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Voices from the Field: Wildland Fire Managers and High-Reliability Organizing Mindfulness

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Wildland fire management agencies manage wildland fires for resource benefit while protecting firefighter and public safety. Firefighting fatalities and property damaged by wildfires prompt reviews aimed at preventing similar accidents. The principles of high-reliability organizing (HRO) have been used to analyze such unexpected, high-consequence events. However, fire managers who agree to the value of an HRO framework often have difficulty applying and teaching it. Using data gathered from experienced fire managers, we identify salient examples that illustrate each HRO mindfulness behavior. We then focus on specific language choices encountered in these examples and suggest how these choices might add to the applicability for both HRO theorizing and practice.

Keywords communications, high reliability organizing, resilience, wildland fire management

Wildland fire management organizations are chartered to manage fire for resource benefit while protecting firefighter and public safety in an inherently dangerous environment with substantial uncertainty in weather, fire behavior, and fire effects. As such, managing risk is a primary concern in fire management (Calkin, Ager, and Thompson 2011). But how is risk communicated both organizationally and individually? Specifically, how do wildland firefighters, as they are anticipating and containing a wildfire, and being cognitively stretched with all the problems associated with wildland fire management, demonstrate stretching in the language they use?

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High-Reliability Organizing

Although the acronym HRO stands for high-reliability organizing, theorists and practitioners use the acronym to indicate both a product (the organization) and a process (organizing). As an organization, an HRO functions in constantly changing environments where risks, uncertainty, and ambiguity are high. The organization that operates “under very trying conditions all the time and yet manages to have fewer than their fair share of accidents” is considered to be an HRO (Weick and Sutcliffe 2007, 17). Ultimately, the organization becomes more resilient as it increases its ability to anticipate problems that might occur, recognize small discrepancies in the work environment as they emerge, and contain problems once they are occurring. HRO theory has been applied to aircraft carrier operations (Rochlin, LaPorte, and Roberts 1987) hospital administration (Berwick 2007), and business schools (Ray, Baker, and Plowman 2011), as well as to fire operations (Weick 1993; Putnam 1995).

As a process of organizing, the sensemaking behaviors associated with high-reliability organizing (HRO) have been used to study unexpected events associated with the Cerro Grande (New Mexico) wildfire (Keller et al. 2004), to guide the review of prescribed fire escapes (U.S. Department of Agriculture Forest Service 2007; Wildland Fire Lessons Learned Center 2008), and to study public information procedures (Knotek and Watson 2006). HRO workshops have been developed for most federal firefighting agencies (e.g., U.S. Department of Interior Bureau of Land Management 2010).

HROs are skilled at continually organizing, updating, and reorganizing, to make sense of an ever-changing, always dangerous work environment by enacting five behaviors: (1) preoccupation with failure; (2) reluctance to simplify interpretations; (3) sensitivity to operations; (4) deference to expertise; and (5) commitment to resilience (Weick, Sutcliffe, and Obstfeld 1999; Weick and Sutcliffe 2007). The first three HRO behaviors (preoccupation with failure, reluctance to simplify interpretations, and sensitivity to operations) help organizations imagine and think through problems before they occur and as they are beginning to emerge. The next two behaviors (deference to expertise and a commitment to resilience) focus on “in-the moment” problem solving. Each behavior is intrinsically linked to the others; thus, HRO is more accurately viewed as a web of interlinked behaviors. Organizations that enact these behaviors are said to practice high-reliability organizing *mindfulness*, hereafter HRO-mindfulness (Weick and Putnam 2006; Weick and Sutcliffe 2007).

Recognizing the important relationship between theory and practice, Weick (2011) noted that the HRO “principles by themselves, without any experience or practice attached to them, are empty. They have little meaning. But, experiences, by themselves, without an interpretation or framework attached to them are blind” (6). Highlighting their own struggles with implementing the framework in healthcare settings, Carroll and Rudolph (2006) argued that the principles “are difficult for managers and professionals to understand and implement” and that researchers often use them to critique organizational failures “without specifying actions to avoid future failures” (15). There is a continued need to bridge the gap between theory and practice associated with HRO-mindfulness.

Despite its increasing application in wildland fire operations (Weick 1993; Putnam 1995; Keller et al. 2004; Dether and Black 2006; Knotek and Watson 2006), HRO’s theoretical concepts, the threads that make up the web of

HRO-mindfulness, often make sense in the abstract, while practitioners have a difficult time applying them in “real” wildland fire management contexts. For example, to understand the meaning of “commitment to resiliency” depends on one’s understanding of resiliency, which has been discussed so broadly that there is little conceptual agreement to guide practical application (Woods, Leveson, and Hollnagel 2006).¹ Practitioners who agree to the value of HRO-mindfulness often have difficulty applying it and teaching others how to cultivate it. One fire manager, Riva Duncan (2008), discussed the difficulty in classroom situations defining resiliency for wildland firefighters. She wrote,

Even after becoming a part of the [teaching] cadre . . . [of a] Managing the Unexpected [HRO] Workshop series, I . . . [had] trouble with this principle. After many discussions with colleagues and with Weick and Sutcliffe, “resilience” still means different things to me. (44)

Mindfulness and Figurative Language

The behaviors associated with HRO-mindfulness require us to think differently and to counteract old comfortable ways of thinking and acting that can blind us to safety problems. When we practice HRO-mindfulness we are encouraged to stretch beyond our old ways of thinking. This cognitive stretching is reflected in the communication choices we make, but these choices also invite others to think differently, or stretch cognitively, too. Our language choices then, especially the use of figurative language, allow us to accommodate this type of cognitive stretching (or at times, stretching to the breaking point, and replacing old ways of thinking). Exaggeration, whether in the form of *hyperbole* (deliberate overstatement) or *litotes* (deliberate understatement), provides linguistic resources for cognitive stretching. For instance, if after a flood you ask your friend how he liked those “little showers we had the other night,” you are drawing attention to the magnitude of the flash flood by intentionally mislabeling it in the opposite direction.

Metaphors are also used to reflect and invite cognitive stretching, but can also be used to invite an entirely new way of thinking (completely replacing old ways of thinking). A metaphor positions “two terms normally regarded as belonging to different classes of experience” together (Black 1962, 360). The interaction that occurs because of this juxtaposition, or “intercourse of thoughts” (Richards 1936, 94), allows us to “comprehend partially what cannot be comprehended totally” (Lakoff and Johnson 1980, 193). While noting that metaphors are inherently paradoxical, Morgan (1997) says their use creates “fresh ways of seeing, understanding, and shaping situations” (6). Conversely, we may “restrict flexibility” and “encourage narrow solutions” to organizational challenges when our language choices, including our selection of metaphors, are unexamined or overused (Weick 1979, 51). Instead, we should examine how the metaphors being used restrict or enable the flexible thinking required for mindfulness² (Grant and Oswick 1996).

Using the personal accounts of experienced fire managers gathered during interviews, we illustrate the five behaviors associated with HRO-mindfulness. We are specifically interested in the interviewees’ language choices and how those choices might reflect the kind of cognitive stretching we believe essential to HRO mindfulness. By linking HRO-mindfulness behaviors with data from these interviews, we add to our understanding of the role of language in performing HRO-mindfulness.

Methods

We looked for illustrations for the five HRO behaviors using data from 74 videotaped interview transcripts collected for a knowledge management project (Thomas, Leonard, and Miller 2012). Interviewees were highly regarded by their workplace peers for their experiential knowledge. No attempt was made to determine whether an interviewee had expertise; interview selection was based primarily on a peer's recommendation. Expertise spanned six domains: prescribed fire; fire behavior forecasting; public information; management; research; and fire suppression. Each interviewee was asked to select and to describe a significant fire management challenge that the interviewee had successfully worked through.

Because our goal was to illustrate and not quantify how HRO-mindfulness was communicated, we intentionally selected salient examples from these data. We looked for examples of when experienced fire managers discussed on-the-job challenges. In many cases we found that their discussions of these challenges were conspicuously marked by a diverse use of figurative language.

Results: HRO Behaviors

In this section, we illustrate the five HRO behaviors with specific quoted material selected from the interview transcripts.

Preoccupation with Failure

According to Weick and Sutcliffe (2007), the primary objective of HRO-mindfulness is to notice discrepant events early. To be preoccupied with failure is to be constantly suspicious that something has been overlooked. It is to detect "small discrepancies anywhere" (59), to maintain an acute awareness of not having "experienced all the ways the system can fail" (73), and to openly discuss "mistakes [we] don't want to make" (9). In the context of fire management, it is to presume that a wildfire is dangerous even if it looks safe.

One firefighter in our set of interviews used preoccupation with failure when he called himself "a worst case scenario type person" and said he planned for the hottest "expectations on the weather forecast." A hallmark of being preoccupied with failure is to "Be suspicious of good news and seek out bad news" (Weick and Sutcliffe 2001, 164). When this firefighter says he is a "worst case scenario type person" he is creating some "bad news" for himself. In another interview, a fire manager described a close call he had while working a fire burning in a wilderness. The fire nearly crossed outside the wilderness's boundary. This "near miss" forced him to change how he would size up and make decisions about future fires. He said, "I'll walk into the next fire and I won't know anything. . . . As old and as experienced as I am in relationship to these large fires . . . I'll say . . . I won't know anything." By approaching new fires as if he didn't "know anything," he intimates that his automatic method of sizing up wildland fires relied too heavily on old categories, on automatic routines. By admitting that he has not seen it all before and that his past experience could not protect him from making future mistakes, he created a fresh cognitive decision framework. In rethinking how he would partition information he'd used to make decisions about wilderness fires, he became more preoccupied

with failure by updating what for him were “dated distinctions” (Weick and Sutcliffe, 2001, 44).

One fire behavior analyst (FBAN) described why she calls all near misses “near kills.” She argues, “A near miss has more impact if I think of it as a near kill; . . . But if I think of it as a near kill, it’s like, holy cow; I could be snuffed out.” She is practicing what Weick (1979) calls “future perfect thinking” (197). She is using “near miss” to force herself to imagine future events going spectacularly wrong. This is an effective form of HRO-mindfulness, in that “pessimism is more mindful than optimism” (Weick and Sutcliffe 2001, 161).

One interviewee described his approach to imagining how things can go wrong when he recalled:

The way I look at a [prescribed] burn, it’s like trying to keep a wild animal in a fence . . . no matter how big [the burn] is, it can be the smallest burn or the biggest burn, I just picture the perimeter of that burn as a fence and the fire is the animal. And [the animal] is constantly checking the fence, wanting out . . . that’s one of the ways that I just keep [the burn] in my mind. I know it’s trying to get out. I just got to figure out where [the animal/fire] is trying to go today. . . . There are always some weak spots in the fence that you got to be patching on all the time.

Reluctance to Simplify Interpretations

To accomplish work, fire managers must simplify complex environments; however, they must be wary of their simplifications because to simplify is to attenuate information and this attenuation limits “both precautions people take and the number of undesired consequences they envision” (Weick et al. 1999, 41). To test for what they might have missed when simplifying, fire managers consciously pause to question the applicability of standard operating procedures (SOP). By questioning automatic routines, they disconfirm and “complicate simplifications” (Weick and Sutcliffe 2007, 53). For example, an FBAN in her interview pointed out the dangers associated with relying on “rules of thumb” when she said, “You’ve got to be careful . . . rules of thumb leave a lot out. There are a whole lot of other things that can happen . . . leave leave your brain open.” “Rules of thumb,” often embedded in SOP, are necessary to any fire operation. However, this fire manager is reluctant to simplify when she says, “Rules of thumb leave a lot out.” Aware that “simplification can’t handle novel events” (Weick and Sutcliffe 2007, 67), she challenges simplification by keeping her “brain open,” overtly allowing for other possibilities, which could have been easily excluded by the act of simplification.

FBANs use computer programs based on mathematical fire models that are specifically developed to simplify fire behavior complexity. Fire behavior model outputs are important tools but also gross simplifications. FBANs must be adept at calculating the fire model output and coupling it with their experience, thus calibrating their forecasts. The FBANs interviewed created “work-arounds” for the limitations to the mathematical models, and in so doing, fought the simplifications of the fire environment the model produced. They skeptically asked, “What do the models leave out?” An operations section chief warned against unqualified trust in model output when he said, “Computerized models . . . came out as gospel . . . [we’d]

go out and run the models. [But] then we'd go out and squeeze pine needles... [Squeezing needles] that's how we would know [fire behavior]." Another FBAN interviewed, commenting on a computer's "swift calculation processes," said, "The [computer] tools are incidental... [for] judgment gets involved all along... there's a lot in our senses... that you can't write down... that you see, feel, smell... the [models] are incidental."

When discussing how to interpret fire behavior calculations, one fire behavior researcher interviewed said not to use a sharp pencil: "No, no, no! Use a crayon. Get sloppy because if you use a sharp pencil, you're going to believe your answer." By using a "thick crayon" and getting "sloppy," this specialist uses skepticism to fight the fire model's inherent tendency to oversimplify the fire environment.

Sensitivity to Operations

Weick and Sutcliffe (2007) write, "Sensitivity to operations is about the work itself and about seeing what we are actually doing" (59). Sensitivity to operations has been described as having "the bubble," the constant assurance that one possesses a cognitive map of the whole operation (Rochlin 1997). It means that someone not only has a complete cognitive map of what is going on but understands that this map must be regularly updated. Fire managers incessantly test and update their cognitive maps as they practice sensitivity to operations.

Individual perceptions of a fire's behavior (fire intensity, rate of spread, etc.) vary and even experienced fire personnel may arrive at divergent conclusions about what is happening and what is likely to happen. As such, in the context of managing a fire, constructing a cognitive map of what is going on is a collective process. Skillful interpersonal communication is needed as fire personnel check, verify, and adjust to each other's perceptions. Weick and Sutcliffe (2007) suggest that sensitivity to operations increases when rich media are used. They write, "Unexpected events are often confusing, and people need to use the richest possible media to build some idea of what they face" (155).

A wildland fire specialist in one of our interviews described her method for maintaining sensitivity to operations through perception checking. She reflected a reliance on the richness of other people's viewpoints when she commented;

It's that synergy that you get from bouncing ideas off of each other—what did you see, does this make sense? That's when you get a good plan, when you're all looking at it because [we] all look at things... differently.

Here, she emphasizes the need for diversity of thought in problem solving, but also the centrality of communication to the perception checking process. This process enables her to maintain sensitivity to operations, and may also reveal pockets of expertise that may have otherwise gone undetected.

Deference to Expertise

Weick and Sutcliffe (2007) argue that expertise is not "necessarily matched with hierarchical position" (74). When a problem is noticed, managers should allow whoever, regardless of rank, power, or authority, is closest to the problem, and has the skill and knowledge, to fix it (Weick 2005). To operate in such a manner

is to defer to expertise. According to Weick and Sutcliffe (2007), deference to expertise is “not just an issue of content knowledge” but is closely aligned to credibility, trust, and attentiveness.

One way to facilitate deference to expertise and to build credibility is to openly discuss one’s strengths and weaknesses with coworkers. One fire manager recalled, “It helps immensely when people know me and they know my weaknesses . . . they’ll listen [to me] but they are not hesitant to disagree.” This fire manager, by publically admitting his “weaknesses,” helped his coworkers more easily establish his expertise and credibility. Not only should individuals be willing to defer to expertise, they need to know when to actively seek it out. For example, another interviewee spoke of the difficulty associated with locating expertise when he said he had to “corner” people to get them to talk about what they knew.

Commitment to Resilience

Weick and Sutcliffe (2007) argue, “To be resilient is to be aware of errors that have already occurred and to correct them before they worsen and cause more serious harm” (68). Resilient fire managers have the ability to absorb strain and preserve functioning during a crisis, and to learn from the event. As team members, they learn to “grow from episodes of resilient action” and to become better at withstanding surprise (71). When faced with surprise, they “stretch without collapsing” (71). Rather than simply bouncing back to the previous state, committing to resilience means taking the time to ask questions and to learn from significant events. Indeed, Weick and Sutcliffe (2007) note that one sign of an organization’s resilience is that “people learn from their mistakes” (99).

One fire manager in our study emphasized taking advantage of every learning opportunity when she advised, “Learn from every single fire, even if it’s on TV or front-page news, look at that [newspaper story] and learn. . . Always play the what-if game.” A fire manager who had recently experienced a wildfire where homes burned reflected on the importance of asking pointed questions in the learning process: “To critically think about your decision-making process is imperative. . . Your personal integrity rests upon your ability to be critical of yourself.”

One fire manager discussed the likelihood of adverse events and the need for personal resilience when recounting how a fire, under the influence of strong frontal winds, threatened communities. He warned:

The [wilderness] fire program is going to have some bad outcomes . . . bracing yourself for those bad outcomes is important. There are not very many people that [sic] have come through this program that didn’t get nicked. How we respond to that is everything.

This fire manager draws attention to the inevitability of bad outcomes (getting “nicked”) during the process of managing fire, and the importance of developing personal coping mechanisms (“bracing yourself”) for these bad outcomes. Clearly, there are physical dangers associated with fire fighting, but political tension and conflict in the work environment also require one to develop resilience. Coutu (2002) argues that we should be able to identify resilient individuals because of their “staunch acceptance of reality, a deep belief that life is meaningful, and the ability to improvise under pressure” (4). Many fire managers voiced high levels of personal resilience related to

a sense of duty. One manager, having experienced the escape of a large fire, said that he could only survive the stress of this risky wildland fire work if he came to it with a “higher purpose.” Another interviewee, echoing this higher purpose sentiment, claimed that a “wilderness ethic, a feeling for the land” bolstered his confidence during adverse times because he had “the feeling that you weren’t doing it for yourself, [or] for an agency.” One park ranger, reflecting on the controversial decision not to allow bulldozers into Yellowstone Park to control a wildland fire in 1988 (the heavy earth-moving machinery would have produced scars that would be visible for hundreds of years), showed his commitment to duty by saying, “To me [not to allow bulldozers] was a big deal. [We] literally fell on our sword [not to allow bulldozer use].”

Interviewees often humorously commented about their decisions even though doing the “right thing” for the land could be career-ending events. One interviewee revealed the tension that exists when individuals feel they have committed to resilience but they perceive the organization, as a whole has not committed. He said, “I knew you could lose your job over this stuff. Okay, you can lose your job. So, why risk losing your job over it? Because it’s the right thing to do.” Williamson (2007) found that to be comfortable authorizing fires in the wilderness, managers needed an attitude that “stems from their personal commitment to restoring fire for the good of the land, despite multiple disincentives” (76). This personal commitment³ may be indicative of their resilience.

Results: Language-Focused Analysis

In this section, we report the results of performing a language-focused analysis of the HRO behaviors as found in the interview transcripts, highlighting the use of figurative language that invites the cognitive stretching associated with HRO mindfulness. Individuals routinely employed figurative language that functioned to reflect and invite mindful thinking. We identified the rhetorical tropes of *hyperbole* (deliberate overstatement) and *litotes* (deliberate understatement), as well as metaphor used by these experienced fire managers.

When hyperbole or litotes is used, either type of exaggeration stretches language beyond the literal usage through figurative language. When a fire manager used the phrase “worst case scenario” he selected a hyperbolic way to reflect a preoccupation with failure. Not every scenario is the worst-case scenario. In another example, the fire manager says that he tells himself he “doesn’t know anything,” which is deliberate understatement, litotes. This figurative language in the form of exaggeration (of course he knows some things) is used to help him evaluate a situation without taking anything for granted.

One FBAN stretches a familiar phrase, a “near miss,”⁴ into an unfamiliar one with a stronger tone, a “near kill.” If we grow accustomed to experiencing “near misses,” viewing them as only minor deviations, we risk normalizing them and accepting new and dangerous levels of risk (Vaughn 1996). When this FBAN opts to use “near kill” she is exaggerating to jolt her crew into understanding the potential magnitude of a close call. If she fears her crew has become desensitized to dangerous situations, this more powerful language choice may serve as a corrective to this desensitization. These examples reveal language choices of firefighters who may be thinking hypothetically and using figurative language to do so in order to be preoccupied with failure.

In addition to the cognitive stretching that is reflected and invited by exaggeration, metaphors can be used to stretch as well as to completely replace categories of thought. When one fire manager compared the potential for a fire to escape its control lines to a wild animal inside a fenced area, he drew attention to the metaphor explicitly. (“I just picture the perimeter of that burn as a fence and the fire is the animal.”) However, the metaphors that individuals choose to employ are not always so explicit. While explaining the same thought process, one interviewee said of a wildland fire, “It’s got to eat, it’s got to breathe, it’s got to move around, and sometimes it goes to sleep.” In this example, we are only able to identify the metaphor by the language that signals its presence, specifically, the language that animates the fire.

When experienced fire managers say things like “rules of thumb leave a lot out” and that we must leave our “brain open” and “get sloppy” by using a “thick crayon,” they are using metaphors meant to warn us against an unchecked faith in the fire behavior models’ outputs. These metaphors alert fire behavior specialists to the problem of being overconfident of their predictions, suggesting that the forecasted output’s confidence interval might actually be much wider than they think. Each of these metaphors draws attention to the dangers associated with becoming overly confident that we have successfully and completely communicated all of the important aspects of the fire environment. Weick (2007) argues that we are able to apprehend more of the environment when we are aware of how language as a tool structures our thinking. He writes, “Learning to hold one’s tools lightly shifts the focus from decision making to sense making” (12). Additionally, explicitly communicating the provisional nature of our assertions by articulating our reservations is another way to guard against generating a false sense of confidence.

Warning, as one fire manager did, that you will get “nicked” somewhere along the way draws attention to the need for resiliency via metaphor. One way to prepare for these inevitable “bad outcomes” is to practice getting “nicked.” Practicing to experience bad outcomes before they actually occur builds resiliency and helps managers become more skilled to “notice and pursue . . . information that [others] leave unnoticed and untouched” (Weick and Sutcliffe 2001, 173). Metaphors related to injury were used to discuss the need for resiliency. If being resilient means a person has the ability to be stretched without breaking, and to bounce back after being stretched, then we might expect the language of resilience to do the same. Worn language that no longer serves us well may be replaced by the apt use of figurative language, specifically metaphor. Selection of language in itself is an act of resilience. The same fire manager drew attention to the personal commitment needed to manage political tension in the work environment when he recalled having to defend a decision about which he felt strongly. When he said we “fell on our sword [not to allow bulldozer use]” he increased the intensity of the “getting nicked” metaphor (from scrape to impalement) and thereby drew our attention to the range of personal and organizational challenges that require a personal commitment to resilience.

Discussion

“The human fields [of organizational science] require a tight linkage between theory and practice . . . abstract theories aren’t very useful unless they are based on and linked with experience” (Ed Schein, as cited in Lambrechts et al. 2011, 140). We sought to provide concrete, practical examples of voices from the field in order to contribute to the link between the theory and practice of HRO-mindfulness.

When literal language does not suffice to explain complex, tacit, or otherwise hard-to-articulate concepts and ideas, fire managers, like skilled *bricoleurs*, use figurative and imaginative language to shape thought and action. We developed a preliminary format to analyze the language of HRO-mindfulness behaviors through fire managers' accounts of particularly challenging times on the job.

Our data draw attention to the types of language choices used by individuals when they recall personal challenges and how they reacted toward those challenges. We believe this is an important step, but more work is needed to increase organizational members' skills in listening to and then analyzing these behaviors to determine their effectiveness.

The selection of figurative language, specifically the metaphors and exaggerations used by our interviewees, served important functions. When fire managers needed to imagine and communicate highly uncertain hypothetical scenarios, like those that would mark a preoccupation with failure, figurative language, especially exaggeration, was used. Similarly, when language became worn or overused and ceased to have the intended effect, fire managers deliberately changed their language to initiate a change in thinking in others. "Near misses" became "near kills," wildfires became animals that could easily escape their fences [control lines], tense political situations, both personal and organizational, became moments "to fall on your sword" and to get "nicked." In each case, these fire managers were stretching their language to jolt themselves into thinking freshly about wildfires, and to renew their own sources of resilience. They were using their rhetorical resources "to sharpen the pointless, and to blunt the too sharply pointed" (Burke 1969, 393).

Similarly, Weick (1979) argues that to increase our understanding of the impact of our selected metaphors we should "mutate" them, and what we are suggesting here is a process whereby this mutation can take place. Once we have identified and critiqued the figurative language present in our discourse, we have the opportunity to select and try on metaphors that might be more useful to us. Pondering how we use metaphors reflects a skeptical view of how language functions to "increase doubt and doubting" (Weick 2001, 369). This can often be accomplished by thinking literally about the metaphor. Once we identify the metaphors in use, explicit ones or those identified through linguistic extensions and commitments, we can begin to analyze them. We can begin to ask whether they help us understand a workplace situation or actually obscure our understanding of it. In the example of an animal inside a fence used to illustrate preoccupation with failure, there are the implications of thinking about fire as a wild animal—that fire is unpredictable and always potentially dangerous. Additionally, when we describe how the fire "breathes," it draws our attention to fundamental elements of fire, specifically oxygen, but also air, wind, and so on. However, we must also be mindful of how the same metaphors that enable us to stretch our thinking have logical limits of their own. For example, what are the logical limits of discussing fire as a (willed) animal with a brain of its own? If wildfire truly is wild, what kind of faith should we have in fire behavior prediction models and methods?

Understanding the relationship between language and mindfulness from a theoretical perspective is important, but what are some of the better ways to cultivate HRO-mindfulness? Training in mindfulness is obviously important. However, Coutu (2002) reminds us of the difficulty of training for even one behavior that makes up mindfulness, resiliency, when she argues, "The challenge confronting resilience trainers is often more difficult than we might imagine. Meaning can be elusive, and just because you found it once doesn't mean you'll keep it or find it again" (6). Because of its elusiveness, we also agree with Buzzanell et al. (2009) when they argue that the most effective form for developing resiliency, a cornerstone of HRO-mindfulness, is

through in-depth, focused conversations that provide space for reflection. We suggest that HRO-mindfulness, because it is inextricable from resiliency, can be cultivated in similar ways. Recognizing the importance of settings that allow for reflective conversation, Buzzanell et al. (2009) argue, “Workshops . . . that prompt conversations about the contradictions and ironies manifest in discourses, organizing practices, and associated material realities, such as specific tasks and consequences for well-being, can help sustain people and organizational systems” (310).

Agreeing with Buzzanell et al., we suggest that one of the best practical uses that can be made of this research is for fire managers, in a group setting, to have discussions about the meanings associated with the language they commonly use to get their work done. Initiating a discussion of the language used regularly in fire operations, and specifically during the anticipation and containment of unexpected events, functions to create an opening in discourse, or a time to reflect and scrutinize how language both reflects and influences our thinking. These language discussions would enhance critical attributes of HRO-mindfulness by more deeply defining what each person means when they are using the same words. “Words,” note Weick and Sutcliffe (2007), “can limit what you see and report” (33). A more universal understanding of the words commonly used fighting forest fires would improve a fire manager’s ability to spot and to communicate the unexpected before it occurs, by certifying that the word-labels attached to actions are valid for all members of the fire crew. One good place to start this language discussion would be to use the metaphorical examples highlighted in this article as starting points for discussion.

Admittedly, our identification of specific HRO-mindful communicative behaviors was a subjective process. We examined and then attempted to categorize examples of some of the language associated with each HRO behavior. However, we did not ask interviewees whether they thought their language choices fit one of the five HRO behaviors. Their language choices were located in retrospective accounts, in some cases decades after the fact, so we are left to wonder whether they would have made the same language choices when working a “real-time” wildfire. We also found it more difficult to identify certain HRO behaviors than others in the transcripts. For instance, we may feel confident when we have heard someone defer to expertise (“I’m outside my skill set here,” or “I’ll defer to you here”) but it is much more difficult to identify a commitment to resilience in discourse.

Additionally, we recognize that the five HRO behaviors that make up mindfulness are intertwined, but we did not capture this overlap in our examples. Future research should focus on the interconnectedness of the behaviors and specifically seek to find examples of communication that would reflect these intersections.

We are better thinkers and more informed managers when we remember that language is powerful and structures our thinking in particular ways. Our ability to be more mindful and to cultivate mindfulness in others is intertwined with our ability to articulate mindfulness. How we talk to each other about risky situations, as we are trying to make sense of them, is a vital skill, and a better understanding of the language of HRO-mindfulness is crucial in developing this skill.

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Notes

1. Resiliency has been articulated as a personal quality (Pulley, 1997; Richardson, 2002), an organizational quality (Vogus and Sutcliffe, 2007; Chewning, Lai, and Doerfel, 2012; Ouedraogo and Boyer, 2012), a quality of communities (Bevc, Nicholls, and Picou, 2010), or a combination of personal and organizational qualities and as a process of discursive creation (Buzzanell, Shenoy, Remke, and Lucas, 2009), which makes isolating resilient communication in discourse often a difficult task. Although we agree with the Buzzanell et al. notion that resilience is a combination of personal and organizational qualities and a discursive creation, our data include retrospective accounts, which limits our ability to discuss resilience as it is produced in real time.
2. Although we argue that the use of figurative language reflects and invites mindful thinking, we also recognize the potential for figurative language to create misunderstandings that might go unchecked. This characteristic of language is described by Peters (1999) when he argues that language is both *bridge* and *chasm*.
3. Heifetz and Linsky (2002) say the hardest part of being a leader is “to experience distress without numbing yourself.” They call this state of mind “sacred heart.” “Sacred heart” is the “courage to maintain your innocence and wonder, your doubt and curiosity, and your compassion and love even through your darkest, most difficult moments” (227). We believe that this type of courage marks a commitment to resiliency.
4. Often, the term “near miss” can be confusing because we reason through it to mean a “near hit” instead—as in, “those two airplanes were so close, they nearly hit.” But it actually refers to the idea that airplanes miss each other in the air all the time, but sometimes they only miss each other slightly, still a miss, but a near miss.

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