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REFRAMING SYSTEMS DISASTERS WITH THREE PERSPECTIVES OF ORGANIZATIONAL CULTURE

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This paper presents the major literature on systems disasters and how organizational culture is portrayed in this literature. The paper then outlines the three cultural perspectives used by Martin (2002) to describe organizational cultures: integration, differentiation, and fragmentation. The paper explores how these perspectives influence interpretations about the disasters described. The paper concludes that the effect of an organization's culture on safety, reliability, and disasters can be fully understood only when all three perspectives are applied.

In 1984 Yale Sociologist Charles Perrow coined the phrase "normal accident" in a book bearing that name to explain unexpected, and hence unavoidable, disasters that arise out of complex, tightly coupled systems. Examples of such disasters include Three Mile Island, the ValuJet crash, and the Space Shuttles Challenger and Columbia. According to Perrow, one of the hallmarks of a normal accident is the incomprehensibility of events while they are occurring. Consider, for example, the Three Mile Island incident, which was the culmination of four failures all occurring within 13 seconds, some of which were failures of safety systems, and any one of which, by itself, would not have been a problem.

The literature on Three Mile Island and other systems disasters has benefited from the insights of political scientists (e.g., Sagan, 1993), sociologists (e.g., Perrow, 1984; Clarke, 2001; Vaughan, 1996; Weick, 1993); social psychologists (e.g., Snook, 2000), and organizational behavioralists (e.g., Morris and Moore, 1999; Haunschild and Sullivan, 2002). While organizational culture as a variable in systems disasters is referred to explicitly in some of these literatures (e.g., Vaughan, 1996; Weick, 1987), and implicitly in others (e.g., Weick, 1990; La Porte and Consolini, 1991), there is no consistent pattern in the references to culture that allows us to understand what culture means in the context of systems disasters and how the field could benefit from such a discussion.

Weick (1987) does, however, anticipate the importance of culture in systems disaster in his paper entitled "Organizational Culture and High Reliability." Weick argues, for example, that inertia is a complex state and that a day of no-errors should be praised as a difficult state to achieve. In other words, an uneventful day at air traffic control should be as exciting as a no-hitter baseball game. Yet as enacted in organizations that require high reliability, uneventful days are construed as just the opposite, as expressed by a nuclear power plan operator: "I'll tell you what dull is. Dull is operating the power plant" (1987:118). Weick argues that to effectuate a system of reliability in the face of tedium, more attention needs to be paid to organizations as "interpretation systems that generate meaning" rather than "organizations as decision makers" (1987:123). The importance of this emphasis is summarized by Cohen, March and Olsen's (1976) description of an organization as "a set of procedures for argumentation and interpretations as well as for solving problems and making decisions." Weick goes on to argue that "[m]aking meaning is an issue of culture" (1987:123).

Further, culture can create a system that is both centralized and decentralized, which is precisely what high reliability requires (Perrow, 1984). Culture does this by creating "a homogeneous set of assumptions and decision premises which, when they are invoked on a local and decentralized basis, preserve coordination and centralization" (Weick, 1987:124).

In creating a high reliability culture, Weick stresses the importance of stories (1987:125):

> Richard Feynman tells a story about the Challenger disaster when he dips O-ring material from the booster into a glass of ice water and discovers that it becomes brittle. Rudolph Pick, a chemical engineer writing to the New York Times on January 14, 1986, observed that the only way he could impress people with the danger of overfilling vessels with chemicals was to use what he called the psychological approach. "After I immersed a piece of chicken meat for several minutes in the toxic and corrosive liquid, only the bone remained. Nobody took any short cuts to established procedures after this demonstration and there were no injuries." Pick tells this story about hydrofluoric acid and the message remains with people once they scatter to their various assignments. Thus, the story coordinates them by instilling a similar set of decision premises. But the story also works because, from this small incident, people are able to remember and reconstruct a complicated set of chemical interactions that would be forgotten were some other medium, such as a set of regulations, used.

Essentially, Weick argues for high reliability through organizational stories. He argues that stories create a much richer store of well-remembered tacit knowledge than organizational rules ever can. In other words, culture, as

represented by stories, can be an important factor in high reliability systems.

Stories, however, are just one aspect of organizational culture that may be important in the study of systems disasters. Other manifestations of culture include formal practices, informal practices, rituals, language and jargon, humor, and physical arrangements (Martin, 2002). These manifestations may take many forms. Stories, for example, need not be accurate portrayals of events; myths are just as important to organizational culture. Hazing and indoctrination may be forms of formal or informal practices or rituals.

Langewiesche (1998a) describes how language played a role in the crash of ValuJet Flight 592 in 1996:

> It was known from the start that fire took the airplane down. The federal investigation began within hours, with the arrival that evening of a National Transportation Safety Board team from Washington. The investigators set up shop in an airport hotel, which they began to refer to as the "command post." The language is important. As we will see, similar forms of linguistic stiffness, specifically engineerspeak, ultimately proved to have been involved in the downing of Flight 592 – and this is a factor the NTSB investigators, because of their own verbal awkwardness, have been unable to quite recognize.

Perrow (1983:534-535) underlines on the importance of physical arrangements in creating organizational culture in his discussion of the self-reinforcing organizational structures and human factors engineers:

> Little thought has been given in nuclear power plant design for routine maintenance, engineering, and operator tours so that personnel can interact and share information. Fortunately, there is a central control room where face-to-face interaction can take place, but even where the design allows this, management policy is to discourage interaction because managers fear that company time will be used for conversation about personal topics. I could find no evidence that in commercial airline operations provisions were made in the design of support systems for the flight crews and attendants to have comfortable, informal contact with the maintenance crew, cabin-servicing crew, or those who direct the aircraft on the ground. This isolation of work groups promotes stereotyping. Personnel sometimes build unauthorized bridges to overcome this isolation. That such bridges might then be "misused" for personal ends, even while they are used for essentially organizational ends, is not surprising.

Other authors have identified these cultural manifestations in explicit discussions of the role of organizational culture in systems disasters. Vaughan (1996), for example, extensively discusses the "production" culture at NASA. Langewiesche (1998b) describes the pilot, controller, management, and FAA subcultures of air traffic control. And Weick (1990) exposes the shifting, ambiguous cues and roles of the parties involved in the Tenerife disaster.

THREE PERSPECTIVES OF ORGANIZATIONAL CULTURE

Vaughan, Langewiesche, and Weick all view complex, tightly coupled systems through one of three perspectives articulated by Martin (2002) that have come to dominate research on organizational culture: integration, differentiation, and fragmentation.

Martin's (2002) matrix summarizes these perspectives as shown in Table 1:

Table 1: Three Perspectives of Organizational Culture

		Integration	Differentiation	Fragmentation
Level of Analysis	**Organization**	Consensus throughout organization. Goal is assimilation and conformity.	No organization-wide consensus. Organization is a cluster of subcultures.	Issue-specific attention with no consensus. Patterns of issue-activation in flux.
	Group	No important subcultural differences.	Relation of subcultures can be: enhancing, conflicting, or independent.	Subcultural boundaries uncertain, fluctuating, blurred, nested, overlapping.
	Individual	Self is unified, constant member of the culture.	Self is composed of multiple subcultural identities.	Self is fragmented, in flux, no central unity.

Source: Martin, 2002

The integration perspective focuses on the aspects of culture that tend to create commonality and predictability and minimize conflict and confusion by generating mutually fulfillable expectations (Martin, 2002). The integration perspective focuses on clarity, consistency, and consensus. Weick's (1987) prescription of stories as a way to enhance reliability is an "integration" view of culture. That is, he describes culture primarily in terms of consistency (across the various manifestations of culture), organization-wide consensus (regarding the interpretations of those manifestations), and clarity.

Vaughan (1996) also adopts an integration definition of culture in her discussion of the production culture at NASA. She sees culture as institutionalized scripts that consist of rules of appropriateness "that constrain choice by shaping the menu of possible options people consider, making some choices viable and precluding others" (1996:197). Implicitly defining culture as those organizational artifacts that manifest consistency, clarity, and consensus, Vaughan writes (1996:199), "Shared cultural meaning systems give otherwise diverse groups an understanding of the requirements of each other's roles, enabling them to negotiate accommodations during conflicts that grow out of role necessities."

La Porte and Consolini (1991), too, assume the integration perspective of culture in their analysis of high reliability organizations – meaning those with good track records at handling hazardous technologies, such as aircraft carriers, air traffic control centers, and certain power companies. They describe such organizations with words such as "consistency" and "stability" (1991:24). They point out that high reliability organizations "invest a great deal in recruiting, socialization, and incentives to assure that there is agreement about organizational mission" (1991:24, emphasis added). Further, "Consensus is unequivocal" (1991:24).

The differentiation perspective, in contrast, portrays cultural manifestations as in conflict with one another and focuses on inconsistencies, lack of consensus, and non-leader-centered sources of cultural content (Martin, 2002). Langewiesche's (1998b) discussion of air traffic control is replete with references to the subcultural tensions across the organizational levels. As one controller complained (1998b:182):

> You seemed surprised that controllers now have a vested interest in the failure or embarrassment of the FAA. But "they" have taken our profession and our air traffic control and completely screwed it up. "They" have blown every opportunity to do what is right. "They" have devoted their efforts to the godless Bureaucracy. "They" have relegated us to second class status. "They" have completely forgotten why "they" and "we" are here.

This tension across levels is also evident within the control tower (1998b:179):

> [A] controller in New York mimicked his bosses for me. He said, "When I was a controller, I worked aircraft. That was easy. I told them what to do and they did it. Now that I'm management, I work controllers. Same deal. I tell you what to do, and you do it."

Snook (2000), in his analysis of the accidental shootdown of U.S. Blackhawks over Northern Iraq in 1994, views the Armed Forces from a different perspective. The most obvious competing subcultures are the Air Force and Army, with their incompatible missions and technologies. A marvelous manifestation of tensions created by physical arrangements are the photographs used to train the F-15 pilots, who fly through the air, that were taken by the Army from the ground. Even within the Air Force there are many conflicting subcultures: the F-15 pilots, the F-16 pilots, the AWACS enlisted crew, the AWACS officers, and the ground crew.

This differentiation view is also evident in Perrow's (1983) paper on human factors engineers. Perrow identifies at least four organizational sub-groups that have differing priorities: top management, design engineers, human factors engineers, and operators. Perrow clearly identifies structural factors that reinforce the power of management and design engineers and relegate the human factors engineers and operators to second-class status. He also hints at the differing sub-cultures among these groups that hinder implementation of human factors engineers' suggestions and perpetuate the organizational structures. Perrow cites, for example, the different logics that guide design engineers versus operators, and the cultures that support the logics (1983:535):

> [The human as poor substitute for machine] perspective, ingrained in students by engineering schools and common in top management, pervades the culture of the design engineer. It leads to equipment that at best is only to be monitored by an operator, and thus leads to a social structure of incentives, punishments, physical layouts, output measures, etc., that reinforce the perspective of designing out the "man" in the loop. The structure of the organization is in part an accommodation to this perspective. The operator, in coping with the structure, provides the very resistance that confirms the predictions. Awareness of this pervasive culture could lead to alternative engineering designs.

Unlike the integration view, which sees organizational clarity, consistency and consensus, and the differentiation view, which sees clarity, consistency, and consensus within subgroups at odds with each other, the fragmentation perspective does not presume any clarity, consistency, or

consensus at any level (Martin, 2002). Instead, the fragmentation perspective attends to inconsistencies and further differentiation within subcultures. It stresses individual adjustment to environmental fluctuations, including patterns of attention and interpretation. Weick's (1990) description of the Tenerife air disaster is replete with inconsistencies, subcultural differentiation and individual adjustment to environmental fluctuations. Snook's (2000) description of the physical arrangements in the AWACS also suggests a manifestation of culture that could be detected from the fragmentation perspective.

In light of the treatment of culture in the foregoing literature, it may be tempting to argue that the three perspectives simply represent different levels of analysis: the integration perspective looks at the firm level, the differentiation perspective looks at the group level, and the fragmentation perspective looks at the individual level. To do so, however, would be to miss the depth and richness of information that each of these perspectives can reveal at each level. Indeed, each perspective can reveal different meanings and interactions from the same manifestations at each level.

THE THREE PERSPECTIVES COMPARED

The ability of organizational artifacts at all levels to be viewed from different lenses can be seen in comparing the integration approach that La Porte and Consolini (1991) take in studying high reliability organizations with Snook's (2000), Langewiesche's (1998a), and Rochlin's (1991) differentiation (and sometimes fragmentation) approaches to similar organizations. La Porte and Consolini, for example, make the following claims with respect to the high reliability organizations (HROs) in their study (1991:23-24):

> The HROs in this study are characterized by well-agreed-upon operational goals. Those in the organizations carry on intensive efforts to know the physical and dynamic properties of their production technologies, and they go to considerable pains to buffer the effects of environmental surprises. In most regards, the organizations come close to meeting the conditions of closed rational systems, i.e., a well-buffered, well-understood technical core requiring consistency and stability for effective, failure-free operations. Decision strategies for most situations are straightforward, well-programmed, standard operating procedures (SOPs).

Note the assumption that the organization is a unitary entity where there is no dissent or subgroup conflict. The organization is assumed to have a single goal, and all organizational members are assumed to share that goal. In essence, La Porte and Consolini have accepted the idea that the organizational world is how the organizational leaders construe it. They are not alone in this view. There is a huge demand for the "creation" of "strong" organizational cultures (see, e.g., Schein, 1992; Nahavandi, 1993).

Would it be unreasonable to suppose, however, that there are in fact subcultures that have different interests, as revealed by Langewiesche in his description of air traffic control and Snook in his description of the participants in Operation Provide Comfort? Can scholars and practitioners be so sanguine as to suppose to that ambiguity and issue-specific attention is a matter of just not "trying hard enough" (La Porte and Consolini, 1991:24)?

The value in viewing organizations through multiple lenses is apparent in Vaughan's (1996) treatment of the Challenger disaster. If observers focus on just one event – the fateful meeting on the eve of the launch – they can glean additional insight into the culture that allowed the launch in the face of contraindicators. Vaughan writes, for example, that "[t]he previously shared values about rule following, authority relations, and technical rigor that participants automatically invoked on the eve of the launch did not work in the best interests of safety" (1996: 418). She assumes that there was consensus, clarity, and consistency with respect to the rules, authority, and technical rigor: "the teleconference was a microcosm through which we watched these patterns of the past reproduced in a single, dynamic exchange" (1996: 398). She then assumes that these aspects of culture made the choice clear: "Not only did the correspondence of their actions with these cultural scripts normalize their actions, in their view, but their awareness of their conformity had a separate effect. The fact that they did everything they were supposed to do reinforced the technical choices they made" (1996:397).

What if these events and relations are viewed from a differentiation perspective? Might it become apparent that the cultures of each of the groups enabled the other groups to proceed with faulty premises? Might a better understanding arise of the power relations among the groups? What contributions could a fragmentation perspective make? Might it become clear that the physical arrangements (participants at three different locations) created ambiguity and enhanced not only the uncertainty of the technology, but also the uncertainty regarding how to construe the situation and resolve conflicts? In other words, cannot the very same manifestations – rules, physical arrangements, stories, etc. – reveal something very different simply by changing the perspective?

It is not just the literature adopting the integration perspective that could benefit from a dose of the other perspectives. Snook's (2000) explanation of how F-15s could shoot friendly Black Hawks out of the sky might be enhanced by the addition of an integration analysis. While Snook is explicit in his description of the various subcultures that permeate the Armed Forces, and he describes the differing needs, ambiguity, and lack of cohesion among the AWACS crewmembers, he does not consider how the manifestations might suggest clarity, consistency, and consensus. Are there no underlying assumptions that are shared by members of the armed forces? Do the uniforms mean anything? What about notions of patriotism? What

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myths and stories are in circulation? What rituals invoke shared meaning? While Snook suggests individual, group, and organizational factors that contributed to the shootdown, there may be some implicit expectations shared by members of the military that contribute to these sorts of incidents.

COMBINING THE PERSPECTIVES

The value in viewing a disaster from the three perspectives can be seen with the integration of the many literatures analyzing the Space Shuttle Columbia disaster, which occurred on February 1, 2003. While the puncture of the left wing by foam that detached from the rocket booster has been identified as the physical culprit, it is clear from the accident investigations that it was the NASA culture that prevented discovery of the extent of the problem and hence any attempt to remedy the problem before it culminated in disaster 16 days after the initial puncture.

In his independent exposé of the Columbia disaster, William Langeweische (2003) viewed NASA's culture from each of the three perspectives, although he did not identify his investigation in these terms. These three perspectives on the same disaster show a more robust picture of causation than any perspective alone. Examples of the cultural manifestations seen by each perspective are listed in Table 2:

Table 2: Cultural Manifestations Seen by Each Perspective

Integration	Differentiation	Fragmentation
• "Space flight is known to be a risky business"	• "only a handful of people – a few engineers deep inside of NASA – worried that the vehicle and its seven souls might actually come to grief." (p.60)	• "though it [the Columbia] continued to lay flares in its wake, the astronauts aboard remained blissfully unaware of the trouble they were in"
• "They [the astronauts] were also team players, by intense selection, and nothing if not wise to the game." (p.60)	• "In the jargon-laced language of the control room Kling said, 'Flight, Macs.'" (p.61)	• "Sitting at their specialized positions, and monitoring the numbers displayed on the consoles, a few of the flight controllers had begun to sense, just barely, that something was going seriously wrong. The worry was not quite coherent yet. One of the controllers later told me that it amounted to an inexplicable bad feeling in his gut." (p.61)
• Reports from the astronauts were "Miracle Whip on Wonder Bread, standard NASA fare."	• "O'Keefe [NASA Administrator] Was not a space crusader, as some earlier NASA administrators had been, and he was not about to pick up the fallen banners of visionaries and try to lead the way forward … NASA's true believers called him a carpetbagger and resented the schedule pressures he brought to bear" (p.64)	• "When word got to the White House, the executive staff ducked quickly into defensive positions: President Bush would grieve alongside the families and say the right things about carrying on, but rather than involving himself by appointing an independent presidential commission, as Ronald Reagan had in response to the Challenger accident, he would keep his distance by expressing faith in NASA's ability to find the cause. In other words, this baby was going to be dropped squarely onto O'Keefe's lap. The White House approved Gehman's appointment to lead what would essentially be NASA's investigation—but O'Keefe could expect little further communication. There was a chance that the President would not even want to receive the final report directly but would ask that it be deposited more discreetly in the White House in-box. He had problems bigger than space on his mind." (p.64)
• "But all the failing instruments were in the left wing. The possible significance of this was not lost on Cain: during the launch a piece of solid foam had broken off from the shuttle's external fuel tank, and at high speed had smashed into the left wing; after minimal consideration the shuttle program managers (who stood above Mission Control in the NASA hierarchy) had dismissed the incident as essentially unthreatening. Like almost everyone else at NASA, Cain had taken the managers at their word—and he still did." (p.61, emphasis added)	• "the simulator went into the ocean well short of the airport. The incident caused a disturbance inside the Johnson Space Center, particularly because of the long-standing struggle possession of data (and ultimately control) between the pilots in flight and the engineers at their consoles." (p.69)	• "This time, however, it turned out that two of the flight controllers had not communicated correctly with each other, and that a the judgment of Mission Control therefore was wrong." (p.69)
• "In Houston the controllers maintained discipline, and continued preparing for the landing, even as they received word that the Merritt Island radar, in Florida, which should by now have started tracking the inbound craft, was picking up only false targets." (p.63)	• the low-level engineers at the Kennedy Space Center whose job was to review the launch videos and film were immediately concerned by the size and speed of the foam that had struck the shuttle. As expected of them, they compiled the imagery and disseminated it by e-mail to various shuttle engineers and managers—most significantly those in charge of the shuttle program at the Johnson Space Center. Realizing that their blurred or otherwise inadequate pictures showed nothing of the damage that might have been inflicted, and anticipating the need for such information by others, the engineers at Kennedy then went outside normal channels and on their own initiative approached the Department of Defense with a request that secret military satellites or ground-based high-resolution cameras be used to photograph the shuttle	• "'Because the problem was not identified in the traditional way "Houston, we have a problem!" – well, then, "Houston, we don't
• "Cain insisted on control-room discipline. He said, 'No phone calls off site outside of this room. Our discussions are on these loops—the recorded DVIS loops only. No data, no phone calls, no transmissions anywhere, into or out.' Later this was taken by some critics to be a typical NASA reaction—insular, furtive, overcontrolling." (p.63).		
• "the launch is a critical and complicated operation, demanding close teamwork, tight coordination with Mission Control, and above all extreme concentration"		

Integration	Differentiation	Fragmentation
(p.69) • "it had become a matter of faith within NASA that foam strikes—which were a known problem—could not cause mortal damage to the shuttle" (p.73)	in orbit." (p.77) • "The MMT was a high-level group. In the Houston hierarchy it operated above the flight controllers in the Mission Control room, and just below the shuttle program manager" (p.80) • "The frustration is that some people on lower levels were actively worried about that possibility, and they understood clearly that not enough was known about the effects of the foam strike on the wing, but they expressed their concerns mostly to one another, and for good reason, because on the few occasions when they tried to alert the decision-makers, NASA's management system overwhelmed them and allowed none of them to be heard." (p.80) • "'They claim that the culture in Houston is a 'badgeless society,' meaning it doesn't matter what you have on your badge—you're concerned about shuttle safety together. Well, that's all nice, but the truth is that it does matter what badge you're wearing. Look, if you really do have an organization that has free communication and open doors and all that kind of stuff, it takes a special kind of management to make it work. And we just don't see that management here. Oh, they say all the right things. "We have open doors and e-mails, and anybody who sees a problem can raise his hand, blow a whistle, and stop the whole process." But then when you look at how it really works, it's an incestuous, hierarchical system, with invisible rankings and a very strict informal chain of command" (p.82) • "the astronauts had been told of the strike, but almost as if they were children who didn't need to be involved in the grown-up conversation" (p.85)	have a problem!'" Because Houston didn't identify the problem.'" (p.81) • "The confusion was now total, yet also nearly invisible – and within the suppressive culture of the human spaceflight program, it had very little chance of making itself known. At the top of the tangle, neither Ron Dittemore nor Linda Ham ever learned that the Debris Assessment Team wanted pictures; at the bottom, the Debris Assessment engineers heard the 'no' without suspecting that it was not an answer to their request. They were told to go back to the Crater model and numerical analysis, and as earnest, hardworking engineers (hardly rebels, these), they dutifully complied, all the while regretting the blind assumptions that they would have to make. Given the obvious potential for a catastrophe, one might expect that they would have gone directly to Linda Ham, on foot if necessary, to make the argument in person for a spacewalk or high-resolution photos. However, such were the constraints within the Johnson Space Center that they never dared. They later said that had they made a fuss about the shuttle, they might have been singled out for ridicule. They feared for their standing, and their careers." (p.81)

Source: Langeweische, 2003.

What is striking is the effect of the differentiation and fragmentation perspectives on the decomposition of the disaster. It is these views of culture that highlight the problems NASA had with communication, an insight thoroughly lost by viewing the culture from an integration perspective alone. The integration perspective is nevertheless important in drawing attention to what NASA management believed was happening (sharing information) and accordingly believed could not be happening (hoarding information).

MANAGERIAL IMPLICATIONS

The managerial implications of using all three perspectives on organizational culture are significant. Managers that view culture as only those factors that organizational actors share are likely to miss those very factors that are most likely to contribute to a systems failure. For example, NASA managers assumed that all organizational participants bought into the notion of "open doors" when it came to safety, yet engineers in the lower echelons of NASA believed that if they expressed their concerns freely, they would lose their jobs (Langeweische, 2003).

Another implication is that sometimes the same culture that helps an organization achieve certain goals hurts the same organization's pursuit of other goals. This was obvious in the Challenger disaster, where the same highly structured culture that prevented poor decisions in most cases in fact led to resistance to cancelling that flight. This appears to be particularly problematic when a situation arises that is

outside the range of expectations, the "Black Swan" event. In the case of the Challenger, the Black Swan was an unusually low temperature; in the case of Columbia, it was a large piece of foam hitting at an unusual and unexpected location. NASA in both cases relied on a highly integrated culture that dealt well with "routine" risks, and suppressed information flow from differentiation/fragmentation elements that were more alert to implications of the "outlier" situations.

An additional important implication is that managers must realize that the organization they see is not necessarily the organization others see. Where managers see order, efficiency, and competence, other organizational participants may see rigidity, disregard for safety, and blind obedience to protocol. Realizing that culture is more than what is shared by all or imposed by management will help managers be more effective in ensuring that subcultures communicate with each other and share beliefs and assumptions.

CONCLUSIONS

Like the author who was speaking prose his entire life without knowing it, the systems disasters researchers have been speaking culture, often without acknowledging it. Organizational culture played a significant role in each of the incidents described above. An organization's culture – and its effect on reliability and disasters – can be fully understood only when all three perspectives are applied. Only then can cultural perspectives fully address the troubling question: how can such terrible things happen in spite of our best efforts to prevent them?

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