience that people are reluctant just to try, to experiment—just to see what will happen! (Nayak and Kettingham 1986, pp. 57–58)

The outcome was a substance Silver had never seen before, and so an event he could not readily place into a familiar category derived from his work experience. As he put it, "I was doing some experiments with a new polymer system and I made this material and said, 'This is interesting.' When I looked at it under the microscope, it was beautiful!" Because the substance did not fit a familiar category, Silver decided to investigate it further. Asked whether his experiment that led to an "impermanant adhesive" was a mistake, Silver answered, "They want to call it 'a mistake that worked.' I like to think of it as a solution that was looking for a problem to solve" (Lindhal 1988, p. 14). He added, "The first time I saw it, I said: 'This has got to be something.' Then I started telling people about it. Anyone who would listen. Technical directors, other scientists, the tech group I was part of."

In these exchanges, we see how Silver used a developing narrative to both *attend* to and *tell* others about his unusual experience. Silver believed his discovery was potentially valuable when he juxtaposed it against what was already known, i.e., it was something that neither he nor anyone else had seen before. But because it was still not clear what it was or why it might have value, he started telling anyone who would listen about it. His hope was that with help from others, he would identify economic value in the unusual substance he had created.

In talking to others, Silver developed a provisional narrative—a speculative, incomplete account. He also invited ideas from others on the potential usefulness of the material he had stumbled upon. On the one hand, it was not clear how a 'glue that did not glue' could have value given the 3M context and its commitment to glues that stuck (Nayak and Kettingham 1986). On the other hand, 3M's culture also emphasized that unusual things may have potential value (Coyne 1996). This shared culture enabled discussions about Silver's new substance to easily unfold and the new substance's unusual nature further engaged others.

The process leading to the emergence of Post-it Notes® have been *transcribed* into several texts. These narrative texts create a durable record that 3M employees can draw upon over time. We have quoted from Lindhal's interview with Silver in 1988. There is a longer narrative describing this episode in Nayak and Kettingham's (1986) book *Breakthroughs*. Other renditions can be found in books chronicling the history of 3M or in Coyne's UK Innovation lecture

series. A video narrative presents interviews with people directly involved to recount their recollections of the process and what happened (Peters and Waterman 1982).

But, it is not just the Post-it Notes® narrative that circulates at 3M. Narratives about innovations abound at 3M,<sup>4</sup> each describing what 3M people have done as they have encountered something unusual. Each features a particular series of unusual experiences as viewed by those who were involved. Together, these narrative texts provide a cultural perspective on how innovation unfolds at 3M, and informs individuals about how they should view and respond to unusual events in their work contexts. A formal analytical text is also available—a metanarrative—that Coyne has used to talk about 3M innovation processes (Coyne 1996). In his *analysis* of several 3M innovation narratives, Coyne draws from them insights concerning how innovation processes are sustained within 3M Corporation.

The wide availability of such narratives emphasizes how people at 3M necessarily encounter unusual experiences on an ongoing basis. “Stories are a habit of mind at 3M, and it’s through them—through the way they make us see ourselves and our business operations in complex, multi-dimensional forms—that we’re able to discover opportunities for strategic change,” stated one 3M employee (Shaw et al. 1998, p. 42). By institutionalizing narratives of unusual experiences, 3M has created a narrative infrastructure that not only memorializes past innovations, but also provides a springboard from which to generate new ways of encouraging and exploring the possible meaning of new unusual experiences.

### Tapping into 3M’s Generative Memory

To further illustrate the generative aspects of learning from narratives, we recount Kris Kindem’s personal experiences at 3M.<sup>5</sup> Kindem was a member of a knowledge management group exploring how 3M could take advantage of digital media and the World Wide Web. In 1997, Kindem reported how he was influenced by a “smoke stack” metaphor that appeared in some of the Post-it Notes® narrative texts, which signified the importance of interacting directly with the people who actually use a product. *Reading* the text, he asked himself, “What does it mean ‘to go to the smoke stack’ in today’s information technology world?” (personal communication).

Kindem ignored the surface details of the original narrative—smoke stacks and early 20th century factories—and attended to the challenges that were relevant to a digital age. Specifically, he concluded that 3M should use the power of the World Wide Web to facilitate more direct contact and interaction with its customers. Kindem decided to create digital three-dimensional representations of 3M products so customers worldwide could get a “virtual 3D feel” of 3M’s products. This would not only take advantage of the disintermediation the Web naturally enables but, in addition, it would help

customers get a better appreciation of the 3M product range.

Kindem’s reading of other texts describing 3M’s innovation processes reinforced his understanding of the importance of getting many people actively engaged if his project was to succeed. He also realized that his claims about what could be achieved in the virtual world would likely be contested by many managers, most of whom were accustomed to presenting and selling material products, not virtual artifacts. In fact, many people at 3M at the time had no immediate reference to or familiarity with the notion of a “virtual object.” Kindem knew that converting his new idea into good currency would be a critical yet highly difficult task.

With this task in mind, Kindem was further influenced by another generative mechanism in 3M narratives—bootlegging. At 3M, bootlegging refers to the opportunity and right of all 3M employees to access and use any of 3M’s unutilized resources. Art Fry described how it works:

At 3M we’ve got so many different types of technologies operating and so many experts and so much equipment scattered here and there, that we can piece things together when we’re starting off. We can go to this place and do “Step A” on a product, and we can make the adhesive and some of the raw materials here, and do one part over here, and another part over there, and convert a space there and make a few things that aren’t available. (Nayak and Ketteringham 1986, pp. 66–67)

This observation explains how 3M had institutionalized bootlegging processes so all 3M employees could draw upon 3M’s material, social, and financial resources for new projects. In Kindem’s case, he bootlegged resources from the knowledge management group to create digitized representations of 3M products, and he then targeted product departments with these examples to demonstrate the benefits of “going to the smoke stacks” via the World Wide Web. “Wouldn’t it be exciting to apply the smoke stack approach to your industry?” (personal communication) he asked product managers who were also familiar with the 3M narratives using the smoke stack metaphor. In sum, Kindem used the “going to the smoke stacks” metaphor to establish a link with 3M traditions even as he sought support for his new digitalization proposal.

In our Post-it Notes® and Kris Kindem illustrations, we have drawn on several different narrative texts that describe how an unusual experience emerged and was then used to foster innovation. As Useem (2002) noted, “At 3M, stories are a big deal. Every employee knows about the 3M scientist who spilled chemicals on her tennis shoe—and came up with Scotchguard. Everyone knows about the researcher who wanted a better way to mark the pages of his church hymnal—and invented the Post-it®. Collectively these stories form a larger narrative about how 3M became, and remains, one of America’s premier corporations.”

## The Distinctiveness of a Narrative Perspective on Learning

Our organizational learning framework addresses how narrative development processes enable organizations to continually learn from ongoing unusual experiences. As a foundation for our work, we adapted and extended Riessman's (1993) framework describing the narrative development processes central to how individuals represent their everyday experiences. We also drew on insights from narrative theory to outline the processes through which organizational actors then make sense of, respond to, and learn from unusual experiences.

To highlight the distinctive aspects of our framework, we now further explore how organizational learning through narratives differs from yet builds upon learning that occurs through scientific (Kanigel 1997) or experiential (Argote 1999) approaches. Both of these approaches focus on the progressive refinement of knowledge to learn improved responses to known categories of experiences. In the scientific approach, the learning strategy is based on generalizations from samples to populations. Generalizations are made possible by abstracting away the contextual details in a situation in order to identify the causal relationships linking underlying variables (Eisenhardt 1989, Mohr 1982). The narrative development processes we have outlined, in contrast, preserve rich contextual details to provide a holistic account of what has occurred (Tsoukas and Hatch 2001). Whereas a scientific approach assesses the statistical confidence of causal findings in particular conditions at a given point in time, narrative development processes focus on assessing the plausibility of an emerging explanation as it unfolds over time (Bruner 1986, Fisher 1984, Lampel 2001). Moreover, whereas a scientific approach uses objective measurements and statistical tests to assess situations, developing a narrative about an unusual experience requires people to play active interpretive roles to determine the meaning of an unusual situation and to work out an appropriate response (Fisher 1984, Ricoeur 1984). Consequently, narrative generalizations are driven by "generative imitation" processes (Tarde 1962) rather than being based on an exact replication process as a scientific approach recommends (e.g., Winter and Szulanski 2001).

A narrative perspective on learning also differs from an experiential approach to learning. Central to an experiential approach is a reliance on a stimulus-response mechanism to generate learning by doing. Such a mechanism discourages variation<sup>6</sup> and often short-circuits reflection when a known task problem arises. In contrast, narrative development directly engages actors and demands continual reflection on the implications of unfolding possibilities. By developing narratives, for example, actors make sense by imbuing phenomena with meaning rather than responding to them in nonreflexive ways (Boland and Tenkasi 1995, Gioia and Chittipidi

1991, Weick 1995). These attempts at sensemaking set in motion unfolding interactions between actors with different perspectives who tell narratives that simultaneously overlap and differ from one another (cf. Barry and Elmes 1997). This ready availability of different perspectives provides the "requisite variety" (Ashby 1956) needed to understand and possibly counter the complexities associated with unusual situations (see also Rerup 2009). The conflict that is likely to emerge as a result of these different perspectives (Lounsbury and Crumley 2007) generates dialectical tensions that are addressed through the use of narratives, thereby enabling organizational actors to deal with and learn from unusual experiences.

The distinctive contribution of our organizational learning framework is that although it differs from the experiential and scientific approaches, it nevertheless builds upon both in productive ways. Specifically, a narrative perspective on organizational learning from unusual experiences combines the reflection that is central to a scientific approach with the action that is central to an experiential approach. Reflection unfolds with provisional narratives—the snippets of conversations that serve as mechanisms to enable actors to speculate as they try to find out, "what is going on here?" (Boje 2001). Provisional narratives also serve as mechanisms for improvisation and experimentation (Baker et al. 2003, Weick 1998) that can transform situations through action, which further aids the development of meaning and understanding (Schon 1983, Tsoukas and Hatch 2001, Weick and Sutcliffe 2001). Continually facilitating this process as it unfolds are memories of prior experiences captured by narratives that guide rather than prescribe ongoing action.

## Future Research Agenda

Our framework for organizational learning from unusual experiences opens up several avenues for further inquiry. Consider the opportunities that may enable organizational actors to interpret unusual experiences through narrative development. We expect that organizations more open to and less buffered from changes in their environments, for example, are more likely to encounter unusual experiences as are organizations undergoing change to their core tasks and work processes. Such organizational situations probably provide many opportunities for actors to learn through narrative development.

In addition, research is needed to examine how organizational cultures inform and guide how actors undertake a narrative approach to learning, as we demonstrated with our 3M example. Shared beliefs about decision rules, evaluation criteria, and what is appropriate will affect the extent to which actors either rely on existing experiential categories for their interpretations, or engage in generative learning powered by narrative development processes to create new understandings.



To build joint understandings, narrative development requires that different ideas be expressed and discussed, and so political dynamics within organizations will necessarily shape how such processes unfold. Our argument is that narrative development processes offer a way to reconcile differences into a productive synthesis. Yet power relations and politics are natural features of organizing that mediate interpretation processes (Clegg and Hardy 1996). Political activity may encourage defensive postures within organizations, for example, silencing voices, constraining reflection, complicating action, and leading to broad skepticism about the usefulness of dialogue. A better understanding, therefore, of the interplay between politics and narrative development may identify how particular courses of action are selected and how learning does or does not happen in organizations.

An implication of the proposed framework that could be investigated further is the idea that by developing narratives about unusual experiences, learning processes may be able to address and better understand the ongoing relationship between exploration and exploitation (March 1991). Our framework suggests that narratives are not only an important way of capturing and attending to unusual experiences, but can also enable organizational actors to generate new and contextualized inferences and possibilities. This process does not occur through a deductive or inductive process but through an abductive process (Peirce 1998) as actors analyze and read narratives to tap into existing knowledge, assess alternative views, and seek out novel options. The idea that narrative development processes may partly account for how exploitation and exploration can occur simultaneously in organizations merits further investigation (March 1999).

Yet another question for future research concerns how narrative development processes may address how organizational actors tap into tacit knowledge. Nonaka (1994) addressed this problem by suggesting that the explication of tacit knowledge can allow it to spiral across knowledge communities. Narratives, in contrast, may operate in a different way, i.e., through abductive processes that trigger the tacit knowledge resident in listeners and readers. For this to happen there is no need to explicate all of the situational details. Even a partial and incomplete explication of an unusual experience may be enough to trigger the tacit knowledge of others who may construct their own unique inferences to fit with their local circumstances. It would be useful to explore the cognitive and social mechanisms that enable narrative development processes to trigger tacit knowledge in others.

## Conclusion

Learning has always been a central issue affecting the functioning of Organizations, and the role different

mechanisms and techniques play in these learning processes is a continually evolving topic. For some time, the focus in designing organizations has been on fostering scientific and experiential learning processes that make it possible to accumulate and refine useful stocks of knowledge in relation to specific categories of experiences that have arisen for an organization with regularity and over time. Today, such learning implicit in many organization designs needs to be supplemented by an approach able to handle unusual experiences; experiences that fall either outside or between known categories.

Organizational learning often involves tensions between (a) generating new insights and applying what has already been learned; (b) integrating different understandings that have developed at individual, group, and organizational levels; and (c) enabling both reflection and action by organizational actors as they engage with unusual phenomena and also each other. Narrative development processes build upon what is already known while preserving the differentiating aspects of unusual experiences. Narratives that emerge and are used during this process serve as boundary objects that connect organizational actors by establishing commonalities even while respecting individual differences. Moreover, emergent narratives allow organizational actors to enact situated understandings of unusual experiences while negotiating emergent meaning to generate consensual validation. An organizational memory of such experiences is generated and replenished in use as the resultant narratives of unusual experiences become part of an organization's narrative infrastructure.

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## Endnotes

<sup>1</sup>We thank an anonymous reviewer for drawing our attention to Riessman's work.

<sup>2</sup>We thank an anonymous reviewer for highlighting the battles that may emerge around categorization of events, and we note that these battles may be captured as critical learning points in the form of narratives.

<sup>3</sup>As a matter of personal preference, we have used the present tense to describe 3M. The data that we draw upon were in fact gathered in 1998. Since then, 3M has had top management changes, e.g., McKearney was brought in from GE and introduced the six sigma initiative at 3M. Reports in the public press suggest that this may have fundamentally changed the culture at 3M.

<sup>4</sup>Narratives include, for example, 3M (1998, 2002) and Huck (1955).

<sup>5</sup>We shared this account with Kris Kindem, and he agrees with this content.

<sup>6</sup>Variations may be initially cultivated as a part of a trial-and-error learning process with the goal of enhancing experiential learning.

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