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## Abstract and Keywords

Positive organizational scholarship is concerned with dynamics that enable organizational strength and flourishing. In this chapter, we argue that organizations that manage unexpected events and prevent small problems from becoming large crises are engaged in important acts of positive organizing. We assume that adverse events, crises, and accidents are not inevitable; rather, they result from small problems, surprises, and lapses that shift, grow, and escalate until they are too big to handle. This chapter focuses on a set of capabilities that allows organizations to contain and repair vulnerability. Specifically, we identify a set of critical capabilities that involve attention, awareness, and action: these include capabilities for attending to, making sense of, and not explaining away discrepancies; capabilities for updating and coordinating understanding as problems unfold; and capabilities for actively managing problems through containment and resilience. We end with avenues for future research and practice.

Keywords: Managing unexpected events, perturbations, weak signals, problem finding, coping with surprise, resilience, high reliability organizing

On the evening of April 20, 2010, a sudden blowout explosion on the Deepwater Horizon offshore oil drilling platform, located 40 miles southeast of the Louisiana coast, killed 11 platform workers and injured 17 others (CNN.com, 2010; Robertson, 2010). It also initiated a massive ongoing oil spill in the Gulf of Mexico that gushed for 4 months beneath the ocean, at an estimated rate of between 35,000 and 65,000 barrels of crude oil per day (Finard, 2010), until early August when the runaway well was finally capped. Estimates of the short- and long-term ecological and economic damage from one of the largest spills in the world and perhaps the largest spill in U.S. history suggested costs would be massive (Weisman, Chazan, & Power, 2010). Cleanup costs, damages, and fines

for British Petroleum (the well's owner) alone were estimated to be in the range of $50 billion (Sandler, 2010).

The day after the accident, executives of the platform's owner, Transocean Ltd., stated that, before the blast occurred, workers had been performing their standard routines and *had no indications* of impending problems (CNN.com, 2010). Yet, as investigators sifted through internal documents from BP, Transocean, and other involved companies and interviewed those involved, a different story began to emerge (Casselman & Gold, 2010). Warning signs of problems—such as possible contamination of the cement used to seal off the well from volatile natural gas, failure to monitor the well closely for signs that gas was leaking in, and a decision to continue work after a test that checks for leaks in the well suggested that something was wrong—were prominent; not only in the hour before the explosion, but also in the days, weeks, and months before. In fact, there were many ways in which workers, leaders, and others either knew or should have known that something was amiss. For example, prompted by a December 2009 near-disaster on one of its North Sea drilling rigs, Transocean Ltd., on April 5, in a 10-page (p. 844) operations advisory warned the Deepwater crew "Do not be complacent ... Remain focused on well control" (Casselman, 2010).

The preceding story highlights the central issue of concern in this chapter, which is summed up in the following compact sentence: Managing the unexpected is about curbing the temptation to treat small perturbations and discrepancies as normal, and then dealing with the consequences when curbing that temptation fails.

*Unexpected*, by definition, means to come without warning; something unforeseen. Yet, even though it may seem like an apparent contradiction, several decades of research on the underpinnings of crises/accidents and more recent work on predictable surprises (e.g., Bazerman & Watkins, 2004) reveal that unexpected events rarely develop instantaneously or occur without warning (see, for examples, Reason, 1997; Starbuck & Farjoun, 2005; Turner, 1978). Their seeds are sown long before turmoil arrives in small problems, mistakes, or failures that are unnoticed, ignored, misunderstood, or discounted, and subsequently concatenate and escalate into crises or catastrophes (Reason, 1997). To manage the unexpected requires problem insight—becoming alert and aware of small disturbances and vulnerabilities as they emerge, making sense of their possible problematic consequences, and making adjustments to ongoing action before they can turn into a tragic flaw (Perin, 2006). The earlier organizations try to catch problems, the more options are available to deal with them. At the same time, the earlier organizations try to catch problems, the harder they are to spot (Weick & Sutcliffe, 2007).

A chapter focused on "problems" in a book devoted to scholarship that aims to explore "especially positive outcomes, processes, and attributes of organizations and their members" (Cameron, Dutton, & Quinn, 2003, p. 4) may seem ironic. Yet, if we take seriously the idea that small perturbations underlie unexpected events and are a key to their evasion, and that "to go through a day filled with a million accidents waiting to happen, and to find at the end of the day that they are still waiting to happen, *is*

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*amazing*" (Weick, 2003, p. 79, emphasis added), then the study of the mechanisms through which organizations can discern and manage small disturbances before they grow bigger is a "nonobvious outcropping" (Weick, 2003, p. 79) of *positive organizing*, and an important area of inquiry.

Positive organizational scholarship (POS) emphasizes how supportive and "virtuous" organizations can be characterized by climates that enable strength and flourishing. But through what mechanisms does strengthening—the capability to resist attack—come about? In this chapter, we propose that strengthening comes about by organizing in ways to become aware of problems earlier, so that they can be remedied before they become large and unwieldy. In this way, impermanent organizations that tend toward disorder, chaos, and entropy enact structures that facilitate positive adjustment no matter what the conditions (Sutcliffe & Vogus, 2003). We begin with the assumption that the "presumed solidity of organizations is not so obvious" (Weick, 2009, p. 7) and that coordination and interdependence are impermanent and need to be continually reaccomplished (Weick, 2009). Moreover, we assume that organizations tend toward mistakes, errors, and failures. Consistent with Paget (1988), we assume that actions become mistaken but don't start out that way. Given the tendencies toward entropy in interdependent systems, it is clear that episodes of positive organizing occur when the invisible or less visible initial stages of potential organizational failures turn positive rather than negative (Weick, 2003).

The virtuousness and criticality of exploring how systems can be strengthened, so that their operations remain neutral or at least not negative, is heightened by research demonstrating the pervasiveness of *positive asymmetry* (Cerulo, 2006). Positive asymmetry is the cultural tendency of people (especially Americans) to focus on and exaggerate the best-case characteristics, the most optimistic outlook or outcomes. This tendency "to see only the best characteristics and potential of people, places, objects, and events" until it is too late, often leads to situations that "we never saw coming" (Cerulo, 2006, p. 6). In other words, small problems, mistakes, mishaps, or lapses are a natural part of organizational life, but strong tendencies to pay careful attention to best cases and careless attention to worst cases often means that small details don't get attention until too late. We argue that this doesn't have to be the case.

In the remainder of this chapter, we enlarge these introductory ideas in three ways. First, we explore issues of organizational attention and recognition. Second, we explore issues of containment and resilience once the unexpected has broken through. Third, we conclude with a set of ideas for future research that follow from our analysis.

# Toward a Capability Model for Managing the Unexpected

## Managing the Unexpected

We propose that issues of alertness, awareness, and action underpin an organization's ability to manage (p. 845) the unexpected. Specifically, we argue that processes that enable competent action to deal with these issues in various domains (e.g., Dutton, Worline, Frost, & Lilius, 2006; Eisenhardt & Martin, 2000; Orlikowski, 2002) are critical capabilities that underpin organizational strength. Specifically, we explore seven key capabilities: first, the capability to allocate attention, either proactively or reactively; second, the capability to discern and make sense of weak signals/small problems as they emerge; third, the capability to avoid normalizing anomalies away; fourth, the capability to stay flexible and update understandings as situations evolve over time; fifth, the capability to coordinate understanding through intraorganizational communication and interaction; sixth, the capability to contain the unexpected as it manifests; and, seventh, the capability to be resilient in the face of adversity.

## Allocating Attention

Managing the unexpected naturally requires attention. To attend to something means "to direct the mind or observant faculties, to listen, apply oneself; to watch over, minister to, wait upon, follow, frequent; to wait for, await, expect" (*Oxford English Dictionary*). By definition, attending is a deliberate act, in which cognitive effort is being actively expended, and the moment of attending can be seen as a type of "switching of cognitive gears," in which automatic thinking changes to active thinking (Louis & Sutton, 1991). Attention can be allocated proactively or reactively. Proactively, attention can be allocated to scan the environment, looking for potential problems, often those that fit a particular set of criteria (i.e., certain cues to watch for, issues that trigger alerts etc). Reactively, attention can be allocated in response to some sort of stimulus.

Research on organizational attention has been conducted mostly at the level of the organization and its top management team (Ocasio, 1997; Ocasio & Joseph, 2005; Sonpar & Golden-Biddle, 2008; Starbuck & Milliken, 1988; Sutcliffe, 1994), primarily on the topic of proactive attention allocation (which has become synonymous with scanning). For instance, *scanning*—an organizational "process of monitoring the environment and providing environmental data to managers"—is a first step in Daft and Weick's (1984) model of organizations as interpretation systems. Scanning can be either the simple observation of stimuli or a stimulus-driven search carried out through formal data collection systems or the personal contacts of managers (p. 286). Scanning systems have been characterized as irregular, periodic, or continuous, reflecting the increasing formalization, intensity, and complexity of the system (Fahey & King, 1977), and can vary "from high vigilance, active scanning, to the routine scanning or mere maintenance of a state of alertness for nonroutine (but relevant) information" (Huber, 1991, p. 97).

A key idea in these perspectives is that the more attention that is directed to active scanning, the better the recognition of problems, threats, or changes. However, there are at least two problems with the idea that top management team attention leads to better problem finding. First, we know that scanning by top leaders is often flawed. Actors who

are scanning on behalf of the organization (i.e., executives) are themselves prone to biases and may notice certain cues instead of other cues (Starbuck & Milliken, 1988) or have the accuracy of their perceptions shaped by structural factors within the organization (Sutcliffe, 1994). Second, we know that organizational leaders are often unaware of problems that others in the organization have noticed, either because others are not willing to speak up (Morrison & Milliken, 2000) or because they believe that—as experts—they would be aware of problems if they existed (Westrum, 1982).

Unfortunately, few studies have investigated how front-line workers attend to emerging problems or how attention is collectively distributed within teams and organizations (for an exception, see Rerup, 2009). This is a particularly critical issue in complex interdependent work, when both the recognition and resolution of unfolding problems depend on the combined knowledge and action of multiple individuals: For instance, one person may notice that there is a problem, but if they are not able to focus the attention of the team on the problem, they won't be able to resolve the issue (Christianson, 2009).

Research on the reactive allocation of attention suggests that the individual who perceives the cue is important; that one executive may notice something that another executive has filtered out (Kiesler & Sproull, 1982) or an expert may notice something that a novice might not (Benner, Hooper-Kyriakidis, & Stannard, 1999; Dreyfus & Dreyfus, 1986; Klein, Pliske, Crandall, & Woods, 2005). Other studies suggest that the nature of the stimulus is important, that attention is reactively triggered when there is a gap or discrepancy (Cowan, 1986; Klein et al., 2005). A gap or discrepancy can be triggered in several ways: something expected doesn't happen, something unexpected happens, or (p. 846) something completely inconceivable happens (i.e., "bolt from the blue") (Weick & Sutcliffe, 2007). The amount of attention directed toward a problem depends on the magnitude of the problem: Larger problems or crises demand more attention (Christianson, Farkas, Sutcliffe, & Weick, 2009; Meyer, 1982), and smaller problems often escape notice. Ultimately, managing the unexpected is about managing the flow of attention of both top management and front-line workers, so that they are able to proactively and reactively notice small problems before they become big problems and to manage and coordinate the flow of attention within teams of front-line workers, achieving a balance so team members can both attend to their individual tasks and to the collective work of the team.

## Sensemaking

Managing the unexpected not only requires attention, becoming aware of details, but also requires discernment, understanding what those details might mean. Scholars grounded in the computational information processing perspective assume that discernment results from a linear latency period of gestation in which conditions are changing and building and discrepancies accumulate until some kind of threshold is reached and the problem or situation is understood (Cowan, 1986).

In contrast, scholars grounded in the interpretive aspects of information processing (Klein et al., 2005; Weick, 1995) privilege the idea that part of organizational information processing necessitates the creation of "meaning around information in a social system" (Lant, 2002, p. 345). In other words, discernment isn't simply an information processing problem of perceiving cues that add up until a threshold is reached. Rather, because cues and discrepancies unfold in the context of other information and multiple projects are under way at the same time that reflection takes place (Weick, 1995, p. 27), there is equivocality and confusion rather than uncertainty and ignorance. Thus signals are subtle and context dependent (Klein et al., 2005), which means that discernment is an issue of sensemaking. Moreover, we often recognize problems concurrently or after discrepancies signaling their development have already occurred, thus we are always playing catch-up in trying to make sense of their implications.

The point is that discernment is an issue of appreciating the "significance of data elements in the first place" (Klein et al., 2005, p. 20). To call something a cue or discrepancy, one has to already appreciate its meaning. "The same datum can change meaning as context changes, which means that it is fruitless to mount a search for the 'important stuff'" (Sutcliffe & Weick, 2008, p. 66). In other words, meaning is sensitive to some details of the current situation, what is, has, and could be, going on, and what "the observer expects or intends to happen" (Woods, Patterson, & Roth, 2002). Expectancies (expectations) are critical to sensemaking, as cues and anomalies are not given by the situation. They are constructed and inferred. And, expectancies form the basis for what counts as a cue and is singled out—in sum, they are sensegiving structures for sensemaking. In fact, they form the basis for virtually all deliberate actions because expectancies about how the world operates serve as implicit assumptions that guide behavioral choices (Olson, Roese, & Zanna, 1996, p. 220). But they also create blind spots because they direct attention to certain features of events. Thus, they act like an invisible hand, affecting what people notice, take for granted, ignore, overlook, and discount. Coupled with cognitive biases and heuristics that increase the propensity to search for evidence that confirms the accuracy of our original expectations, these blind spots get larger, often concealing small problems that are getting bigger and harder to solve. Still, expectancies "are critical for detecting 'negative' cues—events that did not happen, but were supposed to occur" (Klein et al., 2005, p. 21–22), and because they are sticky, there is a need to generate alternative expectancies. This means that problem discernment "requires people to reframe the way they understand the situation" (Klein et al., 2005, p. 23). This is harder than it might seem.

Research suggests that cultivating expertise (often through deliberate practice; Ericsson & Charness, 1994) strengthens the ability to generate expectancies critical for noticing cues, as well as for discerning their meaning (Klein et al., 2005). Experts can more quickly recognize patterns, spot things that violate expected patterns, or, conversely, piece together into patterns seemingly unrelated cues (Benner, 1984; Dreyfus & Dreyfus, 1986). Moreover, expertise may influence the capability to judge urgency, and "the need

to respond quickly rather than waiting to see how things will develop" (Klein et al., 2005, p. 22).


## Anomalizing

Managing the unexpected requires capabilities to avoid treating small perturbations (e.g., unexpected cues, events or discrepancies) as normal. In other (p. 847) words, to manage the unexpected well requires capabilities to enhance the stability and vividness of attention. Stable, vivid attention means that people can hang onto discrepant details long enough to weaken the tendency to normalize—to treat small unexpected events or weak signals of deviation as no big deal (Weick & Sutcliffe, 2006).

Vaughan's (1996) reanalysis of the 1986 *Challenger* space shuttle disaster revealed evidence of the tendency to normalize anomalies and uncertainties into acceptable deviations or risks or to simply ignore them (Starbuck & Farjoun, 2005, p. 46–47). A variant on this pattern was found in the *Columbia* space shuttle accident, when NASA staff interpreted the burst of debris at the root of the left wing of the shuttle as an "almost in-family event" (Starbuck & Farjoun, 2005, p. 146). This interpretation meant that the event was not a serious "problem," and may have been normal (or expected) because "in-family" events referred to problems that had been previously experienced, analyzed, and understood.

If we assume that anomalies foreshadow potential problems, but that the tendency exists to sweep the details into everyday experience, particularly when people and organizations face performance and production pressures, the obvious question is: What decreases the tendency to normalize? According to Weick and colleagues (Weick & Sutcliffe, 2001, 2007; Weick, Sutcliffe, & Obstfeld, 1999), mindful organizing decreases tendencies to normalize and increases tendencies to *anomalize* (Weick & Sutcliffe, 2006, p. 518)—to become more alert to discrepant details, more able to hold on to those details, less likely to simplify those details into familiar events, and overall to become more aware of their significance. The more people hold on to differences, nuances, discrepancies, and outliers, the more slowly they normalize the details. In other words, the longer that people are able to appreciate the distinctiveness of a cue (e.g., delaying stereotyping), either by avoiding lumping it into a broader category or by developing more varied categories, the more nuanced and fine-grained an understanding they can create. This means that the nuances of anomalies can be more deeply examined and acted on more quickly, so that they don't build up until events become unmanageable.

Patterns of mindful organizing are especially visible in so-called high reliability organizations (HROs), which face special problems of learning and acting because of risky technologies that are not fully comprehended and continuous exposure to dynamic contingencies. The best HROs institutionalize processes and practices that "induce a rich awareness of discriminatory detail and a capacity for action" (Weick et al., 1999, p. 88) by spending more time examining failures to assess the health of the system, resisting the

urge to simplify assumptions, observing operations and their effects, developing resilience, and locating local expertise and creating a climate of deference to those experts (Weick & Sutcliffe, 2006, p. 516). A mindful infrastructure guards against misspecifying, misestimating, and misunderstanding things (Schulman, 2004; Vogus & Sutcliffe, 2007b) and increases the organization-wide sense of vulnerability that can mitigate the competing performance and production pressures that can exacerbate normalizing. Consequently, organizations can continuously manage fluctuations and more quickly discover and correct minor perturbations that can build and cause major disruptions. Research on mindful organizing in health care appears to confirm these ideas. Vogus (2004; Vogus & Sutcliffe, 2007a, 2007b), for example, found strong negative associations between mindful organizing practices and errors and falls, and concluded that the ongoing actions and interactions embedded in safety organizing practices contributed to greater alertness and discernment of unsafe conditions.

## Updating

Managing the unexpected requires updating—that is, the ability to modify understanding of a situation (and the corresponding response to that situation) either because the situation has changed or evolved over time, or the initial assessment of the situation was flawed. This ability to update goes to the heart of adapting and remaining resilient in the face of adversity. However, we know that it is extremely difficult—if not impossible—for people to engage in updating, particularly if they have already started down a particular trajectory/pathway of cognition and action (e.g., Klayman, 1995; Nisbett & Ross, 1980; Rudolph, Morrison, & Carroll, 2009; Staw & Ross, 1987). Updating is made even more complicated by the fact that unexpected discrepancies are often perceived as threats and, under threat, people tend to restrict information processing (i.e., attend only to dominant cues) and constrict control (i.e., revert to first learned responses) (Staw, Sandelands, & Dutton, 1981; Weick, 1990)

Much of the research on why effective updating is so difficult (Nisbett & Ross, 1980; Rudolph, 2003; Staw & Ross, 1987) centers on cognitive (p. 848) biases, and how they act as barriers to updating. *Confirmation bias* is one example (Klayman, 1995; Nickerson, 1998). Confirmation bias pertains to a class of biases in which individuals privilege information that supports their hypotheses and dismiss information that challenges them, interfering with both noticing and interpreting, which are essential for updating. To update understanding, one must notice that something has changed and also must interpret that change as a cue worth paying attention to. Furthermore, one must convert that change into a new understanding. In addition to interfering with updating, cognitive biases can also interfere with activities discussed earlier in this chapter: the allocation of attention, sensemaking, and anomalizing.

If people are able to revisit their understanding—which requires breaking the inertia (or momentum) of the current trajectory—and to reconsider whether they are on the right path, the next question is: How effectively are they updating? Effective updating is

characterized by arriving at a more plausible or closer correspondence between the actor's interpretation of the situation and the situation itself, which can be characterized as "more comprehensive, incorporates more of the observed data, and is more resilient in the face of criticism" (Weick, Sutcliffe, & Obstfeld, 2005, p. 415). Yet, studies show that high variance exists, both in terms of frequency and accuracy, in the extent to which effective updating is accomplished. Rudolph's (2003) study of the diagnostic strategies used by anesthesiology residents showed that only 23% of the sample engaged in effective updating (28% of the sample got stuck on their initial diagnosis, 5% considered only a few alternate diagnoses but did not test them sufficiently, and 44% considered multiple diagnoses but did not spend time to determine if they were correct). Even more strikingly, Christianson (2009) found a 32-fold difference in terms of the speed with which interdisciplinary teams of health care providers were able to detect and correct an equipment malfunction.

Updating requires doubt. Doubt—that "state of uncertainty with regard to the truth or reality of anything; undecidedness of belief or opinion" (*Oxford English Dictionary*)—is necessary for overcoming the many forces that make it difficult to question a trajectory of cognition and action once under way (Weick, 1979). As people make sense of unfolding events, doubt either can be a prompt to consider other courses of action, or it can be the outcome of the chosen course of action. Doubt can be generative, resulting in new ideas (Locke, Golden-Biddle, & Feldman, 2008)

Although questions remain about how to facilitate updating, one promising finding suggests that updating is more likely when people work in groups. Individuals are able to effectively update about 25% of the time (Rudolph, 2003), whereas groups are able to effectively update about 50% of the time (Christianson, 2009; LePine, 1998). It may be easier for groups to make sense of problems because partners make social constructions easier: "A partner is a second source of ideas. A partner strengthens independent judgment in the face of a majority. And a partner enlarges the pool of data that are considered" (Weick, 1993, p. 642). Consequently, as we argue in the next section, interactions are critical for managing the unexpected.

## Interacting and Communicating

Managing the unexpected is about interacting and communicating. Attending, sensemaking, anomalizing, and updating occur in the context of complex organizations that are loosely connected. Interconnecting is critical to "finding" emerging problems (as well as putting them right). As Taylor and Van Every (2000, p. 207) argue, *re*-cognition occurs when "groups composed of individuals with distributed—segmented, partial— images of a complex environment…through interaction, synthetically construct a representation…that works; one which in its interactive complexity, outstrips the capacity of any single individual in the network to represent and discriminate events." A pool of knowledge may result from the summation of people's ideas, "but, a representation of the world that none of those involved individually possessed or could possess" (Taylor & Van

Every, 2000, p. 207) emerges out of dense interconnections. This is consistent with Hutchins's (1995, p. 176) view that "the cognitive properties of human groups may depend on the social organization of individual cognitive capabilities."

The basic point is that the organization's design (task and workflow interdependence [Thompson, 1967] and patterns of interaction and communication) and the culture that results from it can help or hinder how individuals become alert and aware of perturbations as it influences patterns of cognition, and also the extent to which individuals link their cognitions. More controlled cognition, which, as we argued earlier, will affect patterns of attention, results from reciprocal interdependence and mutual adjustment (Weick, 2009, p. 54). After all, (p. 849) problems in complex organizations rarely emerge full-blown; they are constructed and created through various bits of information that must be assembled and consolidated before understanding can emerge. But, it isn't simply a matter of assembling information parts. The meaning of one part may relate "to some other part whose meaning, in turn, is dependent on the meaning of the initial part" (Weick, 2009, p. 54). Moreover, organizations are filled with ambiguous and messy details, so that people can draw different yet equally plausible conclusions from observing the same "objective" data. Ambiguity cannot be resolved through collecting more information; rather it requires debate, discussion, and active listening (Weick et al., 1999). The important insight for our purposes is that detecting and making sense of anomalies is an iterative process of making sense of divergent information and perceptions that requires dense interaction and communication.

Still, reciprocal interaction does not guarantee that that a clear view of the problem will be generated. Challenges to creating a common representation among diverse individuals are many. First, individuals may be embedded in organizations in which silence about emerging problems is more the norm than the exception (Morrison & Milliken, 2000). Moreover, people refrain from speaking up because they fear negative social consequences (Edmondson, 1999), think their input will be dismissed or disregarded (Blatt, Christianson, Sutcliffe, & Rosenthal, 2006), or defer to the expertise of others (Barton & Sutcliffe, 2009; Van Dyne, Ang, & Botero, 2003).

Second, research shows that people tend to surface and discuss commonly held information much more so than unique information (Stasser & Titus, 1985), possibly because of status dynamics or because the bearer of unique news incurs social costs (Stasser & Titus, 2003). Third, even if people do surface details and come together to discuss them, groups with different types of expertise may have difficulty exploiting their diverse perspectives, in part because of cross-functional communication and coordination problems that complicate sensemaking (see Bunderson & Sutcliffe, 2002). Finally, making sense of cues and disparate details and creating a coherent representation of an emerging problem is made difficult because people's understandings are changing at different rates. This issue, labeled *variable disjunction* (Turner, 1976, 1978), refers "to a complex situation in which a number of parties handling a problem are unable to obtain precisely the same information about it so that many differing interpretations of the problem exist" (Turner, 1978, p. 50). It is a situation of high complexity and continuous

change. People may be continuously exchanging information, but because the content of the disjoined sets of information is always varying, it is almost impossible to reach consensus about what exists. In part, it is difficult because one has to convince others of the status (legitimacy) of one's own set of information, and also has to convince others of the validity of one's own analysis.

## Containing the Unexpected

Managing the unexpected is about containing. We deliberately chose the word "contain" to signify two relevant dimensions of its meaning: contain means both to "hold or encompass" and to "restrain or control" (*Oxford English Dictionary*). These subtly different meanings draw attention to the point that the capability of containing the unexpected requires two types of skills: *encompassing* relates to the ability to delineate the boundaries of a specific problem and encapsulate it, and *controlling* relates to the ability to work within the problem space to begin to resolve the problem.

Containing, in the sense of encompassing a problem, requires that the problem be fully comprehended. People make sense of the nature and scope of a problem by categorizing and labeling the problem (Weick et al., 2005). Once the problem is labeled, the next step in containing is to determine the scope or boundaries of the problem. Underestimating the size or consequences of a problem can occur for several reasons. First, just as weak signals (small problems) or vague concerns (ill-defined problems) are difficult to notice and attend to, they are also difficult to contain, because it's hard to know how far the problem extends and hard to forecast what potential consequences may be. This is particularly an issue in tightly coupled systems, in which taking any action to encompass and contain a problem can have potentially unintended consequences (Perrow, 1986). Second, and more generally, as people take steps to address the problem, they enact changes in the environment that can then change the scope and nature of the problem (Weick, 1979, 1988). Because understanding always lags actions (i.e., actions always are a little ahead of understanding), individuals can unwittingly negatively intensify situations before they know what they are doing. To avoid this, people need to make sense more quickly and fully. Last, problems can evolve over time and may not be (p. 850) immediately apparent. Marianne Paget (1990, p. 142), who studied medical errors, argued that errors are not always detectable in real time: "The journey of error, the dynamic experience of going wrong, is crucial in understanding medical mistakes. They are rarely simple events like errors in addition. Rather they are complex activities and cognitions that unfold in time."

Containing, in the sense of controlling a problem, is often what people have in mind when they talk about "managing the unexpected." There are different elements of controlling a problem. First, and most obviously, it's important to keep the problem from getting bigger. Second, once the problem is no longer enlarging or escalating, it is important to attempt to minimize or mitigate the damage caused by the problem. But those dealing

with the problem must also, themselves, exhibit control—they must avoid panic or overload, keep their emotional responses in check, and avoid returning to first learned responses.

Naturally, organizations do not address problems in a vacuum. Problems emerge amid—or even sometimes from—the organization's regular ongoing activity. The unexpected interrupts organizational routines. By routines, we mean "repetitive, recognizable patterns of interdependent actions, carried out by multiple actors" (Feldman & Pentland, 2003, p. 95). Routines rarely come to mind in the context of managing the unexpected, but understanding them is critical for understanding containing capabilities.

When the unexpected breaks through, organizations can respond in at least three ways: first, by enacting a preexisting routine (i.e., contingency plan, standard operating procedure) intended to manage unexpected (yet not inconceivable) events; second, by modifying an existing routine to fit the unexpected event; or, third, by innovating a completely new routine—either de novo (i.e., like the creation of the "escape fire" made famous in the Mann Gulch disaster) or as a bricolage of other existing routines. One challenge is to identify, more or less correctly, what routine to engage in—modifying an existing routine when the problem calls for an entirely novel response is a problem in and of itself. Many organizations, particularly those in dynamic and high-risk settings, try to defend against the unexpected through conventional "prevention" mechanisms such as contingency plans, standard operating procedures, and professional protocols. In these settings, the particular manifestation of the event may be unexpected, but this does not mean the event is unimaginable, just that it is out of the ordinary. In fact, in some organizations, the work consists of managing unexpected events (Okhuysen, 2005). For example, it might be unexpected that a particular patient within a hospital will go into cardiac arrest, but hospitals have protocols for handling cardiac arrests.

Sometimes, organizations don't have a routine that will exactly work, but they can modify their existing routines so that they are able to address this problem. Put another way, they are able to restructure their routines. For example, a study of the collapse of the Baltimore and Ohio railroad museum recounted how curators taught steelworkers how to identify artifacts so that—as the steelworkers were clearing the rubble—they could hold up the artifacts and curators could look at them through binoculars (as they weren't allowed to be on the construction site) and indicate whether the item should be saved or discarded (Christianson et al., 2009).

Sometimes, an event is so completely unexpected that there are no available routines with which to respond. These "cosmology episodes" generate a sense of "vuja de" (I've never been here before) and are so shocking that people "suddenly and deeply feel that the universe is no longer a rational, orderly system" (Weick, 1993, p. 633). In this situation, people must either invent a completely new routine/response to match the new problem or cobble together something (i.e., bricolage) from existing routines. Completely novel solutions are quite rare; more common is a solution that is comprised from the materials on hand, in this case the preexisting routines in an organization. Creative and

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resourceful use of preexisting routines is consistent with the idea of bricolage, in which people, based on deep knowledge of resources, are able to recombine often seemingly disparate elements into a useful solution (Weick, 2001).

Skill is associated with enacting routines that are most useful for containing the unexpected. At the same time, staying flexible and modifying understanding of how well routines are working is critical—in other words, updating around the course of action is critical. It may be that a problem starts off looking familiar but then spirals out of control, requiring the use of other routines. It may be that something that seems completely new is actually similar to something the organization has encountered before.

## Resilience and the Unexpected

Finally, managing the unexpected is about resilience, bouncing back from or coping with dangers (p. 851) that have become manifest (Wildavsky, 1991, p. 77). To become aware of the unexpected earlier, so that actions can be taken to contain problems before they grow bigger and unmanageable, is desirable. Yet, because unexpected events often unfold before they are noticed, and actions in response to weak signals are rare, unexpected problems that do show up are often more severe. This means a well-developed capability to withstand and bounce back from unanticipated surprises is critical (Wildavsky, 1991, p. 120).

Resilience requires "improvement in overall capability, i.e., a generalized capacity to investigate, to learn, and to act, without knowing in advance what one will be called to act upon" (Wildavsky, 1991, p. 70). In this way, resilience relies upon past learning and fosters future learning, but exists independently of learning activities, in that resilience represents a store of capabilities and the presence of latent resources that can be activated, combined, and recombined in new situations as challenges arise (Sutcliffe & Vogus, 2003). As such, resilience implies more than a specific adaptation.

Operating resiliently means "learning through fast negative feedback, which dampens oscillations" (Wildavsky, 1991, p. 120), and highlights the importance of general knowledge, technical facility, and command over resources, so that knowledge can be combined in unexpected ways to address emerging threats. In fact, resilience is enhanced by capacity (i.e., ability) and response repertoires, which paradoxically affect alertness and awareness of emerging problems. As Westrum (1994, pp. 336 and 340) concluded after analyzing the battered child syndrome, "a system's willingness to become aware of problems is associated with its ability to act on them," meaning that systems cannot see that over which they have no control.

Resilience results from processes and dynamics that create or retain resources (cognitive, emotional, relational, or structural) in a form sufficiently flexible, storable, convertible, and malleable to enable organizations to successfully cope with and learn from the unexpected (Sutcliffe & Vogus, 2003). For example, processes, structures, and practices that promote competence, encourage growth, and enhance efficacy (e.g., expanding people's general response repertoires by improving their knowledge, their technical capabilities, and their understanding of how to recombine the resources they have at hand) improve organizational capabilities to mediate perturbations and strain. These capabilities and their associated salutary responses work in part by contributing to a different way of sensemaking. In particular, they counteract tendencies toward threat rigidity (Staw et al., 1981) by increasing capabilities to better sense, process, interpret, and manage small discrepancies as they emerge. This increases the likelihood that disruptive events will be treated as opportunities rather than threats. Rebounding from challenges initiates a positive feedback loop to an organization's capabilities, such that

they are strengthened and further resilience is promoted in the face of unexpected events.

# Future Directions

Managing the unexpected is often portrayed as a reactive activity directed at problems or surprises that catch organizations unawares. We have tried to show the flaws in that portrayal; we have argued that managing the unexpected is less about reacting to surprises and more about proactively paying attention to the small perturbations and discrepancies that can escalate into large problems. The unexpected is not a given, nor is it an inherent part of complex organizations and organizational life. Rather, it is often set in motion by the (mis)perceptions, (mis)conceptions, and (in)actions of organizational actors. We have argued that a constellation of capabilities—*attending, sensemaking, anomalizing, updating, interconnecting, containing,* and *resiling*—undergird organizational abilities to find problems and put them right before they explode into crises and adverse consequences. These instances of positive organizing build a system's strength and are important sites for POS research. Here, we discuss a few of these opportunities for future research and enhancing practice.

By identifying a set of capabilities for managing unexpected events, we provide a more nuanced vocabulary for thinking about how organizations approach small perturbations and weak signals. These capabilities are, of course, interrelated, but it may be that organizations can demonstrate mastery of some capabilities but still have significant difficulty enacting others. Future research may wish to further disentangle how these capabilities relate to each other and determine whether certain capabilities are more difficult to master than others. As well, research can identify whether there are recurrent organizational "blind spots," in which particular capabilities are neglected. Fundamentally, our model extends previous work on high reliability organizing and is premised on the idea that organizations can intentionally develop capabilities and become more expert in handling all aspects of managing (p. 852) unexpected events (Christianson et al, 2009). We hypothesize that those organizations that are more adept at more of the capabilities will be more likely to sustain high performance, which links back to our argument that the absence of catastrophes in high-risk settings is, in itself, an important form of positive organizing.

Specific antecedents to managing the unexpected also influence the capabilities we have identified: expertise, the design of work, and the role of interruptions. The primary presumption of this chapter is that many crises and accidents develop from *failures of insight.* This understanding is based on a stream of studies suggesting that disaster results from a failure to notice critical cues (e.g., Turner, 1976, 1978). The failure to become aware of small perturbations and discrepancies is not only an issue of failing to detect them, but also an issue of failing to make sense of them in context. Expertise is one potential factor that may play a role in influencing detection as well as sensemaking. For example, Klein et al. (2005) propose that experts are more able to perceive (detect) and conceive (make sense of) subtle signs in part because they have a deeper experience base that "provides a sense of typicality" (p. 21), which would serve to affect the ability to

detect anomalies and to understand when expectations are violated. Experts also have more sophisticated mental models, so they are more able to generate explanations for events and tie them into a story. Yet, expertise also has a downside: Experts may fixate on initial explanations and explain anomalies away (De Keyser & Woods, 1993; Klein et al., 2005). This interesting juxtaposition of the possible positive and negative effects of expertise suggests a rich area for research.

In addition to examining the role that individuals may play, it is also important to examine the effects of an organization's (and unit's) design on both attention and containment. Weick and colleagues (Weick & Sutcliffe, 2006; Weick et al., 1999) argue that mindful organizing increases the quality of organizational attention (its stability and vividness) and, at the same time, the ability to act on what is "seen." Yet, they go on to say that, under some conditions, particular practices may inadvertently serve to make attention more scattered (less stable) (Weick & Sutcliffe, 2006, p. 519). Empirical studies examining the effects of mindful organizing on the stability and vividness of attention, as well as how these practices affect the capability to contain the unexpected after it is manifest, are needed.

We have focused on failures of insight and the idea that unexpected events occur because cues are missed, ignored, or dismissed. However, recent work by Barton and Sutcliffe (2009) suggests an important alternative. Noticing small cues may be important for managing unexpected events; however, it may not be sufficient to interrupt ongoing patterns of action that are under way. Rather, psychological and contextual factors create strong "dysfunctional" momentum that is not easily slowed or stopped. Continuing action without interruptions in the face of emerging problems threatens "organizations' abilities to adapt and adjust flexibly" (Barton & Sutcliffe, 2009, p. 1331). Thus, researchers need to better understand the role interruptions play in both sensing and managing the unexpected.

# Conclusion

Several implications for managing the unexpected in practice follow from our work. The practice-related literature on managing the unexpected often focuses on controlling or solving the problem (i.e., keeping the problem from enlarging, minimizing the damage from the problem). Finding the problem in the first place is often thought to be the easy part. The present chapter should help to highlight the weakness in that view. As we have argued, capabilities for noticing and making sense of problems, being resistant to explaining them away, and updating and reconsidering whether the course of action is really the right one—capabilities that all precede problem solving or containment—are vital components of managing for unexpected events. Second, until recently, much of the literature related to managing unexpected events presumed that people and organizations were able to adaptively and resiliently negotiate through unexpected events, incorporating new information and modifying the plan as the situation evolved (Christianson, 2009). However, there is considerable evidence that this adaptation and change is extraordinarily difficult. Put simply, it's easy for people to get stuck (or entrained) in a certain trajectory of cognition and action, even if there are many cues that they are on the wrong path. This chapter acknowledges the difficulties involved and draws attention to key capabilities that organizations can develop in order to become more skilled at managing unexpected events.

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