Social Bodies: Bringing Materiality into Theorizing about High Reliability Organizations

Jody L. S. Jahn [A]

[A]University of California

4114 SS&MS,

Santa Barbara, CA 93107

jodyjahn@umail.ucsb.edu

Abstract: Weick's theorizing about how "double interacts" function to facilitate reliability can be fruitfully extended by examining how the material bodies of HRO members offer important cues that shape member's interpretations within the *social environment*. Identifying important material forces in the social environment that enable and constrain the passage of crucial information is a key starting point for understanding how communication enacts *reliability* in both the operational and social environments of HROs. This paper will problematize *reliability* as a *communicative* process, arguing that theorizing about social processes should consider the materiality of the body (e.g., nonverbal cues, embodied knowledge) in addition to ideational elements of organizing (e.g., culture, symbolism, etc.). Examples from the wildland firefighting HRO are used to illustrate these ideas.

Additional Keywords: Materiality, Bodies, High Reliability Organizations (HROs), Wildland Firefighting

High Reliability Organizations

High reliability organizations operate in uncertain circumstances and thin margins of error while consistently avoiding failure. Initial theorizing on *reliable* organizations comes from observation of the operations of aircraft carriers (Weick & Roberts, 1993), nuclear submarines, air traffic controllers, and wildland firefighters whose operations are unique for their emphasis on catching small errors (Bierly & Spender, 1995; Klein, Bigley & Roberts, 1995; Weick, 1987; Weick & Sutcliffe, 2003). Organizations are systems of collectivities of individuals whose actions are interdependent and play off one another in the form of "double interacts" involving action, reaction and feedback to the reaction (Weick, 2004). Interpretations about tasks or the operating environment change or solidify based on individual actions and other social cues (Weick, 2004). A central tenet of Weick's work is that small events are amplified through processes and sequences of action within a system. Actions do not start out mistaken, but *become* mistaken as HRO members simultaneously perform their jobs and interpret their own and each other's enactments.

Weick acknowledges the inherently social nature of organizational systems. His theorizing focuses on the ways in which HRO members coordinate to accomplish *tasks* within challenging and unforgiving *operating environments*. These operating environments involve numerous seen and unseen risks and rely upon the interdependence and flexibility of members to notice problems when they are small, and communicate about them. To operate *reliably* is to achieve consistent outcomes through constant awareness of potentially unstable situations, and anomalies in the environment. Reliability is only partially achieved through individual vigilance. The crux of reliable processes is the *communication* with crewmembers alerting them to potential problems. Weick argues for the importance of communication in facilitating reliable operations and acknowledges that it is problematic. Yet, his theorizing focuses on cognitions and action directed at the task-driven *operating environment* while attending less to complexities of the *social* environment. In addition, practical training in HROs touts messages such as "if you see something *say* something." But it is not that easy. Because HRO members coordinate in an operational as well as a social environment, there are costs such as loss of crewmember trust associated with being overly sensitive to hazards, or being overly cavalier.

I argue that cues from the social environment (e.g., other's nonverbal messages and bodies) importantly mediate whether and how people interpret the potential and severity of emerging errors. Members must feel at least somewhat confident that the issue they are bringing up actually warrants the attention of others. This is not simply an issue of making a rational choice, but rather an embodied experience that is grounded in "brute facts" of one's material body such as embodied experiences and nonverbal cues from others (Ashcraft, Kuhn & Cooren, 2009) and is confirmed, disconfirmed and otherwise nonverbally cued from other's body motions within a potentially unforgiving social sphere. Weick's theorizing about how "double interacts" function to facilitate reliability can be fruitfully extended by examining how the material bodies of HRO members offer important cues that shape member's interpretations within the *social environment*. Identifying important material forces in the social environment that enable and constrain the passage of crucial information is a key starting point for understanding how communication enacts *reliability* in both the operational and social environments of HROs.

This paper will problematize *reliability* as a *communicative* process, arguing that theorizing about social processes should consider the materiality of the body (e.g., nonverbal cues, embodied knowledge) in addition to ideational elements of organizing (e.g., culture, symbolism, etc.). Next, I will discuss ways that research and theorizing have brought the body into literature, often as subject to discipline and control within the patriarchal gaze. After that I will unpack the materiality of the body, addressing how the body is interactional and communicative because we inhabit it in particular ways. HRO members must act quickly within limited margins of error, thus it is important to understand how knowledge is embodied and how the body nonverbally cues social interpretations of the operating environment. I will then introduce the notion of affordances as a way to bring attention to how the material body provides cues for interpretations. Finally, I will unpack how the body can be brought into theorizing about *reliability* as a social process in HROs that is grounded in enactments of the physical body. Implications for HROs include a better understanding for how "reading" the cues of other's bodies plays an important role in reliable operations, especially in situations in which explicit communication is not possible.

Two HRO Environments: The Operational and the Social

HRO members navigate a complex and dynamic operating environment comprised of challenging sites and terrain, as well as changing conditions. For example, wildland firefighters' operating environment is the external fire environment of fuel, topography, and constant changes in fire activity and weather. Engaging hazards and retrospectively making sense of actions is thought to be the most effective way for HRO members to develop experience within these fluctuating environments (Weick, Sutcliffe & Obstfeld, 2005). Current theorizing on reliability focuses on cognitive and individual processes of mindfulness as the key to noticing inconsistencies, reporting errors and ultimately developing reliability (Weick, et al., 1999). However, HRO members may only have sporadic opportunities to directly engage hazards. Therefore, observations of other member's enactments of operating environments may be crucial for understanding differences between safe and unsafe conditions. Models of rational action can be fruitfully extended by theorizing how highly interdependent crewmembers cue actions with one another, or how coordination is rooted in enactments of the material body. For example, a wildland firefighter enacting the operational firefighting environment may notice a slight increase in fire activity and may be tempted to alert crewmembers. Firefighter training and conventional wisdom advise the firefighter to do so in order to avoid large errors. However, increases in fire behavior are fairly common, and there are numerous demands on firefighter attention. For these reasons, the firefighter may decide to delay bringing the fire intensity to other's attention (or choose not to do so at all) until he or she is more certain that the increase warrants the attention of others. The firefighter has dual concerns about 1) the increase in fire intensity observed in the operating environment, and 2) social concerns about whether the fire behavior warrants the attention of other crewmembers. Thus, it becomes not simply a matter of observing an increase in fire behavior and then alerting team members to it. Instead, communicating about the fire behavior is a decision that is mediated by a complex social environment.

The *social* environment consists of assessments that individuals make about the operating environment. The social, communicative realm brackets individual's assessments of the operating environment within ideational and material elements of organizations. Ideational elements of organizational life include norms for behavior and action, and also subject individual's assessments of the operating environment to cultural expectations and criticism. Even if an organizational culture has achieved a mindset that encourages communication about small errors, members still must manage norms and social pressures that influence when, how and what they bring to the attention of others.

As previously mentioned, the social environment has been addressed in largely ideational terms. In this paper, I propose that new theorizing should consider these ideational elements alongside the *material* aspects of organizational life such as ways that bodies move, enacting tasks, embodying knowledge and nonverbally cueing one another. If achieving *reliability* depends on members sharing information, then it is crucial to understand the ways in which the *social* environment enables and constrains communication among HRO members.

The Social Environment as Ideational Versus Material

Weick and other scholars have acknowledged the importance of the social environment of HROs in terms of organizational culture (Bierly & Spender, 1995; Klein, Bigley & Roberts, 1995; Weick, 1987; Weick & Sutcliffe, 2003), collective mind and mindfulness (Weick & Roberts, 1993; Weick, Sutcliffe & Obstfeld, 1999). This body of work identifies specific practices that can facilitate reliability (e.g., preoccupation with failure, reluctance to simplify interpretations, etc.). Perhaps more important than practices is the broad notion that achieving

reliable operations can only occur if rigid authoritarian, hierarchical organizations embrace an overarching culture that *accepts* flexible operations and individual vigilance. Thus, existing ideational research on organizational cultures and mindsets highlights the ways in which human elements such as language, cognition, metaphors, desires and norms work to produce and reproduce understandings of organizational actions and experiences (Ashcraft, Kuhn & Cooren, 2009). Yet, ideal elements of organizations are grounded in less-understood physical, material realities making it crucial to investigate how the ideational and material elements influence one another.

While ideational research focuses on symbolism and meaning, materialist research focuses on the "brute facts" of organizational life (Ashcraft, et al., 2009). The materiality of organizations comes into view in the technical, concrete and physical factors of the body and of organizational sites and objects (Ashcraft,et al., 2009). This paper focuses on physical realities of the material body within high reliability organizations proposing that the importance of the social environment is that nonverbal cues from crewmembers importantly guide how an individual may make sense of tasks they have accomplished and terrain across which they have struggled. The next section briefly reviews and critiques extant approaches to examining the material body. I then introduce the notion of *affordances* as a way to explore the physical experience of the body while avoiding the dangers of essentializing physicality within HROs.

Literature on the Body

Existing research exploring the materiality of the body tends to focus on ways in which the body (particularly the female body) is "inadequate." This work often takes a gendered lens, drawing attention to the ways the body is managed or exploited under patriarchal systems (Witz, 2000) and tends to fall into three broad categories. First, research addresses *body appearance cues* dealing with individual's presentations of the self, such as attractiveness and professional dress (Dellinger & Williams, 1997; Wolkowitz, 2002). This work points to ways in which the body appearance can be manipulated so that it can better fit with the ideal worker in that profession. However, this work essentializes the privileged white male as ideal, while other combinations of gender and race are ultimately marginalized. Second, research on *body work* addresses how particular professions require work with specific bodies, for example, nursing, caring, beauty work (Wilkowitz, 2002; Lee-Trewick, 1997; Parker, 1997), also research on health and safety (Kenan, McLeish & May, 1998). This work examines the gendered nature of care work and the exploitation of people who do it. Third, the *excessive body* deals with inadequacies of the (usually female) body in relation to the male ideal. This work often employs the Foucaultian notions of discipline and panopticism to unpack how bodies are managed and sanctioned in work environments, and how individuals control their excessively sexual, emotional, or leaky bodies (Buzzanell & Liu, 2007; Smythe, 1995; Trethewey, 1999; Wendt, 1995).

In focusing on the inadequacy of the body within patriarchal systems, these lines of research fail to explore ways in which the body *affords* agency. The body is an essential and under-theorized aspect of the social environment, particularly in terms of enabling and constraining communication processes among crewmembers. It has been primarily treated as an object to be manipulated and controlled rather than an important filter by which people enact their subjective experiences. An alternative way to problematize the body is to consider it in terms of phenomenology. Merleau-Ponty (1962) rejects the notion that there is a split between mind and body such that the mind holds all of one's knowledge while the body holds none. Instead, he considers the body itself to be a *knowledge-acquiring apparatus* (Merleau-Ponty,

1962). From this view the body is inherently interactive in that interpretations of others' experiences are rooted in understandings of our own materiality. Bodies enact environments that are both operational and social. As the body moves through operational environments, it enacts tasks and moves across landscapes providing an individual with physical experiences for what it feels like to perform tasks and encounter hazards, as well as the material realities of laboring across terrain.

Individuals enact operating environments and partially make sense of actions they have taken. The material body also enacts tasks within collectives of individuals (e.g., as a crew). As bodies enact operating environments and tasks together, body movements cue one another about which actions should occur next. To better understand task complexity in high reliability organizations, it is important to examine how cues from the physical body *afford* coordination of HRO members as they operate reliably. *Affordances* refer to the individual's sensitization to what they know at the "gut level," and how other's physical cues influence their own interpretations of the operating environment.

Affordances and the Material Body

Affordances, coined by Gibson (1977), refers to the ways in which meaning is understood based on the physical relationship between humans and their environments. The notion of affordances is rooted in ecological psychology and its primary focus is on people's negotiation of features of spaces and their uses of objects that maximize, or *afford* the most, agency (Gibson, 1977). For example, flat landscapes afford more mobility to a walking person than do steep landscapes; and the height of a chair's seat affords sitting while resting feet on the floor. Ecological psychology is a useful perspective for extending Weick's cognitive work to include the body because this line of thought blends the cognitive and the empirical. The result is an acknowledgement that bodily enactment, in addition to cognitive processing, contribute to what an individual knows (Shaw and Pittenger, 1977).

This paper employs the notion of affordances to unpack ways in which the body and bodies of others cue interpretations in the HRO social environment. As previously mentioned, the idea that others' interpretations influence one's own understanding of an event is similar to Weick's notion of the "double interact" involving action, reaction and feedback to the reaction (Weick, 1979). Affordances bridge across the Cartesian mind/body split to include what the "wise" body knows into individual's cognitive interpretations and physicality (Gaver, 1996; Greeno, 1994). This is important to examine because it can help us understand how HRO members negotiate between "gut" level knowing and social pressures of the situation.

Beyond acknowledging what human behavior affords, Gibson (1977) treats humans as interactive objects. There are a few ways of bringing the body into this idea of affordances. First, following the reasoning of ecological psychology and Gibson's concern with the human's use of objects and navigation through spaces, the body can be viewed as having physical abilities that help an individual excel within the *operating environment*. From this perspective, affordances would be tied directly to physical features of the body that help the person physically accomplish tasks. For example, the body's proportion of muscle and physical strength could be considered affordances for wildland firefighters who must move across steep terrain. Walking speed could be considered an affordance for firefighters who must quickly escape a hazardous situation. The risk with this approach is that there may be a tendency to essentialize HROs as environments that would always already privilege masculine notions of the body. A preoccupation with physical traits ignores the bodily *enactment* of tasks and environments that embody individual knowledge and cue actions within the collectivity of the crew.

A second approach examines how affordances arise in the *social environment*. This approach holds that affordances arise as people become attuned to the ways in which their awareness of self and others is enabled and constrained within a potentially unforgiving social sphere. If, for example, a firefighter fails to alert crewmembers to increasing fire intensity, perhaps it is because the firefighter does not trust his or her knowledge and prefers to avoid the social costs associated with being overly cautious. A primary reason for understanding how enactments of the body create knowledge is because HROs are complex environments that are overlaid with complicated social cues. Thus, wildland firefighters gain embodied experience in complex operating environments by first becoming attuned to ways their individual physical enactments of tasks have informed their knowledge. Firefighters also may benefit from becoming sensitized to ways that other's physical enactments of tasks cue their actions in particular ways subsequently guiding their interpretations of situations. As Thayer (1967) notes, "inquiry is initiated in conditions of doubt; it terminates in the establishment of conditions in which doubt is no longer needed or felt" (p. 434). Therefore, of particular importance is how the actions of others confirm or disconfirm an individual's doubt ultimately shaping their interpretation of what they see in the operating environment. The next section introduces how the material body cues interpretations within the social environment of HROs.

A Typology of Affordances

Affordances give us a way to understand how the body and cues from it drives the social environment. Therefore, affordances arise as individuals become sensitized to what they know, what others know, and how the actions of self and others within the social environment influence their own assessments of the operational environment. Below, I introduce two categories of affordances. First, the *"wise" body* (individual level) evolves through instantiating performances and failure performances. Second, *coordinating bodies* (group level) involves becoming attuned to improvisational performances and weighing interpretations.

Typology 1: The "wise" body

When Weick (2004) discusses HROs, he often mentions the idea of wisdom, which refers to actions carried out confidently while also recognizing that one may have incomplete knowledge about a situation. The notion of wisdom addresses the social environment because it accepts that HRO members must navigate an ambiguous space between knowing when to act and when to disengage, and it accepts that actions may arise from a combination of what the individual knows, and what others indicate that they know. The wise body is a category of affordances that focuses on ways that physical experiences of the body function to generate and augment what an individual knows. While the mind may contain knowledge, the key to this affordance is that the sensory experiences of the body record the knowledge in particular ways that allow an individual to understand something with greater insight, or become sensitized about the extent of what they know. Thus, the focus of this section is less about how information is *learned*, and more about how the embodiment of information breathes life into what an individual already knows.

I**nstantiating performances**. This affordance emerges when individuals enact what they already know or what has been learned in the classroom in a way that cements the information into embodied knowledge. Due to instantiating performances, something that an HRO member already knows becomes understood with greater depth or insight. This could occur due to seeing in real life what has been learned in the classroom, having a surprise or counterintuitive experience, or revisiting taken-for-granted knowledge through the process of teaching others.

For example, a wildland firefighter may have learned from classroom training that large accidents often are the result of small errors that, if ignored, accumulate and "line up" like holes in swiss cheese (Reason, 1997). Each defense against a potential failure is a slice of swiss cheese, and the weaknesses in the defense are represented by the holes in the cheese. As weaknesses such as gaps in supervision and lack of experience accumulate, the holes in the swiss cheese align and hazards breech the system's defenses (Weick, 2003). To prevent failures from happening, the firefighter is taught to enact practices that provide the best possible defense (e.g., appointing lookouts to monitor fire behavior and changing weather conditions). However, it is through fireline enactments that the firefighter comes to understand how some defenses are associated with avoiding particular types of failures, and when some defenses are more appropriate than others. For instance, a firefighter may serves as a lookout taking readings on temperature and humidity every hour. From this experience, she may note that in the midday hours, a severe drop in humidity and sharp rise in temperature are accompanied by dramatic increases in the smoke column. Enacting this role of physically monitoring the temperature gives her the opportunity to see how her role as a lookout provides crucial information about the potential for dangerous rates of fire spread. This is an instantiating performance in which the firefighter enacts the experience of watching the fire. She embodies classroom knowledge such that she not only understands through direct experience the importance of having a diligent lookout, but she also understands the ways in which a diligent lookout serves as a fallible but crucial line of defense.

Failure performances. Weick, et al., (1999) discusses the importance of failures in HROs. Preoccupation with failure means that organizations are sensitive to as many lessons as possible from failure and near failure incidents. The failures that seem far removed from personal experience may not affect everyone in meaningful ways unless experienced firsthand. Thus the *failure performances* affordance arises. This affordance arises is not just from being surprised, but specifically having to *enact* the worst-case-scenario. For example wildland firefighters enact failure performances when utilizing a safety zone, deploying the fire shelter, drop tools or gear to enable escape, or run away from fire when it is normal to walk. Through failure performances, the body goes through the characteristic sensory experiences involved in a life threatening failure. The body becomes more knowledgeable as it performs the motions while also experiencing the shock and emotions of what it is like leading up to a total failure.

For example, wildland firefighters are taught to always have safety zone nearby. A firefighter may have an understanding about the approximate size of a safety zone and the permissible amount of vegetation that still allows for safety. The firefighter may also understand the appropriate distance of and type of terrain present in an escape route that connects working firefighters to the safety zone. However, this rational and sensible knowledge may become truly relevant only after the firefighter has had to actually hike to the safety zone under stress. Thus, enacting the escape route and safety zone is a failure performance in which the body labors across terrain, experiencing the physical reality of the escape route and understanding this already held knowledge about escape routes and safety zones in a new way (e.g., escape routes would be safer if shorter and not as steep, etc.). From the enactment of failure, the body becomes "wise" recognizing the limits and material realities of what is considered taken-for-granted and normative firefighter knowledge.

Typology 2: Coordinating bodies

Coordinating bodies is a category of affordances in which the physicality of others' bodies cues action and interpretation in particular ways. Thus, it centers on what individuals see

in the operating environment, and how their communication about what they see is both enabled and constrained by social factors. The affordances arise from firefighters 1) knowing a repertoire of nonverbal cues so that they can interpret others' actions in situ (improvisational performances), and 2) distinguishing whether other's actions confirm, disconfirm and guide their individual assessments of a situation (weighted interpretations).

Improvisational performances. The improvisational composition style characteristic of jazz musicians has been identified as an example of the prototypical emergent organization (Miner, Bassoff & Moorman, 2001; Weick, 2001; 2006). In jazz, improvisation is an activity of extemporaneous composition of an original piece of music that is executed through the coordinated activities of ensemble members whose music becomes an elaboration of pre-composed musical phrases (Miner, et al., 2001). Improvisation does not occur spontaneously; rather it is rooted in common understandings of a simple and minimal structure (Weick, 2006). Applied to organizations, it is important to note that improvisation depends on sets of rules that guide action, fragments of routines, and trajectories for action. Improvisational performances require that all members have some knowledge of the basic rules for action, and that the more experienced members are both sensitized to the experience levels of less practiced members, and that they socialize members toward a deeper awareness of the workgroup's conventions. Improvisational performances can afford a greater repertoire of flexible actions rooted in the crew's functional routines and notions of appropriate actions. Improvisational performances arise as HRO members anticipate potential failures and re-adjust their actions on-the-fly. This idea is similar to Hindmarsh and Pilnick's (2007) notion of *intercorporeal knowing*, defined as a sensitivity to the "delicate and subtle shifts in the embodied conduct of colleagues" (p. 1413). Hindmarsh and Pilnick contend that intercorporeal knowing involves understanding how current movements indicate trajectories of action, and opportunities to assist in task accomplishment. Similarly, this paper focuses on how the actions of colleagues' bodies cue their own actions in an emerging situations. While Hindmarsh and Pilnick focus exclusively on task sequences, this paper focuses on the ways in which the material body cues social sensemaking processes, not just task accomplishment.

Weighted interpretations. A variety of physicality factors may go into an overall assessment of another person within the HRO social environment. This affordance refers to knowing the brute cues of others' bodies. Gibson (1977) indicates that complementary relationships afford weight to the ways individuals interpret one another's actions. For instance, the complementary relationship between a supervisor and a subordinate would afford weighted interpretations of one another's actions such that when the boss' behaviors (e.g., rushed movements, sweating, shaking) show uneasiness about a situation, the display carries more gravity than if a less experienced subordinate displays the same cues. Thus, the interaction of organization member's salient identities in the moment, combined with the physical actions and behaviors displayed, would shape the attributions made about their behaviors and cues, and interpretations of them. A firefighter describes a situation in which the actions of a co-worker, who had at least a comparable experience level, forced him to question his observations about a situation:

> **"**When somebody else on your crew has the same experience or has more experience than you and they are visibly upset or completely going bonkers, like 'we gotta get out of here!' and they're running through the bushes and that kind of thing, it makes you wonder 'what am I seeing?' It's hard to actually pay attention to your own feelings at that time because they're clouded by, I think, other people's visions, too. You're thinking "hey, maybe I'm not seeing something right, maybe somebody else has experiences that I don't have."

The firefighter points to non-normative ways in which his crewmember physically enacted the fire environment, running through the bushes, "going bonkers," and looking visibly upset. The co-worker's actions are unusual in an environment in which firefighters move their bodies deliberately (rather than hurriedly), and remain calmly watchful (rather than upset). Not only are the co-worker's actions influencing the firefighter's evaluation of the fire environment, also important is the weight of the co-worker's actions given the firefighter's assessment that he and his co-worker share similar levels of fire experience. The co-worker's actions carry such a weight that the firefighter pauses to re-evaluate what he is seeing in the operating environment.

Theoretical and Practical Implications

Theoretical implications. In Weick's (1995) classic sensemaking book, he emphasizes the power of labeling through the story of "multiple unsuspected trauma syndrome" in which x-rays of children often revealed bones that were broken in multiple places and at various stages of healing. Parents indicated they did not know or could not remember the cause of the child's fractures. These fractures were in fact signs of brutal child abuse, yet the labeling of "multiple unsuspected trauma syndrome" reflected only what the health care system of the 1950s had in its power to do about the problem (e.g., advise parents to watch their "brittle boned" children more closely). However, once social workers became part of the health team, the system had the capability to acknowledge and deal with the abuse, and re-label it for what it was, "battered child syndrome." Weick (1995, 2006) concludes that a system can only *recognize* and label that which is in its capacity to handle, and anything beyond its capability is simply not visible.

Similarly, in HRO theory and practice we have developed theoretical models for cognition and behavior rooted in the notion that knowledge is exclusively held by the mind. The importance of the body in holding knowledge, driving individual actions and cueing one another in the social realm is merely alluded to, while remaining largely unexamined. Like the broken bones, we see and theorize the material body, but we are labeling its functions exclusively in terms of cognitive reasoning. New theorizing must address how interpretations of emerging circumstances are shaped by the physical cues shared among HRO crewmembers. *Reliability* of operations depends on noticing the operating environment and communicating in the social environment. Unpacking the materiality of bodies in HROs and how they enact reliability involves a new way of processing physical brute facts that contribute to bridging across mind and body, rather than favoring either mind *or* body. The hope is to "materialize" the body as a knowledge acquiring apparatus with physical presence among other knowledge acquiring bodies. This paper introduces and labels several ways in which reflexive attention to one's own embodied knowledge, and physical cues from others, can *afford* greater awareness of social pressure and sensitization to spirals of pluralistic ignorance.

Practical implications. Practitioners who train HRO members ground their training in the existing, primarily cognitive research, and often are important players in near-miss and fatality investigations. High-level agency and corporate representatives who depend on HRO theorizing and research to make sense of their operations understand that HRO members face time pressure, stress and information overload. However, they lack crucial understandings for how the complex social and physical environment of HROs constrains communication such that people cannot just bring up any small thing that causes concern. Fatality investigation findings declare that "communication was not in place" among firefighters (USDA Forest Service, 1994), the underlying assumption being that if people would just *talk* to one another, they could have averted catastrophe. Weick, et al. (2005) suggest creating a "culture" in which "admitting failure is rewarded," yet this research is entirely at an individual cognitive level, focused on operational

rather than social cues. This paper proposes that examining the materiality of bodies within an inherently social realm can inform his theorizing, bringing us closer to understanding how HRO members "read" one another. Members must feel at least somewhat confident that the issue they are bringing up actually warrants the attention of others. This is not simply an issue of the mind making a rational choice, but rather an embodied experience that is grounded in brute facts of one's material body and is initiated and processed through the material bodies of others within a potentially unforgiving social environment. Identifying important material forces in the social environment that enable and constrain the passage of crucial information is a key way to expand on extant theory while offering practical tools for HRO members.

Conclusion

In order to operate reliably, interdependent HRO members must navigate a complex social environment to communicate critical information for effectively handling a situation and avoiding problems. Much of the literature indicates that if members stay aware and pass along information, they will avoid failure. Communication is the crux of that work because it is through communication that the crucial information is conveyed. Yet, communication is taken as an unproblematic act, without consideration for the ways in which the social environment both enables and importantly constrains passage of crucial messages. This essay introduces typologies of affordances that may operate as potential mediators of communication about emerging failures. The wise body, and coordinating bodies *afford* agency because they are the "gut level" evidence of embodied experience, or brute facts that may mediate whether somebody chooses to pass along information about a potential failure or hold back because they doubt their experience. Finally, connecting materiality to communication, it is important to consider that making sense of cues on the crew increases the load that individuals should be expending on individual efforts to assess the environment, specifically the processes of mindfulness. Therefore, a major contribution of this work is to offer HRO members with practical tools for understanding how other people's reactions to situations may be influencing their own assessments.

References

Acker, J. (1990). Hierarchies, jobs, bodies: A theory of gendered organization. *Gender and Society, 4,* 139-158.

Ashcraft, K. L., Kuhn, T. R., & Cooren, F. (2009). Constitutional amendments: "Materializing" organizational communication. *The Academy of Management Annals, 3,* 1-64.

Bierly, P.E. & J.C. Spender (1995). Culture and high reliability organizations: The case of the nuclear submarine, *Journal of Management, 21,* 639-656.

Buzzanell, P. M., & Liu, M. (2007). It's "give and take": Maternity leave as a conflict management process. *Human Relations, 60,* 463-495.

Dale, K. (2005). Building a social materiality: Spatial and embodied politics in organizational control. *Organization, 12,* 649-678.

Dellinger, K., & Williams, C. (1997). Makeup at work: Negotiating appearance rules in the workplace. *Gender & Society, 11,* 151-177.

Gaver, W. W. (1996). Affordances for interaction: The social is material for design. *Ecological Psychology, 8,* 111-129.

Gibson, J. J. (1977). The theory of affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting, and knowing: Toward an ecological psychology* (pp. 67-82). Hillsdale, NJ: Erlbaum.

Goodwin, C. (1994). Professional vision. *American Anthropologist, 96,* 606-633.

Greeno, J. G. (1994). Gibson's affordances. *Psychological Review, 101,* 336-342.

Hindmarsh, J., & Pilnick, A. (2007). Knowing bodies at work: Embodiment and ephemeral teamwork in anaesthesia. *Organization Studies, 28,* 1395-1416.

Kenan, R. H., McLeish, J., & May, D. (1998). *Pregnancy at work: Health and safety for the working woman.* London: Pluto Press.

Klein, R.L., G.A., Bigley and K., Roberts (1995). Organizational culture in high reliability organizations : An extension, *Human Relations*, 48: 771.

Lee-Trewick, G. (1997). Women, resistance and care: An ethnographic study of nursing work. *Work, Employment & Society, 11,* 47-64.

Merleau-Ponty, M. (1962). *The phenomenology of perception.* New York, NY: Humanities Press.

Nadesan, M., & Trethewey, A. (2000). Performing the enterprise subject: Gendered strategies for success? *Text and Performance Quarterly, 20,* 223-250.

Parker, J. (1997). The body as text and the body as living flesh. In J. Lawler (Ed.), *The body in nursing.* Melbourne: Churchill Livingstone.

Reason, J. (1997). *Managing the risks of organizational accidents.* Aldershot, UK: Ashgate.

Smythe, M. J. (1995). Talking bodies: Body talk at Bodyworks. *Communication Studies, 46,* 245-260.

Trethewey, A. (1999). Disciplined bodies: Women's embodied identities at work. *Organization Studies, 20,* 423-450.

US Department of Interior Bureau of Land Management, & US Department of Agriculture Forest Service. (1994). Report of the South Canyon Fire accident investigation team. Glenwood Springs, CO: Authors.

Weick, K. E. (1979). *Social psychology of organizing*. Reading, MA: Addison-Wesley.

Weick, K. (1987). Organizational culture as a source of high reliability, *California Management Review*, 24: 112-127.

Weick, K. E. (2003). Positive organizing and organizational tragedy. In K. S. Cameron, J. E. Dutton & R. E. Quinn (Eds.), *Positive organizational scholarship: Foundations of a new discipline* (pp. 66-80). San Francisco, CA: Berrett-Koehler.

Weick, K. & Roberts, K. (1993). Collective mind in organizations : Heedful interrelating on flight decks, *Administrative Science Quarterly*, 38: 357-381.

Weick, K., Sutcliffe, K.M. & Obstfeld, D. (1999). Organizing for high reliability : Processes of collective mindfulness, *Research in Orgnizational Behavior*, 21: 81-123.

Weick, K. & Sutcliffe, K. M. (2003). Hospitals as cultures of entrapment : A re-analysis of the Bristol Royal Infirmary, *California Management Review*, 45, pp. 73-84.

Wendt, R. F. (1995). Women in positions of service: The politicized body. *Communication Studies, 46,* 276-296.

Witz, A. (2000). Whose body matters? Feminist sociology and the corporeal turn in sociology and feminism. *Body & Society, 6,* 1-24.

Wolkowitz, C. (2002). The social relations of body work. *Work, Employment, & Society, 16,* 497-510.