THE CONSTITUTION OF HIGHLY RELIABLE PRACTICES:

MATERIALIZING COMMUNICATION AS CONSTITUTIVE OF ORGANIZING

A Dissertation

by

ROBERT TYLER SPRADLEY

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: Communication

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Approved by:

Co-Chairs of Committee,	Linda L. Putnam
	Katherine Miller
Committee Members,	J. Kevin Barge
	Charles Hermann
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ABSTRACT

The Constitution of Highly Reliable Practices: Materializing Communication as Constitutive of Organizing. (August 2012)

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National and international crises in the early 21st Century, whether natural, technological or man-made, emphasize the need for highly reliable organizations (HROs) to conduct emergency response in a relatively error-free way. Urban search and rescue units provide a pivotal intermittent role in these high-risk environments. Traditional HRO research focuses on a concept known as "collective mind" – heedful interactions of responders that accomplish reliability. Rather than focusing on collective mind, this study uses a practice-based communication approach to examine the material interplay of bodies, objects, and sites using ethnography and grounded theory. In-depth interviews, participant observations, and organizational documents were coded and contrasted to find patterns in material interplay. More specifically, this study examines how these material features interact to orchestrate reliable practices through ecological coherence, a bonding of multiple forces to construct meaning and improvisation. The study has implication for HRO theory through focusing on the role of the body rather than emphasizing cognitive judgment in collective action. Collective body shifts the

discussion of mindful processes to embodied practices and offers insights into the ways responders enact safety and perform responses in dynamic, high-risk environments.

DEDICATION

Elizabeth, my Beautiful, your endurance and love are amazing.

Linda, your compassion for me and your zeal for the field are inspiring.

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I would like to thank my chair, Dr. Linda L. Putnam, and my committee members, Dr. Katherine I. Miller, Dr. J. Kevin Barge and Dr. Charles Hermann, for their guidance and support throughout the course of this research. Special thanks goes to Dr. Linda Putnam for staying on as my chair through all of the changes that we have both been through over the tenure of this project. Additionally, thanks to Dr. Dave McIntyre and Dr. Joel Iverson for serving on the committee prior to leaving Texas A&M University.

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I also want to extend my gratitude to the urban search and rescue organization members who willing gave of their time during the data collection process of this study and who willing give their lives for the benefit of all who find their way to their arms – may we all learn from your example.

Finally, thanks to my wife for always believing, always loving and always smiling, to my parents for support on this intellectual endeavor, and my sons for coming to make life crazy and fun during the journey.

NOMENCLATURE

AAR	After Action Report
B	Body
BSO	Bodies, Sites and Objects
CCO	Communicative Constitution of Organizing
CoP	Communities of Practice
HAZMAT	Hazardous Material
HRO	High Reliability Organization
O	Object
S	Site
USAR	Urban Search and Rescue

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CHAPTER I

INTRODUCTION AND

HRO LITERATURE REVIEW

Unexpected organizational environments are normative in the 21st Century, as organizing processes are complicated and challenged by an increasingly dangerous and technologically permeated society (Weick & Sutcliffe, 2007). Central to the increasing social complexity is a dynamic and emergent material reality that is often dropped or positioned in the background of organizational communication scholarship. This study employs a comparative approach to theory building (Charmaz, 2000, 2005, 2006) to address questions of communication and materiality (Aakhus et al, 2011; Phillips & Oswick, 2012) from a practice perspective (Schatzki, 2001) to contribute to the body of work on communication as constitutive of organizing (CCO) (Putnam & Nicotera, 2009; Fairhurst & Putnam, 2004; McPhee & Zaug, 2000). To attend to these issues, a post-dualistic practice-based CCO lens will be applied to examine the constitutive entanglement (Orlikowski, 2007) of social (i.e. ideation, discourse and norms) and material components, such as body, site, and objects (Ashcraft, Kuhn & Cooren, 2009), in the production and progression of search and rescue organizational practices. Specifically, the study will focus on building an argument for the centrality of communication as the ecological coherence of material and discursive interplay.

This dissertation follows the style of *Communication Monographs*.

Additionally, the study will show how materiality and discourse are simultaneously intertwined and inseparable in the production of the meaning and performance of highly reliable organizational practices, in turn, decentering ideational privileging in theoretical constructs.

Chapter I will examine how high reliability organizing literature frames organizational practices in dangerous, dynamic environments, the role of communication, and the ideational/material dualism. Chapter II will review CCO literature to provide backing for the advantages of using a practice perspective as well as review literature on materiality. Chapter III will identify the organizational site and the methods used to collect and analyze data. In Chapters IV and V data will be analyzed using grounded theory to develop new insights in answering the fundamental question: how do search and rescue sociomaterial practices emerge and accomplish highly reliable organizing in dynamic, high-risk environments? Chapter VI will conclude this study by integrating insights from data analysis and relevant literature 1) to shape future directions of CCO literature pertaining to questions of communication and materiality and 2) to use these conclusions to broaden HRO scholarship. Finally, Chapter VII will a) summarize key constructs examined in the study, b) provide implications for communication and materiality beyond organizational communication, c) provide applied implications for urban search and rescue organizations, d) outline limitations of the study, and e) discuss future directions using the contributions of this study.

Rationale

High Reliability Organizing

High reliability organization (HRO) literature examines organizing processes in fluid high-risk environments where "disasters can be minimized in frequency and severity" (Roberts & Bea, 2001). Fundamentally, HROs must continually maintain relatively error-free operations to circumvent human casualties and/or high monetary damages (Weick & Roberts, 1993). Organizations, such as nuclear power plants (Klein, Bigley, & Roberts, 1995), nuclear aircraft carriers (Roberts, Rousseau, & La Porte, 1994; Roberts, Stout, & Halpern, 1994), and air traffic controllers (Klein et al., 1995), have been prime sites of study due to their risk-inherent environments that demand perpetual reliability. Yet, a category of organizations, such as fire departments, exists, in which risk-inherent environments are intermittently experienced with varying degrees of hazard.

These organizations, unlike nuclear aircraft carriers, do not operate in a continually hazardous environment. Instead, these organizations experience hazards during emergency response and training. Thus, emergency response organizations such as police and fire departments, urban search and rescue units, and emergency medical units represent highly reliable organizing. The dynamic environments in which they respond are described as sites of uncertainty and urgency, as response organizations comprised of trained, professionalized responders and non-professionals alike converge in such environments (McEntire, 2007). Organizational communication studies have examined municipal and wildland firefighting and produced considerable research on

HROs (Larson, 2003; Myers & McPhee, 2006; Myers, 2005; Scott & Myers, 2005; Thackaberry, 2004; Weick, 1993), but have not centered on other emergency response organizations such as urban search and rescue.

Collective Mind

Predominantly, HRO research has contended that a highly reliable culture (Weick, 1987) is prescribed for managing high-risk environments (Weick, 1987; Roberts et al, 1994b; Klein et al, 1995; Bierly & Spender, 1995), and a culture of reliability is described as advantageous to managing unexpected events, even in non-high risk organizations (Weick & Sutcliffe, 2001; 2007). To achieve a culture of reliability, research has focused on sensemaking processes and human interaction, such as, collective mind (Weick & Roberts, 1993; Weick et al, 1999; Weick & Sutcliffe, 2001; 2007; Weick & Putnam, 2006), decision-making processes (Roberts et al, 1994a), organizational self-design (Rochlin, 1989), socialization (Myers & McPhee, 2006; Myers, 2005; Scott & Myers, 2005), and trust relations (Cox, Jones, & Collinson, 2006). Collective mind is at the forefront of HRO theorizing. Collective mind is defined as "heedful interrelating," a combination of situational awareness and social action (Weick & Roberts, 1993, p. 375). Weick and Roberts state, "we conceptualized mind as action that constructs mental processes rather than as mental processes that construct action" (p. 374). Collective mind is a coordinated sensemaking process (Weick, 2001; Weick, 1995), thus, constitutive of organizing– "How can I know what I think until I see what I say?" (Weick, 1979, p. 133). Specifically, Weick identifies collective mind as the selection stage of sensemaking - "the retrospective interpretation of enacted cues" (2001,

p. 238). As Weick explains, "when individuals have an ongoing concern with contributing to, representing, and subordinating to an emerging social system they produce interpretations with sufficient commonality to allow for coordinated sensemaking" (p. 238).

This commonality is in the form of equivalent, not shared, mental models that direct the collective focus of individual members toward more similar means, or activities, by which to accomplish organizing in highly complex environments. The more mindful an "enlarged set" of interpretations is, the greater the probability of managing unexpected and/or high-risk environments (p. 239). Action is understood in terms of the thoughtful coordination of the collective. It is through social interaction that the heedful system is reproduced. "To connect *is* to mind" (Weick & Roberts, p. 374). Thus, to understand this shared cognitive framework, a researcher must turn an inquisitive eye toward the practices privileged to achieve reliability. Collective mind research has stopped short of descriptively demonstrating that social reality is constructed, evolving and contextual within dynamic interrelationships of material realities. Instead, studies tend to place theoretical boundaries on how organizing reliability takes place in a physically fluid world.

While physical environments are in the conversation, sensemaking and collective mind are more attentive to constructed information environments than to interrelationships between material arrangements and their entanglement with cognition and social interaction. However, communication as symbolic meaning construction becomes central to the collective minding process and, in turn, highly reliable organizing

process. For example, where expectations are useful in less equivocal information environments since they suggest "the probable course of events" (Weick & Sutcliffe, 2007, p. 25), communication is a necessity as environments increase in complexity because "organizational members introduce and react to ideas" through communication (Miller, 2009, p. 68). Therefore, Weick argues, communication is constitutive, and collective mind processes are the key ingredients of the constitutive process in HROs. While communication is more than information transmission and is central to the constitution of high reliability organizing processes, both communication and collective mind are given boundaries that privilege cognition.

Such boundaries are forwarded by specifying what comprises heedful interrelating (Weick & Roberts, 1993). Weick, Sutcliffe, and Obstfeld (1999) delineate five mindful selection processes that are crucial for organizing in reliable ways: preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and an underspecification of structures (later termed deference to expertise). First, a preoccupation with error is defined as organizational actors attuned to error detection and error prevention – tracking small failures (Weick & Sutcliffe, 2007). Rather than organizing for efficiency, HROs institutionalize mental processes that attend to error, treating even the smallest errors as windows on the system as a whole. Organizational actors are encouraged through training, assimilation, and onsite experience to question processes and structures, report small errors and near misses, and learn from errors (Weick et al, 1999; Weick & Sutcliffe, 2001; 2007).

Second, HROs institutionalize collective mental processes that resist oversimplifying the complexity of the system and encourage the subsequent need for complex interpretations (Weick & Sutcliffe, 2001; 2007). Mindful activity avoids simplistic interpretations by elevating the importance of building larger knowledge repertoires from which to draw when performing in equivocal environments. Often labeled as requisite variety, collective mental organizing processes should become more complex as environments grow more ambiguous (Weick, 1995). Simply put, resisting oversimplification is achieved by co-constructing shared realities to engage the rising levels of risk, uncertainty, and complexity in the environment.

Third, HROs maintain a continual situational awareness termed sensitivity to operations (Weick & Sutcliffe, 2001; 2007). A sensitivity to operations, also known as "having the bubble" in Navy terms, is an effect of perpetually updated environmental, contextual, task, individual, and collective knowledge (p. 59). In other words, organizational actors must keep the small and big pictures in mind and be willing to alter their pictures in conjunction with the changing environment. Case studies of aircraft carriers demonstrate the consequences of lacking sensitivity to operations, such as a mechanic losing a leg or a multi-million dollar aircraft landing in the ocean (Weick & Roberts, 1993; Weick & Sutcliffe, 2001).

Fourth, an organizational commitment to resilience represents a learning organization with tightly coupled relations yet loosely coupled structures (Weick & Roberts, 1993; Weick & Sutcliffe, 2001). Basically, the social connections within the organization should facilitate trust during uncertainty while the structures of the

organization should prevent static reactions to uncertainty. Over reliance on plans, structures, and training processes may lead to inappropriate reactions to the crisis context. To effectively improvise in uncertainty, coordinated action needs to match the situation (Weick et al., 1999; Weick & Sutcliffe, 2001).

Finally, deference to expertise or underspecification of structures refers to the heterogeneity of organizational actors and the expertise each organizational member provides (Weick & Sutcliffe, 2001). Regardless of position, deferring to the expert assures that decisions are made and carried out based on expert knowledge of the system, structures, relationships, and crisis. In this sense, top-down command structures may be transcended to empower ground-level knowledge (Weick et al, 1999). Roberts states, "One of the major early findings was that HROs often structure themselves fairly hierarchically when nothing much is going on. As their environments become uncertain or their tasks become more complex they move to more fluid structures that allow decisions to move ever lower in the organization or to whoever is closest to the operations situation" (Bourrier, 2004, p. 94). Mindful practices, such as deference to expertise, seem to adjust as environments change.

Weick and Sutcliffe (2007) place these five processes, which act as a prescriptive guide for accomplishing HROs, into two categories that are ordered based on action sequence during a critical incident: (a) anticipation and (b) containment. Anticipation processes set up a framework of preparation for the unexpected. It is a cognitive exercise that develops sensing and slowing capabilities. Sensing imagines a "small cue" as sign of what greater incident is potentially in store. Slowing potential undesirable

events is also an act of anticipation, as mindful processes seek to deescalate and/or slow the spread of crises. Preoccupation with failure, reluctance to simplify and sensitivity to operations are all anticipatory. Practices that "operationalize" these three anticipatory processes seem to enhance heed (p. 45). As Weick and Sutcliffe (2007) state,

> HROs deal with this difficulty [anticipating errors, surprises and the unexpected] by trying to improve their ability to anticipate. They invest resources in such activities as developing contingency plans, imagining a greater range of worst-case scenarios, and detecting hazards early in their development. The intention in all these is to prevent small unexpected outcomes from worsening. (p. 65, explanation added)

While anticipation processes provide a foundation for sensing and slowing potential failures, they can also have adverse effects. For example, the anticipatory practice of planning based on expectations that can influence the seen or the unseen. Expectations have the potential for framing emergent events as relevant or irrelevant, which leads to influencing the number of things noticed and acted. Secondly, planning can lead to the specification of contingency actions, as a result, limiting resilience. Lastly, anticipatory practices, such as planning, can become routinized, resulting in an organization's inability to deal with novel events in a flexible manner. Mindful processes must be continually adaptive, rather than stable routines.

When crises occur, containment processes are enacted to make sense of and act on the changing environment at hand to prevent undesirable outcomes. HROs fully understand the limitations of anticipation processes. However, two cognitive processes

have been consistently present during containment: commitment to resilience and deference to expertise. Containment processes rely on trust and other social commitments in order to halt crises and move on. Reacting mindfully to the emergence of high-risk events results in graceful recovery and organizational continuity.

Weick and colleagues have significantly advanced the understanding of collective mind in relation to HROs, yet their perspective privileges explanations at the macro level at the expense of achieving explanations at the micro level. From a communicative lens, Cooren (2004b, 2006a) argues that collective minding can take place in mundane organizational contexts, just as it can in the HRO contexts to which is traditionally connected. Furthermore, conversation analysis is an effective method of analysis due to its focus on in-depth, localized communication and its relevance to organizational communication scholars. Cooren's (2004b) analysis of a transcribed board meeting for a drug rehabilitation center paves the way for researchers concerned with detail and depth in collective mind studies.

The debate that ensued from Cooren's (2004b) use of conversational analysis to study collective mind serves in micro level organizing as inspiration for this study and provides a framework for moving HRO and collective mind research forward. First, Cooren (2004b) critiques Weick's macro and processual approach to studying HROs and collective mind, which opens the proverbial door for organizational communication researchers who are interested in how HROs are constituted at micro, meso, and macro levels. Cooren (2006a) surmises that regardless of the analytical tool utilized, "we will still need to document our institutions on how organizing really works" (p. 337).

Second, in response to Cooren's work, McPhee et. al. (2006) elucidate the insufficiency of conversational analysis to capture the complexities of interrelating in HROs, which has implicitly led me to use multiple methods of data collection and a flexible method of data analysis. Thirdly, Cooren's rejoinder (2006a) extends the possibilities of conversational analysis to include non-human agency. In other words, Cooren considers the material to be communicative and situates the material in organizing, a line of reasoning fore grounded in this study. This *analytic extension* (p. 330) is integral to understanding highly reliable practices as both ideational and material and to studying these practices at micro and meso, as well as, macro levels.

RQ 1: How does communication offer the potential to decenter the mind in HRO?

Gaining the Material

Each of the five mindful processes demonstrates the selection stage of sensemaking in a variety of equivocal environments. While (a) material risks and consequences are acknowledged and (b) material risks and structures contextualize reliable organizing, primacy is given to ideational realities such as cognitive complexity (i.e. heed) and social interaction (i.e. interrelating) when defining reliable processes. Materiality is minimized and not significantly explored as active in the constitutive process. Interrelationships between dangerous, dynamic environments, or sites, the human body, and objects (such as tools and communications equipment) are placed in the background in HRO literature. These material realities are extremely significant, not only as a theoretical argument, but also in terms of safety during potential catastrophe.

Theoretically, treating materiality and ideational realities as equal provides a platform by which to explore the indivisibility of these realities as they construct meaning in fluctuating, high-risk environments. In turn, the physical danger and limitations experienced in the enactment of highly reliable practices is equally influential as cognitive and linguistic components that are associated with collective minding.

In sum, in HRO literature communication is construed as important and even constitutive of organizing processes (Weick, 1979; 1995). However, the ideational has been privileged over the material (i.e. body and objects), and thus has stifled research that views human and non-human agents as critical to the constitutive communication process. Dynamic, unexpected environments are understood and managed through heedful interrelating, which is situated in cognitive complexity and interpersonal skill (Weick and Roberts, 1993). In traditional HRO research, the focus on mind is consequential. Cooren (2006a) zeros in on how we idealize language and how the terminology of mind "leads us to circumscribe, as much as we can, the nature and functioning of a given phenomenon [mind]" (p. 332). Mind, even if an enacted collective accomplishment, remains fixed on ideation rather than action.

Dynamic and emergent material realities are minimized or dropped in traditional HRO research. However, as Orlikowski (2007) argues, the "ways in which organizing is bound up with the material forms and spaces through which humans act and interact" should not be overlooked in organizational research (p. 1435). Dealing more directly with materiality allows the researcher to examine the forms of organizing which are influenced by various evolving and emerging technologies (i.e., objects such as tools),

the dynamic physical environments in which HROs operate, as well as the bodies of organizational members.

CHAPTER II

COMMUNICATIVE CONSTITUTION OF ORGANIZING AND MATERIALITY

This study extends the work on the communicative constitution of organizing (Fairhurst & Putnam, 2004; McPhee & Zaug, 2000; Putnam & Nicotera, 2009; Taylor, 1993) movement through integrating it with a practice perspective (Reckwitz, 2002; Schatzki, 2001), specifically, sociomaterial practices (Orlikowski & Scott, 2008; Orlikowski, 2007), to attend to the ideation-material dualism debate (Aakhus et al., 2011; Phillips & Oswick, 2012; Putnam & Cooren, 2004). By examining HRO with a post-dualism lens, the material, and the social, nature of communication can be argued as essential. Materiality should not be something considered only in special cases; rather, it should be seen as "constitutively entangled" with the social in everyday life (Orlikowski, 2007; Orlikowski & Scott, 2008). Such a lens concludes that the social/ideational and the material are intertwined. Thus, Orlikowski (2007) argues for considering social practices as sociomaterial practices. With this label, both the social/ideational and the material are understood as intrinsically connected in the constitution of organizations and organizing processes. Specifically, organizational practices form linkages between cognition, discourse, human bodies, physical buildings and conditions, and tools.

In particular, Ashcraft, Kuhn and Cooren's (2009) work on "materializing" organizational communication scholarship is central to this project and supports such a

stand for using CCO literature, both in expanding CCO literature and connecting with management studies. Before discussing their contributions, I will provide a brief introduction to CCO literature by teasing out central constructs and the limitations presented when materiality is hidden by ideation-privileging language in defining communication. Next, using Ashcraft et al. (2009) as a catalyst, I will examine practice theory literature to flesh out the notions central to assisting the expansion of CCO theories to include sociomateriality (Orlikowski, 2007; Orlikowski & Scott, 2008). Additionally, I will argue that by using a practice-based CCO lens HRO literature can evolve into a more robust definition of heedful interrelating.

Using CCO as a Theoretical Lens for Incorporating Materiality

Organizational communication has shifted from transmissional views of communication and container views of organization (Axley, 1984) to embrace more dynamic, emergent constructions of organizations (Ashcraft et al., 2009; Cooren, Taylor & Van Every, 2006; Fairhurst & Putnam, 2004; McPhee & Zaug, 2000; Mumby, 1997; Putnam & Nicotera, 2009; Taylor, 1993). As Taylor (2005) argues, CCO explains how organizations have the "ability to reproduce themselves as universes of patterned transactions involving a complex network of interconnected agents" (p. 209). To this end, Taylor introduces a framework of communication as constitutive of organizations. This framework situates language as a "medium of interaction (a conversational dimension) and a medium of sensemaking (a textual dimension)" (p. 215). From Taylor's (1993) initial work, scholars have delineated among the various CCO

perspectives, identifying exemplary scholarship, and directing attention to research areas (Ashcraft et al., 2009; Cooren et al., 2006; Putnam & Nicotera, 2009).

In particular, Ashcraft et al. (2009) differentiate between embedded and explicit CCO models. In one school, organizational communication researchers embed strains of CCO models, meaning that constitutive models are not primary in their research yet strains of *communication as generative of reality* permeate much of the literature. In other approaches, organizational communication researchers directly address communicative constitution in their exploration of the structure-agency relationships in structuration and in text/conversation studies (Montreal School). Structuration in organizational communication research has found a variety of germane applications, especially in McPhee and colleagues' work on the four flows.

Four Flows

McPhee and Zaug (2000, 2009) identify four constitutive communication processes, message flows, through which organizations are (re)produced and rules and resources are resisted (Deetz & Mumby, 1990; Giddens, 1979; 1984). The four flows are social structures brought into being by social interaction and are described as constituting the process of organizing. McPhee and Zaug's flows extend Weick's (1979) processual view of organizing as linking "the organization to its members (membership negotiation), to itself reflexively (self-structuring), to the environment (institutional positioning), …and to…adapt interdependent activity to specific work situations and problems (activity coordination)" (McPhee & Zaug, 2009, p. 33). Consideration has been given to the four flows as criteria, or measures, for determining whether or not the

phenomenon can be labeled an organization. What distinguishes an organization from a social group is that at least two flows occur and these flows are "more interrelated, more mutually influential" (p. 42). As McPhee and Zaug argue, the flows have to demonstrate relevance amongst each other within a complex relationship to truly connote an organization. The utility of the four flows approach has been demonstrated through works such as Iverson and McPhee's (2009) analysis of a nonprofit community governance organization and Lutgen-Sandvik and McDermott's (2008) analysis of an employee abusive organization in the case of a women's multiservice industry. The four flows are, thus, one set of organizing conditions that CCO scholars have explored; yet, there is another set of organizing conditions proposed by Taylor (2009a; 2009b; Taylor & Van Every, 2000) – coorientation (Putnam & McPhee, 2009).

Coorientation

Proposing a different CCO perspective, Taylor (2006, 2009a) introduces the process of coorientation:

> Coorientation implies a simultaneous relationship to something to be done, and to others with whom one is doing it. The unit of communication thus takes the form of a triad that links, at minimum, two communicators to a common object or objects (Taylor, 2009a, p. 155).

Coorientation is premised on Newcomb's (1953) triadic model of communication episodes, in which two actants interact based on a shared activity or focus, termed the object. The coorientation model is represented as A-B-X, A and B being the two actants and X being their joint activity. Taylor argues that language is a resource and agent that

enables actants to coorient through a shared enterprise. From this perspective, communication is triadic. Triads (two actants engaged in joint activity) imbricate much like the tiles on a roof overlapping one onto another to create the covering (Taylor, 2009a; Taylor & Van Every, 2000). With that image in mind, imbrication includes triadic interaction occurring simultaneously and repetitiously. As a term, imbrication denotes organization.

In this model of CCO, coorientation is "the building block enabling the analyst to climb the scale of complexity, rung by rung, to arrive at a characterization of complex organizations of the kind we who live in modernity have become accustomed to" (Taylor, 2009a, p. 159). In other words, coorientation functions as a means for organizational scholars to articulate how organizations scale up through productive and imbricating triads. Taylor (2009a) discusses coorienting as reaching a point of finality, which is perpetually a state of becoming, when actors become a "we" or an A/B unit, when they orient themselves in relation to the organization (as in a community of practice within the organization) and see themselves as having collective identities (as in inter-organizational communication). Communities of practice and collective identities, like the triads that scale up to form them, are possible through language. One assumption undergirds Taylor's conclusions about coorientation: "human communication is primarily mediated by language" (p. 156). This assumption drives Taylor to advocate that organizational communication research center on how communicators use language and how language influences communication.

Reconfiguring the four activity flows (McPhee & Zaug, 2000), Taylor (2009a) uses tight and loose coupling of coorientation to categorize activity coordination, membership negotiation, self-structuring and institutional positioning. First, coorientation is a communication model that illustrates triadic interaction at the smallest unit of interaction – tight coupling of a work group represented by A-B-X. Activity coordination is achieved by two actants (A and B) maneuvering and responding to one another in relation to a shared object of focus or activity (X). Membership negotiation is illustrated as A interacts with B based on the member's organizational role. The A-B-X pattern demonstrates how organizational members enact organizational responsibilities and delegate such responsibilities to negotiate membership. Second, collective identity, which subsumes self-structuring and institutional positioning, emerges in relation to organizational members' loosely coupled interactions that develop patterns recognized by members as the organization. The coherent and specialized patterns of interaction shared by groups are termed communities of practice and result in inter-community communication. From Taylor's vantage point, coorientation is a means of explaining how the four flows are able to accomplish the communicative constitution of organization.

On a final note, coorientation is a promising model for extending CCO research with a practice-based perspective. The A-B-X model pivots on the shared activity between actants, and from a practice-based perspective (which will be explored in more detail in a latter section), the shared activity is accomplished through a set of negotiated practices. Coorientation provides an explanatory model as to how actants interactively

produce and transform practices to enact the process of organizing. Furthermore, coorientation demonstrates how practices are shared and learned by actants and, subsequently, develop into a community of practice.

Materiality and CCO

Most CCO models have, thus far, focused on symbolic meaning construction, leaving non-human agency in the darkened recesses of their research. Understandably, the CCO field-at-large is founded on the "interpretative turn" (Burrell & Morgan, 1979; Putnam & Pacanowsky, 1983) and the "linguistic turn" (Alvesson & Karreman, 2000; Fairhurst & Putnam, 2004; Putnam & Fairhurst, 2001) that provided a refreshing recognition of the constitutive power of communication and the limitations of positivistic paradigms. This study does not relinquish this progress; instead, it expands the role of materiality. Putnam and McPhee (2009) conclude that while minimal attention has been directed at materiality, there is a general acknowledgement of its influence in the CCO movement. Yet, as Cooren (2006b) acknowledges, materialists are quick to criticize discursive perspectives as falling prey to reducing the "material into discursivity" (Reed, 1998; 2000) or "neglecting the material conditions of [an organization's] production" (Fairclough, 1995) (p. 81). Answering this challenge, Cooren (2006b) coins the phrase *plenum of agencies* to "take into account all of the human and nonhuman entities that, day by day, contribute to [the organizational world's] building and organizing" (p. 85). For Cooren, organizational life is full of agencies, "entities with variable ontologies" that make a difference in organizational processes or outcomes (p. 82).

Ashcraft et al. (2009) redress the ideation-material dualism in CCO models by offering an alternative definition of communication and delineating three non-human agents:

> the meanings defining organizational reality are not merely those in people's heads; they are distributed across a variety of material objects, locales, and bodies. Moreover, our capacity to wield symbols is affected by non-human agents, not all of our own making. Consequently, the symbolic-material relation *and* the plenum of agencies that orchestrate it merit attention. (p. 35)

Bearing in mind this reasoning, Ashcraft et al. (2009) offer an edited definition of communication that encapsulates the *plenum of agencies* constituting organizational realities (Cooren & Fairhurst, 2009; Cooren, 2006b). Communication is "the ongoing, situated, and embodied process whereby human and non-human agencies interpenetrate ideation and materiality toward realities that are tangible and axial to organization existence and organizing phenomena" (Ashcraft et al, 2009, p. 26 and p. 34). This definition reconciles the material to the ideational, confronts dualistic thought by framing ideation and material as co-constitutive, and implicates the evolving and emergent qualities of organizing. Operationalizing what is meant by the material, Ashcraft et al. (2009) categorize non-human agents as objects, sites, and bodies.

Objects, Sites, and Bodies: Materializing Communication

Objects. Within organizational communication research objects are classified as artifacts and technologies that simultaneously embody ideational and material properties and wield agency (Ashcraft et al., 2009). The review of object literature is divided into

1) research that focuses on culture and 2) research that explores agency within organizing processes. To begin, culture research, generally and more specifically within organization communication, has examined objects as cultural artifacts – products and symbols of a material and ideational system (Mitchell, 2010). For example, Murphy (1998) documents flight attendants' use of dangle earrings to resist rules about appropriate dress, and Pierce and Daugherty (2002) document pilots' use of company pins to identify with an airline subsumed in a merger and differentiate themselves with the parent company pilots. In each of these studies, objects are used symbolically to resist forms of organizational control. But, object research is not solely focused on power implications and culture.

Additionally, scholars studying objects are also interested in how objects become textualized to take on symbolic meaning and how ideation becomes materialized into a textual object. The notions of *text objects, discursive objects,* and *textual agency* stem from Latour's (1994; 1999; 2005) work with Actor-network Theory and the Montreal School's Conversation Analysis methods to explore the text-conversation dynamic (Cooren, 2006a; 2006b; Taylor, 2009a; 2009b; Taylor & Van Every, 2000). To illustrate, Bencherki and Cooren (2011) describe how a manager makes a *reminder note*. The manager acts on a material object (the paper), transforming it into a *reminder*, which in turn *reminds* him or her to do something. Agency is a hybrid of human and nonhuman, in that the manager created the note to *remind* and in that the note *reminds*. The note is a *text* or *discursive object* that exhibits *textual agency* by acting to *remind* the

manager (Bencherki & Cooren, 2011). Therefore, how objects act is an important strand of inquiry for scholars interested in objects.

An emergent body of literature that links concerns about objects and agency is focused on technology and organizing. Leonardi (2009a; 2009b) and Leonardi and Barley (2008; 2010) are working to tease out "the messy communicative processes by which the material and the social elements of technology and organizing become entangled" (Leonardi, 2009a; p. 278). Applied studies of this kind have examined technology in London's control room for the underground line (Heath & Luff, 2000), computer-aided design in architectural work (Heath & Luff, 2000), computerization of an automotive firm (Leonardi, 2009b), and the practiced-based works of Orlikowski (2007). The research with technology demonstrates how technology (as a material object) and technology-in-use (as sociomaterial practices) (Leonardi, 2011; Orlikowski, 2007) are more or less relevant to organizational actors based on technological features and organizational activities (Fairhurst & Putnam, in press).

Sites. Second, sites refer to organizational spaces, both physical and virtual, that impart special and temporal infrastructure for interaction. There are a number of terms used to talk about site including landscape (Bender, 2010), place/space and time (De Saint-Georges, 2004; Murphy, 2002; Tyler & Cohen, 2010), and environment and natural world (Marafiote & Plec, 2006; Rogers, 1998; Sawyer, 2004). Site is conceived of as a significant nexus of activity and material arrangements (Ashcraft et al., 2009; Schatzki, 2001). The term "nexus" denotes site as an intersection of human and nonhuman agents, social practices, and action (De Saint-Georges, 2004; Schatzki, 2001).

Murphy's (2002) research on space and place demonstrates how architecture and aesthetics communicate meaning. In the case of an airplane, the design masks risks and creates normalcy for consumers (i.e. seats are reclining chairs but double as flotation devices). De Saint-Georges (2004) examines human agents transforming an attic and the relationship between site, action, and discourse. As agents coordinate to transform the attic, they simultaneously affect the range of choices available to them in the site. De Saint-Georges (2004) uses diagraming, drawing, and photography to illustrate the co-constitution of meaning through materiality (primarily site) and discourse (primarily utterances or turns-at-talk). Dale (2005) and Halford and Leonard (2006) provide examples of how management can exert control through site design. Each of these site research samples highlight how human agents can manipulate and transform the site to serve their own purposes, how the site may enable and constrain their activity, and how the site represents a nexus of agency, practices, and activity. The present site research reifies human agency and focuses on relatively stable sites, research should extend to examine more fluid, dynamic sites and their influence on agency, practices, and activity.

Bodies. Third, the disembodiment of organizational communication and organizational studies research is evidenced through the Cartesian mind-body dualism[1] and the focus on organizing as discourse (Hindmarsh & Pilnick, 2007; Styhre, 2004). Ashcraft et al. (2009) argue that body and communication mutually implicate one another. Mutual implication is evidenced in: 1) communication as "an embodied process situated in space and time" (p. 33) and 2) (re)shaping of the body through

[1] The Cartesian mind-body dualism casts the body as the site of the mind and reduces the body to cognition and symbolism (Styhre, 2004).

communication. Despite the lack of bodilyness (Hindmarsh & Pilnick, 2007), Styhre (2004) identifies four strands of research on organizing and the body: 1) phenomenological, 2) feminist, 3) practice, and 4) postmodernist.

First, a phenomenological perspective centralizes the body and its lived experiences. Research from this perspective investigates bodily and sensory awareness, emotion, desire, embodied activity, linguistic activity and collective activity in and through experience (Lindlof & Taylor, 2011; Styhre, 2004). Second, feminist organizational research tends to adopt critical or postmodern stances and focus on identity and gendered bodies (Styhre, 2004). Trethewey, (1999), Trethewey, Scott and LeGreco (2006), and Smythe (1995) demonstrate how women's bodies are gendered, which, in turn, disciplines the body (i.e. to curtail excessive emotion or to be physically fit).

Third, practice-based research situates the body in a social system and focuses on how bodies perform practices within the system (Styhre, 2004). Hindmarsh and Pilnick's (2007) research with healthcare practices and routines identify two types of bodies: 1) experienced bodies that can anticipate action for coordination and 2) inexperienced bodies that interrupt action. Their research treats bodies as resources or tools for "real-time coordination" (p. 1421). Fourth, Styhre (2004) classifies a portion of organizational research on body as postmodern, which has been influenced by the writings of Foucault (1980; 1995). Cheney and Ashcraft (2007), Trethewey, Scott, and LeGreco (2006), Zoller (2003a,b), Murphy (1998), and Ashcraft and Mumby (2004) argue that the body is a site of organizational resistance and control.

Finally, a fifth category may be added to address research that connects physiology of the body and the quality of organizational interactions, namely, health. Heapy and Dutton's (2008) model proposes studying organizational contexts comprised of leadership, cultural and organizational practices and how these practices influence the quality of an interactional environment. The link to body is the hypothesis that positive social interaction improves employees' physiological health, specifically, cardiovascular health, the immune system, and the neuroendocrine system. Such research may link to practices in terms of how the organizational context is constructed, but the methods of study emphasize physiological data collection (such as statistically graphing blood pressure rates of employees for a two-year period). Similarly, worksite health promotion research may be critical of an organization's control of worker bodies or establish effective risk communication practices, but worksite health promotion research may also be classified under health. Research on emotional labor, stress, and burnout (i.e. Miller, 2002; Miller, Birkholt, Scott, & Stage, 1995) may also fit under health. Overall, extant research on body and embodiment draw attention to organizational practices, structures and discourses in the construction of identity, health, and discipline.

As examined above, extant research tends to consider materiality and communication under the banner of objects, sites, or bodies. While one scholar might examine bodies and merge other material manifestations into the study, little CCO research looks at materiality by teasing out the interplay between all three. Regardless, whether studying objects, sites, or bodies, Ashcraft et al. (2009) argue from a post-dualist lens scholars should not: 1) minimize the material, 2) conceive of the material as

extraordinary or isolate it in special cases, or 3) dichotomize techno-centered perspectives emphasizing technological effects and human-centered perspectives emphasizing interactions with non-human agents (Ashcraft, Kuhn, & Cooren, 2009). Orlikowski's (2007) notions of constitutive entanglement and sociomaterial practices circumvent the aforementioned potholes in CCO research.

RQ 2: How do sites, objects, and bodies accomplish sociomaterial practices for search and rescue?

Towards Constitutive Entanglement

The needed shift is to move from materiality being conveyed as a sign (Peirce, 1931) where material components are classified as a meaning symbol within social interaction. In doing so, components such as physical bodies, sites, and objects become entangled with the symbolic (Ashcraft et al., 2009; Orlikowski, 2007). Phillips and Oswick (2012) provide a framework for "perspectives on materiality in discourse-based organizational research" (see Table 2: Phillips & Oswick, 2012, p. 32-33). They identify four approaches to the discourse/materiality relationship based on the extant literature, and implications for research: 1) discourse *not* materiality, 2) discourse *or* materiality, 3) discourse *and* materiality, and 4) discourse *as* materiality. First, discourse *not* materiality identifies the relationship between the two as competing and mutually exclusive. These studies draw from constructivists grounded in the traditions of the linguistic turn (Alvesson & Karreman, 2000) that challenge "socio-material and critical realist work" (Phillips & Oswick, 2012, p. 32).

Second, discourse *or* materiality studies are complementary approaches that contend the two are "discrete" perspectives, but they are "not competing" (p. 32). Research in this approach places primacy on advancing discursive approaches but does not challenge materialist approaches. Phillips and Oswick (2012) make the argument that both are "isolationist" discursive approaches that have relatively no engagement with materiality. Consequentially, both approaches lack engagement between materiality and discourse and, therefore, limit innovation and richness in discourse analysis.

Third, the discourse *and* materiality approach contends "the two perspectives are interpenetrating" or "connected" (p. 31-32). Research is often "realist-based" (i.e. Critical Discourse Analysis work) (p. 32; as cited by Phillips & Oswick, 2012 in Reed, 2004, p. 416; Fairclough, 2005, p. 935). A "realist-based" approach maintains the dualism between discourse and materiality. The discourse *and* materiality approach specifically examines the tensions – the dialectics – between process and agency with structures (Fairhurst & Putnam, in progress). This approach casts materiality as discourse that has been concretized over time.

Fourth, the discourse *as* materiality approach treats the two as indivisible. The authors use Cooren's (2004a) discussion of textual agency. In citing Cooren (2004a), they note, "what constitutes an organization is a hybrid of human and non-human constitutions" and "humans are acting upon as well acting through the textual and physical objects that they produce" (p. 388). Discourse *as* materiality poses the question: "What does it mean to be indivisible or co-constituted?" As this present work

seeks to answer this question, it simultaneously pushes the envelope and challenges what research should be categorized as discourse *as* materiality. A practice-based lens allows analysis to move beyond materiality conceived as a representation of physical forms to an actual consideration of how the social and physical forms (i.e. body, sites and objects) and their interrlationships constitute organizing. This study represents work aligned with the grounded in-action category by considering how material interrelationships and discourse are entangled in *practices* that construct, maintain, and change organizational life in situ (Fairhurst and Putnam, 2004). The next section elucidates what is meant by *practices*, particularly, sociomaterial practices.

Practice-based Approach to CCO

Jian (2008) contends that the fruitful research agendas undertaken following the interpretive (Putnam & Pacanowsky, 1983) and discursive (Fairhurst & Putnam, 2004) turns situate organizational communication scholars to now take the practice turn. By practice turn, Jian (2008) calls to mind recent organizational studies of Orlikowski (2007) and Suchman (2007) on technology and practice, and the Montreal School on coorientation (Taylor, 2009a,b; Cooren, Taylor, & Van Every, 2006). The following section contextualizes the practice turn in organizational research by defining and delineating major contributions to practice theory as well as specifying how this study is taking the proverbial turn.

Reckwitz (2002) argues that practice theories are situated among cultural theories that focus on "explaining and understanding actions by reconstructing the symbolic structures of knowledge, which enable and constrain the agents to interpret the world

according to certain forms, and to behave in corresponding ways" (pp. 245-246). Simply put, practice theories are attentive to the roles agency/activity, practical understanding, and material arrangements play in enabling and constraining the organizing of social reality. Reckwitz (2002) argues practice theory moves the social away from mind, discourse, or interaction (the ideational) to a site of interconnected routinized behavior comprised of elements such as bodily activity, mental activity, discourse, 'things' and their use, and background knowledge called practices – a nexus of doings and sayings (Schatzki, 2001). From this perspective, a practice is a connection of various actions and influences, which in the case of this study includes human and nonhuman entities.

Practices may be exemplified as a way of research, a way of teaching, or a way of working. As agents, or practitioners, who enact these practices, we understand how and when to employ certain practices, but we may not fully grasp the reproduction of expected outcomes and the social order or structure that is being legitimized. Practitioners are, then, "artful interpreters" and "creative agents" that select and improvise practices based on situational exigencies, rather than "automatans" or "mindless performers" (Whittington, 2006, p. 615). Reckwitz (2002) clarifies that:

> A 'practice' (Praktik) is a routinized type of behavior which consists of several elements, interconnected to one [an]other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge (p. 249)… A practice is thus a routinized way in which bodies are moved, objects

> are handled, subjects are treated, things are described and the world is understood. (p. 250, correction added)

Practice-based research has examined managerial strategy (Whittington, 2006), technology adoption and use (Heath & Luff, 2000; Orlikowski, 2002, 2007; Suchman, 2007), safety in hospital care (Iedema & Carroll, 2010), gendered practices (Mathieu, 2009), child-care social services (Blackler & Regan, 2009), and learning and reflexivity (Gherardi, 2009; Jordan, 2010; Macpherson & Clark, 2009; Segal, 2010; Yakhlef, 2010) to name a few practice domains. In sum, practice-based research demonstrates how practitioners engaged in actual activity (re)produce and improvise a wide range of activity domains. Practice theory reflects the amalgamation of various perspectives on how activity develops and to what ends. The subsequent sections outline different approaches to the study of practices, identify how sociomateriality has emerged in practice-based research to transcend ideation/materiality dualism, and the utility of merging practice-based research, specifically sociomateriality, with CCO to study HROs.

Practices and rules and resources. Giddens' (1984) structuration theory provides an umbrella framework to shelter simultaneous explorations of social structure and human agency; individual, collective, organizational, and societal behavior; and stability and change (Poole and McPhee, 2005). Structuration theory examines structuring processes on multiple levels by focusing on the social interaction involved. Giddens' (1979) theory recognizes the power of systems and structures while enabling further investigation of the agency of organizational members in the production and

reproduction of the systems' structures. Structures are rules (guidelines for action) and resources (useful for action whether material or non-material) agents draw on to produce, reproduce, and transform the human practice system (Banks & Riley, 1993).

Poole and McPhee (2005) define practices as "patterns of activity that are meaningful to those engaged in them" (p. 174). Whether large or small in scale, practices can be improvisations (actions differing based on context) or routinized patterns of activity ranging from individual to collective enactment. As structures are understood as both the medium and outcome of agents' interactions, a duality of structure explains the stability and change of a practice system over space and time (Poole and McPhee, 2005). When agents draw upon existing structural rules and resources to reproduce the practice system, they, in essence, keep it going. In contrast, when agents construct new structures, transformations in the system ensue. As seen above, ways of enacting practices will be influenced by the multiple levels of interaction, displays of agency, rules and resources, and time and space. Simply put, rules and resources embedded in an understanding of practices determine which actions agents "always or sometimes perform" (Schatzki, 1997, p. 300). Structuration does not consider the interplay of objects, sites, and bodies, or more broadly, material agencies.

Practices as dispositions/habitus. Bourdieu (1976, 1990) argues that practices are self-perpetuating interwoven activities in a field produced by dispositions – characterizations of that field (i.e. medicine, teaching and politics). Dispositions (habitus) are generative of actions while simultaneously responsible for the selection of which actions to generate (Schatzki, 1997). Habitus is the practical sense by which to

understand the appropriateness and function of action within a social context. Sometimes habitus is referred to as "having a feeling for the game" (Schatzki, 2002, p. 78). Both Giddens and Bourdieu anchor action in practical understanding (bodily realized know-how).

Practices as a nexus of action and material arrangements. Using a Wittgenstein approach, Schatzki (1997, 2001, 2002) critiques Giddens and Bourdieu's accounts of practice and action. Instead of limiting structure to rules and resources (Giddens, 1984) or dispositions (Bourdieu, 1976; 1990), Schatzki (2002) proposes practical understanding, rules, teleoaffective structures and general understanding as four phenomenon that link particular practices to doings and sayings.

First, practical understanding is described by Schatzki (2002) as: "knowing how to X [skills or abilities correlated with the practice], knowing how to identify X-ings, and knowing how to prompt as well as respond to X-ings" (p. 77). Practical understanding becomes shared by a collective when those comprising the collective "share knowledge of action circumstances" and share "judger's mentality and action history" (p. 78). Schatzki distinguishes his use of practical understanding from Giddens' practical consciousness and from Bourdieu's practical sense, arguing that neither Giddens nor Bourdieu explain particular action sufficiently. Schatzki acknowledges that practical consciousness and practical sense overlap with practical understanding in their relationship to being an ability underlying activity, but he distinguishes practical understanding in its specificity. Second, rules are "explicit formulations, principles, precepts, and instructions that enjoin, direct, or remonstrate people to perform specific

actions" (p. 79). When a group of people accept the same rules to govern, direct, or orient their doings and sayings, then the rules connect practice to doings and sayings.

Thirdly, teleoaffective structure is described as, "a set of ends that participants should or may pursue, a range of projects that they should or may carry out for the sake of these ends, and a selection of tasks that they should or may perform for the sake of those projections" (p. 80). In conjunction with the "range of normativized and hierarchically ordered ends, projects, and tasks" are normativized emotions and moods (p. 80). Together, teleoaffective structures explain, for instance, how as a professor I have an end related to students learning a specified outcome in a course. When at work, I employ a range of projects and tasks, such as research papers, class activities, and assessments, to fulfill the ends, and I may feel encouraged and happy when I am able to watch students achieve set learning outcomes through the set projects and tasks. Additionally, I engage in a range of projects and tasks that are incompatible with these ends, such as performing tasks as the technology consultant for my department. Fourth, general understandings infuse and pervade a diverse set of practices. Schatzki (2002) draws upon his research of a Shaker commune to illustrate general understandings. Shakers's religious convictions and sense of community represent general understandings that pervaded their teleoaffective structures, rules, and practical understandings. As can be seen above, practices are interwoven activities connected through four dimensions of structure.

Practices as sociomateriality. Building on the works of Giddens (1984) and Schatzki (2001, 2002), Orlikowski (2007) and colleagues propose a constitutive

entanglement perspective of social and material arrangements, termed sociomateriality. Rather than casting materiality and ideation/social as distinctive spheres of social activity (as in materiality *or* discourse) or as collapsed into discourse (as in discourse *not* materiality) (Phillips & Oswick, 2012), sociomateriality casts materiality and social practices as co-constitutive of organizing. Extant literature embracing sociomateriality has examined corporeal practices (Yakhelf, 2010), technology (Heath & Luff, 2000; Orlikowski, 2000, 2002, 2007; Orlikowski & Scott, 2008; Suchman, 2007), artifacts (Macpherson & Clark, 2009), and sites (Dale, 2005; Schatzki, 2005). This growing body of work on sociomaterial practices tends to feature one of Ashcraft et al.'s (2009) categories of materiality – bodies, sites or objects. Yakhelf (2010) draws on phenomenological studies to contend that the body is the medium through which practitioners apprehend and perform practices. A corporeal perspective on sociomaterial practices situates body as the center of practice in the sense that body simultaneously evokes 1) ideation (mental processing, language use, etc.) and 2) materiality (physicality, sensory experiences, etc.). Body is foregrounded from a corporeal perspective in this vein of practice research.

Next, sociomaterial practice research has also fore grounded objects through the study of technology and artifacts. Orlikowski and Scott (2008) specify two branches of technology and organization research: 1) discrete entities and 2) mutually dependent ensembles. The first stream of research, discrete entities, is similar to the separation of materiality from discursive organization processes in discourse *or* materiality (Phillips & Oswick, 2012). Research that treats organization and technology as discrete entities

operationalizes technology and studies its effect on organizing as either an independent or moderating variable. The second stream of research, mutually dependent ensembles, treats organization and technology as "a processual logic where interactions and outcomes are seen to be mutually dependent, integrative, and co-evolving over time" (Orlikowski & Scott, 2008, p. 446). Such a view is commensurate with Phillips and Oswick's (2012) advocacy for discourse *as* materiality, in which materiality and discourse are indivisible, or entangled. Technology and organization as mutually dependent ensembles is evidenced in Orlikowski's (2007) description of researchers' information seeking practices on Google and Plymoth employees' media use practices with their company issued BlackBerrys. This research illustrates the influences of technological design, practices associated with the technological design, and ways that work is influenced by both design and practice. Yet, as with Heath and Luff's (2000) research with computerization of London Ambulance Service's dispatch, Orlikowski (2007) concludes that technology does not solely determine practice; instead, it is an assemblage of sociomaterial relationships mutually implicating and altering one another.

Third, Dale (2005) and Schatzki (2005) privilege site in their respective studies. Dale (2005) examines how space (physical arrangements of site) and embodiment influence EngergyCo's organizational control. Open space dually functions to promote unity and increase organizational surveillance at EnergyCo. Inattention to architecture would eschew ways in which organizational control is enacted. Materiality, thus, is a medium of control for EnergyCo and interpretation for Karen Dale.

Finally, one strain of practice research has advanced a site ontology (Schatzki, 2005). Schatzki (2005) explains that site ontology is defined as a contextualization of human coexistence. From this perspective, practices must be conceptualized and analyzed in the spaces in which they are performed. In turn, practices become contexts or spaces. To use EnergyCo as an illustration, Schatzki might argue that signaling practices that developed in the open spaces became sites contextualizing work activities. Privileging site in practice research evokes Bourdieu's (1977) claim that repetitive routines are understood, experienced, and prompted by an "encounter with the world" (Bender, 2010, p. 305). Overall, by making body, site, *or* object the focal point of the study, practice-based research has made strides to take seriously the relationship between materiality and organization but, nevertheless, provides an incomplete understanding of the fuller relationships between language, bodies, sites, *and* objects in the constitution of organizing.

Sociomaterial practices, CCO and HROs. At this juncture, it is fitting to ask, "Why would an organizational communication scholar interested in CCO work take the practice turn?" To answer such a question, the following three intersections of CCO and practice-based research are explained: 1) shared focus on activity and interaction, 2) problematics of micro and macro bifurcations in theorizing and applied organizational research, and 3) recognition of materiality. First, CCO and practice-based research share a concern related to the how activities and interaction constitute, or scale up to organization (i.e. as in Schatzki, 2001; Taylor, 2009a,b). In other words, theorizing and empirical studies seek to understand what is done and to what end it is done in

organizational contexts. Second, CCO and practice-based research problematize micro (situated activity and communication episodes) and macro (Foucauldian discourse) level bifurcations by advancing research that explores the relationship between the two. From a practice perspective, Reckwitz (2002) contends that practice is understood as it is observable in micro-level interactions, which influence and are influenced by macro-level forces. From a CCO perspective, the Montreal School (Taylor, 2009a,b), especially, contends that a text/conversation approach bridges macro/micro bifurcations to explore how they mutually implicate one another. Third, CCO and practice-based research recognize the pressing need to take materiality in organizing seriously. Thus, practice-based research has proposed a sociomateriality perspective (Orlikowski, 2000, 2002, 2007; Suchman, 2007), and CCO research has proposed a focus on bodies, sites, and objects and their relationship with discourse in the constitution of organizing (Ashcraft et al., 2009; Fairhurst & Putnam, forthcoming). Ashcraft et al.'s (2009) bodies, sites, and objects classifications provide a framework by which to extrapolate how human activity is interwoven in "constellations of nonhuman entities" (Schatzki, 2001, p. 3). For practice theorists, practices cannot be fully examined without explicating material configurations. Schatzki (2001) states,

> Indeed, because human activity is beholden to the milieus of nonhumans amid which it proceeds, understanding specific practices always involves apprehending material configurations (p.3).

These points of intersection between CCO and practice-based research will facilitate extensions in understanding how sociomaterial practices scale up to organization. As

indicated previously in the chapter, no traditional CCO research examining objects, sites or bodies focuses on the interplay of all three in situ.

RQ 3: In extending constitutive entanglement to include the interplay of bodies, sites, and objects, how might this transform traditional CCO literature?

RQ 4: How do the interplay of bodies, sites, and objects relate to language and meaning?

Another application of the practice turn to this study is its critique of traditional HRO studies. Since HRO literature is heavily influenced by "mind" constructs as noted in Chapter I (Weick & Roberts, 1993; Weick & Sutcliffe, 2001; 2007), synthesizing a practice perspective with CCO provides a theoretical perspective for this study and shifts the focus from mind. The linguistic choice of collective mind to describe the process of heedful interrelating is steeped in Ryle's (1949) discussion of mind. For Ryle, mind is reflective of qualities of human behavior that range in degrees of heedfulness (Weick & Roberts, 1993). Weick and Roberts (1993) draw upon Ryle's work to describe how HROs display a disposition toward heedfulness (caution, care, attentiveness, alertness, and thoughtfulness) rather than heedlessness (mindless habit and inattentiveness). While their work on HROs extends collective mind to interrelated activity, Weick and Roberts (1993) position interrelated activity as constitutive of mind, once again shifting the focus back to shared cognition. Instead of focusing on mind (i.e. as Ryle's ghost in the machine cited in Reckwitz, 2002), the practice turn uses practice-based language to focus on "practical and situated activity" (Gherardi, 2009, p. 124).

Posthumanist practice theorists convey, "practices…are generally construed as *materially mediated* nexuses of activity" (Schatzki, 2001, p.11), not as mental structures. Schatzki (2001) goes on to explain posthumanist practice theory in relation to mind. The posthumanist practice approach

> …expresses itself decisively in a rejection of the modern conviction that mind is the central phenomenon in human life: the source of meaning, the receptacle of knowledge and truth, the wellspring of activity, and the co-or sole constitutor of reality. According to practice theory, mind is at least to a significant extent 'constituted' within practices. However much the contents and properties that compose and define mind have biophysiological sources and continuous neurophysiological underpinnings, they depend, both casually and ontologically, on participation in social practices (e.g. Coulter 1989). As a result, the status of human beings as 'subjects' (and 'agents') is bound to practices. Practices, in sum, displace mind as the central phenomenon of human life. (p. 11)

The posthumanist practice perspective, decidedly, hones in on the practitioners' embodiment as tied to sites of activity and practices. Schatzki (2005) references the common structure embodied in Weick and Robert's (1993) description of collective mind. This common structure is sociality and mentality simultaneously. It is not the aim of this current study to negate the existence of this common mental and social structure, but it is the aim to assert that practices offer a more robust and complete understanding of how practitioners jointly interact within material arrangements. In sum, adopting Ashcraft et al.'s (2009) body, site, and object framework and a posthumanist practice

perspective will 1) assist in expanding constitutive entanglement to examine high-risk organizational environments and 2) assist in decentering mind from HRO work.

CHAPTER III

METHODS

Chapters I and II review extant literatures on HRO, CCO, materiality and practice-based research and set the stage for the merging of CCO and practice in this study's approach to examining sociomaterial practices in an HRO. Chapter III begins by describing the specific HRO in which I gained access and collected data – USAR. Then, Chapter III subdivides into methods used for data collection and analysis.

USAR-A: Organization Description

Following the natural and manmade disasters of the early 21st Century in the United States, emergency management and response organizations have begun to emphasize coordinated efforts across jurisdictional and task-oriented boundaries (Lindell, Prater & Perry, 2007). Crises necessitate emergency management, which is comprised of mitigation, preparedness, response, and recovery stages (Lindell, et al., 2007; McEntire, 2007). Mitigation and preparedness manage a crisis before it transpires through risk assessment, risk mitigation, and emergency preparedness planning. Response and recovery manage a crisis as it unfolds and after it transpires to minimize negative outcomes. To assist with the complexity of these large-scale crises and the multi-stage emergency management process, the US President mandated a common incident management system in late 2004. The intent of this system was to establish a common language and structure across a wide array of governmental agencies and non-profit organizations.

After a series of international earthquakes during the 1980's, FEMA established the National USAR (urban search and rescue) Response System to aid in preparing and coordinating with local and state search and rescue teams to locate and extricate victims trapped in collapsed structures and respond to multiple hazards, both natural and manmade (Haddow & Bullock, 2006). While USAR units began in California, by 1991 twenty-five task forces emerged from the Federal Response Plan. The 1995 Oklahoma City bombing of the Murrah Federal Building thrust urban search and rescue functions further into the limelight, demonstrating their applications to domestic terrorism. In 1996, the Texas Engineering Extension Service (TEEX) with the assistance of the Texas State Government established Urban Search and Rescue-A (USAR-A), making Texas the home to one of twenty-eight task forces dispersed across nineteen states (Bea, 2006; Endrikat, 2007). USAR-A has been deployed to various floods in Texas, the 2001 World Trade Center attacks, hurricanes, and the Aggie bonfire incident in 1999. Deployment is always contingent on request from local and/or state officials or federal officials (FEMA). USAR-A's primary function is delineated in the *National Response Plan* and *Emergency Support Function 9*. Foundational to the *National Response Plan* (2004) are fifteen emergency support functions designed to coordinate assistance to state, local and tribal governments during incidents of national significance. *Emergency Support Function 9* establishes a national-level urban search and rescue system designed to assist state and local agencies in response efforts as well as in Federal Emergency Management Agency (FEMA) and state sanctioned training.

For the most part, emergencies are localized, thus, rarely require the services of an organization such as USAR-A. However, when local officials are in need of assistance or the incident is expected to be of national significance, at least three USAR task forces are used. The effectiveness of their services depends on the reliability of their practices. At local and state levels of activation, USAR-A responds to a wider array of needs. At the national level, USAR-A responds to FEMA's request to conduct search and rescue in primarily collapsed structures initiated by natural (earthquake, typhoon, flood, hurricane) and manmade (terrorism, human error such as the World Trade Center collapse on 911) means (Committee on Homeland Security and Governmental Affairs, 2005, 2006). Collapsed structures include – but are not limited to – apartment buildings with unstable levels, shopping centers with collapsed walls, and parking garages with mixes of vehicles, concrete, and steel rubble.

USAR-A, as a representative urban search and rescue unit under FEMA, serves three primary emergency response functions: (a) a fully deployable national search and rescue task force, (b) a training hub for search and rescue practices, and (c) a mechanism for testing new search and rescue technologies. USAR-A is both a state and federal agency. Under certain conditions such as incidents of national significance where collapsed structures are present, the task force is under the direction of FEMA. Currently, in cases of swift water rescue such as flooding, the task force functions as a state agency without financial compensation from FEMA. Additionally, task forces use canine search units to perform searches. While most members of USAR-A are a part of another emergency response organization (i.e. San Antonio Fire Department), many of

the members work on a contractual or volunteer basis per incident or training process. Trainers are usually considered adjuncts through the TEEX, a part of the affiliated university system.

USAR taskforces find victims (search), remove victims from collapsed structures (rescue), use structural engineering to secure collapsed structures prior to rescue (technical), and provide care during and after the rescue process (medical). Task forces assist responders by implementing five primary functions: search, rescue, technical, medical and training. The first four functions are directly related to practices implemented when deployed to aid local responders in large-scale incidents. In addition to these primary functions, task forces are charged with the function of training. McEntire (2007) argues that, "Mitigation [i.e. risk assessment] and preparedness [i.e. emergency planning] should be given the highest priority in the emergency management profession today" (p. 3). Since training is classified as a means of increasing preparedness, training becomes a featured element in the USAR operations and is an ideal context to investigate how USAR practices are (re)produced, contested, and transformed. Training is used to prepare community and international units for implementing search, rescue, technical and medical functions (FEMA, 2003). With training, disaster response organizations are able to build relationships and share technical knowledge and skills that (re)produces reliable practices. USAR-A trains emergency responders from international jurisdictions, the United States, and local task forces. Trainees often have varied occupational backgrounds and organizational affiliations. Thus, USAR-A trains across sectors, agencies and jurisdictions. USAR

members themselves are also cross-trained and are generally flexible in roles (Cone, 2000).

Task forces use the National Incident Management System (NIMS) and the Incident Command System (ICS) as standard operating procedures in search and rescue. These systems function as incident support teams (IST) to assist Federal, State and local officials with command and control and logistics. A task force consists of a task force (TF) leader, a TF safety officer, a search team manager, a rescue team manager, a medical team manager, a structural engineer, a rescue specialist, and a canine search specialist (FEMA, 2003). In addition to working with humans, a task force uses robotics to enhance capabilities and to improve communication with and medical assistance for victims (Murphy, 2004). As an organization representative of a national effort to coordinate reliable practices, USAR-A provides a rich data set for studying high-risk environments.

Data Collection

This study employs a mixed methods approach to qualitative data collection to explore sociomaterial practices of an urban search and rescue unit. It aims to provide thick description (Geertz, 1973) of the dynamic, high-risk environments in which this organization operates. A multi-pronged approach to data collection provides the data necessary to examine how sociomaterial practices emerge and accomplish organizing (Ashcraft et al, 2009) and "how material objects alter the nature of organizing in unpredictable and nonlinear ways" (Putnam and McPhee, 2009, p. 203). Specifically, it uses a range of methods and documentation including: semi-structured in-depth

interviews, participant-observation of training, field notes and memo writing, ethnographic interviews, visual ethnography, and organizational texts. This set of methods parallels the qualitative data collection used by Myers and her colleagues in their HRO studies of municipal fire departments, which employed interviewing (both structured and informal ethnographic), memos, and participant and direct observation during ride-alongs and in the firehouse (Myers, 2005; Myers and McPhee, 2006; and Scott and Myers, 2005). It also aligns with CCO, organization discourse, and practice-based literature that calls for ethnographic empirical work (Bjøkeng, Clegg, & Pitsis, 2009; Mumby, 2011; Phillips and Oswick, 2012) and novelty that pushes researchers to understand communication reality in situ (Akhus et al., 2011).

Preliminary Data Investigation

Twenty-seven semi-structured in-depth interviews were conducted with USAR-A members over a two-year period beginning in Fall 2006 and ending in Fall 2008. First, a pilot investigation with USAR-A began in spring 2006 when I participated in a study of three focus group sessions with USAR members and nine in-depth interviews with members of the groups. The study posed open-ended questions that pertained to organizational change, training, skills, and organizational stories. Sample questions from the interview guide included: 1) What stories do people tell newcomers about USAR? 2) Is there anything that you do differently than "by the books?" 3) What sort of skills are important to know in order to be a good member? 4) If you could change anything about the organization, what would you change and why? Second, in spring 2007, I conducted four in-depth interviews with members of USAR-A. Open-ended

questions in this set of interviews focused on deployment experiences, reliable practices, error prevention, and coordination. Preliminary data collection demonstrated the need for additional interviewing and participant observation to gain a richer data set.

In-depth Interviewing

In Fall 2008, I scheduled in-depth interviews with eight USAR-A members. These interviews were specifically focused on reliable practices and materiality. Furthermore, these interviews followed my involvement in participant observation at USAR-A training; hence, I was able to construct questions based on my experiences. It allowed me to apply sociomaterial practices and to fill in the gaps between training and deployments with information gleaned from USAR members' "experience[s] and perspective[s] through stories, accounts, and explanations" (Lindlof and Taylor, 2002, p. 173). The guide for the final set of interviews posed the following questions: 1) Describe the process of assessing the risk-level of a disaster. 2) Tell me about debriefing conversations and after action talks. 3) When something does not go as planned, what actions do you take to assure your performance remains effective? 4) Explain how responders might read physical elements to better perform their duties (i.e. fire, swift water, collapsed structures). 5) How might training assist responders in reading the changing physical environments they perform in regularly? 6) Do you find yourself making sense of your response actions during the process or after and how?

All in-depth interviews were audio-recorded and transcribed, except for 3 unscheduled interviews in which detailed notes were taken. The process of interviewing yielded disadvantages and advantages. First, due to gatekeeper control and limited

availability of USAR-A members during trainings and deployments, the interview sample depended upon organizational access rather than a systematic sampling technique (Lindlof and Taylor, 2002). Despite this limitation, the interview sample contained diverse employment histories, positions, ranks, ages, and number and types of deployments. Second, interviewing opened a dialogue with organizational members to reconstruct training and deployment experiences. It also provided a follow-up on my participant observation in the training processes. Clearly, interviewing, in and of itself, is insufficient for investigating sociomaterial practices because interviewing is not in situ.

Participant Observation

Participating in two training exercises allowed me to interact with material arrangements and enact sociomaterial search and rescue practices in situ (Ellingson, 2009), thus overcoming one of the noted limitations of interviewing. Training participation included structural collapse technician 1 and swift water rescue. I assumed a participant role in the trainings rather than a nonparticipant or middle-ground position (Creswell, 2007); however, I acknowledged my role with my status as a researcher and openly discussed my purpose with fellow trainees and instructors.

Structural Collapse Technician 1 training is a fifty-hour, five-day training on-site at Disaster City that prepares work groups to coordinate shoring and breaching and to extricate trapped victims and secure collapsed structure. I attended this training on October 2007 with eleven other students from four different organizations and three training instructors. Four of the students were firefighters from Saipan, and all twelve students were firefighters except a student from the US Department of Homeland

Security and me. The collapse structure training employed three instructional manuals with varying lengths: 374 pages, 116 pages, and 430 pages. Additionally, a pocket sized 130-page shoring operations guidebook was provided for use during training exercises and became a resource during search and rescue operations.

The second training, Swift Water Rescue Technician Training, is a 32-hour, four-day training on-site in the spring-fed rapids of two Texas rivers, the Comal and the Guadalupe, including night rescue training. I attended swift water rescue training in November 2007 with twenty other students from seven different organizations and 3 training instructors. All trainees were firefighters except one volunteer firefighter and me. The instructional manual in swift water rescue training was comprised of 243 pages. In both collapsed structure and swift water rescue trainings, instructors distributed Incident Action Plans that detailed daily training schedules.

Taking memos and recording field notes of trainee experiences as well as conducting informal interviews with other trainees and instructors provided a rich set of data. During training exercises, I wrote memos during debriefings, conducted informal ethnographic interviews (45), and completed field notes after daily sessions. Furthermore, I took extensive notes during classroom education in a separate notepad and in the training manuals that were distributed and referenced during instruction. At the culmination of each training day, I used my written notes and memos as well as my head notes to reconstruct the day's events and to generate a chronological narrative of my experiences. Eventually, the chronological narrative evolved into field notes for data analysis (Lindlof and Taylor, 2002).

Visual ethnography was used to capture the acts and material interaction of the participants and to assist me in fleshing out the field notes. Field notes highlighted the practices learned and how they emerged and accomplished organized search and rescue efforts. Moreover, I noted the physical environment, how the environment changed, how tools were used, how my body interacted with and was affected by the material, and how participants adapted to material and ideational constraints.

My research has also been informed by participation in four on-line trainings through FEMA: IS-100 Incident Command System, IS-200 Incident Command System, IS-700 National Incident Management System, and IS-800a National Response Plan. These online trainings through the Department of Homeland Security enhanced my knowledge of search and rescue practices, the physical and political environments of search and rescue, and the training process. On a final note, during March of 2007, I observed and participated as a victim in a collapsed structure training exercise during one day of a multi-day training exercise. I also attended a tour of training facilities conducted one-on-one by a trainer. These observations resulted in 45-single-spaced pages of field notes.

Organizational Documents

Lindlof and Taylor (2002) note the value of reviewing documents to assist in making contextual linkages to the larger social environment, reconstructing unobservable and past events, and understanding organizational rationality and social rules. To standardize emergency response language, accountability, and practices, the national level produces many of the documents, yet these documents have significance

for USAR-A and the way that USAR-A trains and responds. They provided insight into the organizing process through situating practices. Sample texts reviewed for this research include: the Homeland Security Presidential Directives 5 and 8, the National Response Plan, the National Incident Management System documents, FEMA's National Urban Search and Rescue Response System, FEMA's Emergency Support Function 9, The 911 Commission Report, The Federal Response to Hurricane Katrina: Lessons Learned, and FEMA and USAR websites. The training manuals referenced in the participant observation section also served as documents in the study.

Data Analysis

Data collected through participant observation, interviewing, and organizational documents is analyzed from a grounded theory methodology. "Both a method of inquiry and a product of inquiry," grounded theory informs data collection and operationalizes data analysis (Charmaz, 2005, p. 507). As a research strategy (Titscher, Meyer, Wodak, and Vetter, 2005), grounded theory stresses the reciprocity of data collection, data analysis, and theory building in qualitative research (Strauss and Corbin, 1999). Grounded theory does not use a priori categories to code data. Instead, data is used to produce categories for ongoing coding. Using grounded theory, data analysis begins during data collection and, then, moves from the area of study to relevant categories, which are coded (Titscher, Meyer, Wodak, and Vetter, 2005). The goal of this process is to produce theory that is grounded in the data. Judging the theory building process includes four criteria: fit, work, relevance, and modifiability (Strauss and Corbin, 1990). Fit, work, relevance, and modifiability inform the data analysis process reminding the

researcher that theoretical categories produced in multi-stage coding must clearly relate to and fit the collected data. There are two primary approaches to grounded analysis.

First, Glaser and Strauss pioneered grounded theory. Strauss and Corbin continue to develop it as a highly structured and systematic coding process that involves an integration and a saturation of categories (Charmaz, 2005; Creswell, 2007; and Titscher, et.al, 2005). Glaser recommends researchers enter the field without reviewing scientific literature; whereas, Strauss and Corbin recommend researchers review technical and theoretical literature. Glaser also recommends using ongoing comparisons while creating coding families, whereas Strauss and Corbin recommend a multi-stage open coding process that establishes categories for subsequent comparison (Titscher, et. al, 2000).

This study applies Strauss and Corbin's (1990) approach to grounded analysis that entails open coding of data to generate categories, comparisons, and questions related to the data collected. This study treats sentences as the basis for open coding. Following open coding, axial coding is conducted to make connections between categories and understand the conditions that produce categories. During axial coding, researchers denote "causal conditions, phenomenon, intervening conditions, action/interactional strategies, and consequences" in order to refine and differentiate categories (Strauss and Corbin, 1990, p. 99). Next, selective coding entails the labeling of core categories, which organize and integrate all other categories, and explaining the relationship among categories. Selective coding is integrating data and building theory.

Charmaz (2000, 2005, 2006) advances an alternative approach to grounded theory, one rooted in a constructionist lens. Hence, Charmaz adopts a constructivist approach while Glaser, Strauss, and Corbin embrace a positivist approach. The positivist applications of grounded theory claim neutrality of the observer and observable objective realities. However, Charmaz (2000) acknowledges a plurality of realities, recognizes the roles of researcher and participant in constructing meaning, and adheres to interpretive understandings of participants' insights. The researcher influences the hypotheses, literature, and prior experiences, but through self-reflexivity, he or she can explain the literature that informs the research and bypass personal biases in the data (Burck, 2005). Conducting constructivist grounded theory involves coding data so that the researcher can engage in a comparative method of associating "data with data, data with categories, and category with category" (Charmaz, 2005, p. 517). Constructivist grounded theory utilizes grounded coding methods "as flexible, heuristic strategies rather than formulaic procedures" (Charmaz 2000, p. 510). Furthermore, as coding progresses, categories are redefined, collapsed, combined, and ordered to build to more abstract, interpretive conceptions from which to construct theory (Burck, 2005).

Charmaz (2005) claims, "Grounded theory contains tools to study how processes become institutionalized practices" (p. 529). The tools of a comparative method are pertinent to this inquiry of the *constitutive entanglement* of social practices and material arrangements. By assuming a constructivist grounded approach, the researcher can operationalize data analysis using coding, retain flexibility in the application of coding procedures, produce categories inductively, acknowledge subjectivities, and study the

relationship of the symbolic and the material to producing practices. To assist in data management and assigning/comparing codes, I employed a computer-assisted qualitative data analysis software, NVivo 8 (Lindlof and Taylor, 2002). NVivo 8 manages the coding process of large data sets (specifically helping to verify consistency of codes, code definitions, and code families), permits simple quantitative measurements to complement data analysis, and enables researchers to align visual data with verbal data (Lindlof and Taylor, 2002; Titscher et. al., 2005). Considering the advantages of such software, the size of my data set, and challenges in coding categories and exploring relationships between them, I elected to use NVivo 8.

During the analysis of in-depth interviews, field notes and organizational texts, I looked for how ideation and materiality were framed when participants or texts described search and rescue practices. Specifically, initial categories relevant to materiality stemmed from the identification of objects, organizational site, and body as aspects of materiality under researched in organizational communication (Ashcraft et al., 2009). During initial, open coding, I began to label the data line-by-line and segment-by-segment. I identified example codes relevant to objects, organizational site, and body which emerged through examining environmental conditions, communications technologies, protective gear, weather, deployment sleeping conditions, physical health, and alertness. Initial, open coding also produced categories relevant to ideation such as: debriefing and after-action reporting, safety first language, trust, and assigning responsibilities. Transitioning from initial, open coding to axial coding, I began to note how material and ideation codes became entangled in the explanation of action-oriented

phrases, such as knot-tying. These search and rescue practices served as axial codes, which were used to help organize the two data analysis chapters that follow.

After identifying categories of practices and having initially coded for BSOs, I begin to interpret how these practices constitute reliable performance, which is a pattern used to tease out the sociomaterial nature of response practices. Hence, I identified the practice and classified it as body, site, or object practices. Then, I examined how the categories of materiality reflexively constituted each other in the enacting of search and rescue practices.

In sum, Chapter III has provided a detailed description of the organization used in this study – USAR-A, a HRO emergency response and training organization – and data collection and analysis methods. To examine the everyday doings and sayings associated with the domain of emergency response practices, I trained with emergency responders, interviewed them, and reviewed the documents that structure their practices. In a sense, my body experienced what their bodies experience. The subsequent set of data was analyzed using a grounded theory perspective that was informed by open coding of practices and BSOs. The following two chapters outline the results of data analysis by dividing sociomaterial practices into two broad categories: enacting safety (Chapter IV) and performing response (Chapter V).

CHAPTER IV

ENACTING SAFETY

Using a constant comparative approach to theory building (Charmaz, 2000, 2005, 2006), the study focuses on highly reliable organizing practices in a search and rescue organization. The following two chapters address RQ2.

> RQ 2: How do sites, objects, and bodies accomplish sociomaterial practices for search and rescue?

Two primary categories of sociomaterial practices emerged from the data and form the two respective chapters: 1) enacting safety and 2) performing responses. Of central importance to these chapters are the material relationships between bodies, sites and objects that accomplish reliable practices.

Enacting Safety

USAR institutionalizes safety in organizational training manuals[1] by defining it as "a balance between accomplishing the task in the shortest possible time and minimizing the risk associated with the task" (TEEX, 2009, p. PM 19). Safety is characterized as "situation dependent," "an attitude," "a balancing act," and "unpredictable." Enacting safety is fundamental for USAR and equated with reliable practices. "Safety first," an organizational slogan, highlights the centrality of enacting safety to USAR organizing practices. Yet, "safety first" is more than a slogan or

[1] Organizational manuals, such as Collapsed Structure Technician books, are developed by USAR personnel and reflect the perspectives communicated in interviews and field notes from participation in training.

cognitive process reiterated in manuals, trainings, and interviews; it is an ability to act quickly and minimize risk in the moment. Consequentially, enacting safety is more than a vernacular; it is how USAR organizes collective response. For USAR, organizational practices are not reliable unless they are deemed to be safe.

Enacting safety is simultaneously concrete and abstract, objective and subjective, and dependent on how bodies, sites, and objects (BSO) are interpreted, or as seen in the following practices. Three underlying assumptions orient action to safety: 1) safety is not simply an outcome, 2) safety exceeds a mindset or cognitive process, and 3) safety requires interpreting BSO interplay in situ. First, safety should not be reduced to an outcome; instead, safety is a way of organizing that requires balancing real and perceived risks with the meaning of safety in real time. Safety appears concrete in established practices related to collapsed structure and swift water specializations; yet, at the same time, safety is negotiable. In other words, the meaning of safety is subjected to the changing practices, persons, and environments. Organizational members must navigate risks in ways that are safe and that represent what it means to enact safety first.

Second, safety is more than a mindset, or a lens, by which to view environments or govern action. Safety not only balances risks and what it means to be safe, but it surfaces in behavioral responses to real risks as responders live through the moments. Thus, enacting safety is intrinsically bound to material manifestations that are present within the environments and evident in action. For example, responders use their bodies to sense the levels of risk present through physical limitations and challenges on the job. Whether choosing specific tools to use in certain environments, interacting with

elements of nature, or maneuvering their bodies to work through risky sites, USAR members physically react to and interrelate with material manifestations. Subsequently, living through the moments of response uses more than a safety paradigm; it is also a material experience that requires relating with body, site and objects. Notice the magnitude of taking measures to ensure safety:

> We can't lose responders and become a part of the incident, because we got people hurt and we put lives in jeopardy. So you have to take measures to make sure that all of your responders are safe (Derrick).

Safety, then, is more than a lens for seeing the environment and governing practices; it is how USAR materially organizes.

Third, safety requires interpreting BSO interplay reliably in order to contain crises. As flood levels rise and fall and water movement shifts, organized search and rescue performances constitute safe water rescue. As steel beams and concrete edifices crumble under the weight of a collapsing building, trapping victims, responders' actions constitute safe collapsed structure rescue. Responders interpret, react to, and innovate within their environment, thus shaping constructions of what is safe and unsafe search and rescue through the way that their bodies interact with objects and sites. Ultimately, how material manifestations relate with each other impacts the actions taken by responders. Thus, USAR practices are enacted safely by reading and participating within BSO relationships.

As safety practices are being enacted, there is a communal process where members reflexively share and build these orientations into practice. In other words, the

three assumptions that undergird the enactment of safety demonstrate the scaling up of micro practices to construct and maintain the meaning and future enactment of safety. Meaning construction is deeply rooted in how members relate with material manifestations and how prior relating with these manifestations are folded back into organizing. Thus, differences in materiality have implications for how reflexivity is appropriated and used – ultimately, how communal, or collective, experience happens. While enacting safety cannot be separated from the material relationships present within high risk situations, it is the communicative nature of collective experiences that are shared and built into practices that make training and deployment safe. Both material relationships and the communal experiences are necessary for reflexivity.

In sum, as organizational members perform and interact with BSO interplay, safety is constituted. Accomplishing practices reliably requires implementing them within variant risk scenarios, with the right attitude, while balancing multiple complications that will result in a safe outcome. Yet, enacting safety exceeds the attribution of attitude that responders have bestowed upon it. Instead, safety is a communal way of doing organizational life amidst the flux of BSO interplay. Enacting safety is situated in ways of doing and co-constructing the meaning of safety through the following practices: 1) navigating risk, 2) feeling danger, 3) protecting self, and 4) protecting responders (see Appendix A: Enacting Safety Practices).

Navigating Risk

Risk is an inherent and continuous process that poses unpredictable dimensions of danger in a disaster site. "Our job is inherently risky," explains Hank. Navigating

risk demonstrates how site functions as figure in material interrelationships as organizational members, or bodies, strategically plot a course of action through the hurdles present. Site is cast as 1) adversarial due to inherent unpredictabilities and harm or 2) collaborative due to navigational possibilities. Body is cast in a struggle to work through, avoid or circumvent risks to sustain lives. Thus, interrelating within high-risk sites is more about navigating than controlling. In order to navigate, members have to interpret the path of acceptable risk to set a course toward saving lives. Sites pose a myriad of risks that are situational dependent. To move through the site safely and reliably accomplish search and rescue, responders must 1) assess, 2) name and 3) strategically plot the course through the site and the challenges.

Assess. First, navigating risk requires assessing the risks inherent to the site by identifying the unique characteristics that present hazard to responders and victims. Assessing risk requires training "to understand the situation that you are going into before you get involved in trying to respond…if you don't understand what is going to kill you, it is going to kill you, or it will hurt you" (Derrick). Training provides a basis for understanding "the physics and chemistry of the environment," as Will comments. Navigating simulated sites together in training enables members to talk through and describe the experiences of being within the site and the associated risks. As explained by Howard, "If you are observant…[of] your surroundings you should be able to learn over time how those things are going to act, how fire is going to act, how dirt is going to move, how water is going to move." Thus, training together and embodied experiences moving through material relationships within a site construct awareness of the present

dangers. Without this training and experience, responders are at greater risk of being hurt or killed, as Derrick notes. Consequentially, responders approach risky sites with cautious understanding, as indicated by Carl, "not to take unnecessary risks that may hurt others" and halt or hinder operations.

Furthermore, with cautious, safety-oriented lenses communally constructed through training, responders assess site characteristics of site by determining "what is safe, what is changing, what is becoming out of control" (Nathan). Additionally, assessing includes categorizing what is at risk. Nathan notes, "…is the risk to individuals? Or, is risk to equipment? Or, is it risk to communications, press, or those kinds of things?" Categorizing what is safe, changing, becoming out of control, enables responders to build an argument for determining whether the risk is "acceptable or unacceptable risk" (Nathan). In other words, the responders must determine what risks can be taken without resulting in a less safe site based on the previously indicated considerations.

Naming acceptability. Second, naming or labeling what is acceptable and not acceptable risk, as noted by a USAR member, is a "strategic," skillful action by which to move through hazards. Whether swift water or collapsed structure, Larry explains that, "You really don't ever know until you walk into the situation and you see the devastation." First hand situational assessment of the site facilitates navigation of knowable risks and strategic assessment of acceptable and unacceptable risks. Specifically, the presence of swift water determines a different set of risks than does structural collapse. One has the physics of rushing water; the other, piled up debris:

> Now, on the water side I think it's a little bit different because every situation is different. The dynamics of the water, the dynamic features of the riverbeds and the streambeds, uh, whatever, you have to make judgment calls; ok…It's more of a dynamic environment. So, we take calculated risks from time to time, and some people might think they're way out of bounds, but they weren't there at the time (Cody).

As illustrated by Cody, the site-specific demands of swift water dictate different search and rescue practices and present distinctive inherent risks. Making judgment calls is the communicative action of framing sites as acceptable or unacceptable, based on the situation and the inherent and present risks. Furthermore, appropriately naming the risk provides an argument for USAR members to plot practices safely. Based on how sites are named, risks are framed as manageable and are undertaken during response practices. Hence, "calculated risks" are taken by considering the consequences of actions and/or acting within given risks. In sum, labeling acceptable and unacceptable risks demonstrate the centrality of site to navigating risk. Equally, the process of naming is communicative and constructive of the actions taken and choices made.

Plot strategically. Lastly, USAR members strategically navigate risk by working to decrease them. One way to strategically decrease risk is "by balancing…risk benefit and acknowledging how much risk you are going to assume" (Nathan). Balancing options as to what path can be navigated within the site while assuming minimal risk becomes central to navigating risk. To balance options is to plot the implementation of practices strategically so that members encounter the least amount of

risk while providing the maximum amount of results. In other words, some risks will be acceptable to take because the overall expectation of safety can be maintained while members do search and rescue in the risky environment. Some risks will be contextually too risky and some will always be too risky for maintaining safe operations. In a disaster, every action is risky due to the site, but not all risks are equal in degree. In turn, to enact safety by navigating risk is to negotiate what is reliable in situ. One metaphor for this negotiated balancing act used by organizational members is spinning plates.

> I call it plate spinning because there's always something that is going pretty much by itself…And really, you got to…make sure that it's out there spinning. But, there's always something that's just doing this lazy thing that's just about ready to crash and you need to go over and give it a couple more spins to make sure it's up there spinning, and then you go over and do this other thing (Howard).

Balancing risks is inherently managing sites with little to no error. Otherwise, risks grow and danger results. Just as Howard indicates, "spinning plates" is about taking actions to control chaos as much as possible and accomplish tasks simultaneously.

Another key strategy to navigating risk is to "stop things before they happen" (stated by Sanchez during training). Decreasing risks includes looking for "opportunities to stop gap further damage or further loss" (Nathan). "Stopping things" requires performing practices that assume acceptable risk and avoid unacceptable risk. Carl illustrates this practice in describing how USAR members navigated risk using a safety officer during Hurricane Ike:

> [Responders know] not to take any unnecessary risks that might get…guys hurt. The inherit nature of their job is to…break rocks, climb into collapsed buildings, and things like that…They carry a safety officer with them…If they come to a bridge, and they are not real sure about it, they can hop out and look at it.

Having safety officers present during responses enables members to navigate risk by looking ahead and reminding each other to enact safety. In Carl's illustration, the dynamic nature of storms can cause new risks to emerge, such as loosing contact with base, and responders must use practices that stop potential risks from happening. By training members to look into the small details such as the safety of a bridge and putting into place safety officers, responders are able to notice and avoid risks that can lead to disaster. Fostering such awareness and action requires communicating openly about what risks are noticed throughout deployment.

For example, to prevent and stop unnecessary risk in hurricanes, responders rely on a pre-deployment phase that involves staging rescuers close to the predicted path of the hurricane to increase response time while maintaining a safe staging area.

> We are always trying to find that situation where we can say 100% of the time that [responders] are going to be safe. If we can't say 100% of the time that they are going to be safe, then we will stay out of the path of the storm (Hank).

Thus, a way of stopping things before they happen is to assess unacceptable risks and avoid danger when lives and operations are known to be unsafe. USAR recognizes opportunities to stop things before they happen by navigating through risks inherent to sites and having a limited exposure to them.

In sum, navigating risk requires recognizing the levels and types of risk, identifying them using communal and embodied understanding, naming them as acceptable or unacceptable, and taking actions to decrease risk. Navigating risk is about being sure of the risk posed by the site and moving through those risks collectively without endangering lives and/or halting response operations. Furthermore, it is important to note that navigating risk is accomplished through trained and embodied experiences that manifest ability to sense unique attributes of sites that could present hazards.

Feeling Danger

Exposure to harm from risks navigated from within sites, requires members to constantly interact with danger. Interestingly, this is more than a simple consideration or heedful awareness. There is another part to this dilemma – feeling the danger. Danger is consistently something that respondents present as felt. One way danger is felt is through physical sensory cues, such as seeing and smelling. Additionally, whether labeled "sixth sense," "intuition," or a "gut feeling," USAR-A members seem to "just know" with immediate apprehension when danger is near. Lastly, feeling danger includes how emotional and physical stress impacts organizational practices and health. While site is still heavily influential, body becomes primary in the practice of feeling danger; that is, body is cast as a mechanism by which to sense danger.

Sensing. First, bodily presence within the risky site enables responders to sense danger using sensory cues such as seeing, hearing, smelling, tasting and touching. Cody states,

> [Feeling danger] really comes down to *experiencing* things you have seen, things you have heard, and things you have read about before…it is really *knowing* the environment. The more you know the environment; the better off you are.

"Knowing" the environment is more than a cognitive awareness or intellectual understanding; it is the embodied experience of living in the environment. In other words, to live through similar interplay moments when risk is high and danger is unavoidable is to increase one's experiences of knowing. "Things" seen, heard, and learned come to life as responders live through the moments when risks are present. Sensing danger is directly connected to safely avoiding danger or navigating risk.

> Nothing is like they say it is…You really don't ever know until you *walk into the situation* and you *see the devastation*. That totally will change your perspective on it (Larry).

Walking into and seeing the devastation within these sites provides greater awareness of the dangers for the responder because he or she is physically interacting within danger. By smelling gases, seeing cracks in the wall or ripples in the water, hearing rushing water or creeks, tasting sulfur or dust, feeling loss of control, feeling the push of the water, feeling the sensation of suffocation in a tight spot under tons of rubble or water, or smelling death, bodies live out the experience of danger. It is sensory experiences through physical presence and interaction with material manifestations that construct a sense of what is a safe route through risks and a feeling of danger that equates with knowing. Whether walking through, seeing, touching, hearing, smelling or tasting the

environment, bodily presence is central to interpreting how to sense danger and ultimately perform response.

My own experience during swift water training simulations elucidates the interplay between body and site while feeling danger. Swimming in swift water that moves one nautical mile per hour (1.5 miles per hour), proved to be a challenge. Not only did the experience include swimming in a wetsuit, protective footwear, a personal floatation device (PFD), and a helmet, the water temperature was around 68 degrees Fahrenheit and the outside temperature was in the high 50's. It actually felt warmer in the cold water. While feeling the chill and losing crucial body heat, I had to learn how to react to objects obstructing the path of the swift water. I remember trying to swim over an obstruction that was just touching the water. To navigate the obstruction safely, rescue swimmers typically change from swimming on the back with feet pointed downstream to swimming head first on their stomach downstream to use arms and the body to maneuver over the obstruction. Otherwise, rescue swimmers will be sucked under the water by the rushing currents. While training taught me the procedure that would work and convinced me what not to do, my body had to physically feel the force of the water, see the path out of danger, and use strength to pull up over the obstruction. Having the knowledge of the practices advocated in training and knowing what it feels like to experience the danger are two different experiences. Feeling danger is knowing, through lived experience, the interplay between material manifestations within the moment.

Intuiting. Second, feeling danger is considered by responders as an intuitive, embodied response to danger. Notice the distinction made by Howard: "Part of it is intuitive…part of it is what raises the hair on the back of your neck." Feeling danger as intuition is sharpened or enabled through experience. USAR members discuss feeling danger in the frame of experience:

> There is absolutely a sixth sense for people that are experienced that they know something is not right. I mean this is not the situation that we want to be in, or we need to go down a different path. I think it is important to listen to that (Howard).

Feeling danger is directly tied to experience and action. First, without past experiences to draw on, there are fewer "gut feelings" that arise. Additionally, without acting on these feelings, there is no action substantiating their validity. USAR members learn to associate intuitions about rescue practices and dangerous sites with their experiences, thus enabling them to heed their "gut feelings" about feeling danger. "Gut feelings" or intuition is an accumulative knowledge of how USAR members construct meaning through joint lived experiences.

Feeling. Before highlighting the notion of feeling danger as a joint lived experience, it is important to note that intuition or gut feelings are frequently associated with the movement of emotions through the body when danger seems uncontrollable. For example, fear is an enabling emotion that is commonly experienced when the response to a dangerous site motivates, heightens senses, or enhances the memory of the responder. Fear can make dangerous experiences memorable and provide future

perspective of similar sites. Nathan reminisces about placing himself in unnecessary danger during a fire rescue: "When I made it out, I had a wave of *fear rage* over me…I realized how dangerous that situation was." Experiencing strong emotions, such as a "rage" or fear, constructs vivid memories of danger that influence interactions in future circumstances.

Experiences in simulated training also aid in developing "gut feelings." Chad discusses a simulation exercise during swift water rescue training that illustrates this simulation:

> I was involved in teaching a water rescue course and my partner and I were simulating extrication from a strainer, and he actually got sucked into the strainer and was trapped. But, recognizing that this wasn't the other instructor simulating something, I knew something was wrong. He knew what to communicate to me. We were able to effectively do that, but the entire class didn't recognize that that was real. So, what can we do in the safest name possible to educate the new responders and the senior responders in these physical environments? What is safe, what is changing, what is becoming out of control? And I think what most people would tell you, if they develop a gut or they develop this belly, and they know when it is.

Developing "a gut" or "belly" feeling of danger is tied to experiencing BSO interrelationships. The swift water training instructor knew that his co-instructor was trapped in a strainer during the training simulation, while the trainees did not know that

the simulation was an actual rescue site because they lacked the combination of knowledge and experience that the trainers had with BSO relationships.

Central to Chad's gut feeling is the communal nature of feeling danger. Developing a gut to feel danger is contingent on experiencing relationships of BSO individually, but, also, vicariously learning through other responders' experiences. Vicarious learning is characterized by responders observing one another, modeling effective practices, and avoiding ineffective practices through training and debriefings. One USAR member recalls advice from the captain of his fire station when first becoming a responder:

> If you really want to learn how to [respond], you watch me. I have never seen a book put out a fire." That made a real effect on me because, you know, the book is part of your training, but what you learn from others and what you continue to learn each and every day is more viable than any textbook (Nathan).

As previously noted, collectively experiencing danger through observing others is part of practicing safety. Thus, intuition is more than an individual experience; it is a communally assimilated emotion that is constructed through collectively experiencing material interrelationships.

Third, not only is feeling danger communicative in the sense of vicarious learning and developing intuition, feeling danger is also communicative in how stress, an emotion and physical reality, is managed collectively. Feeling danger is more than the sensory and intuitive assessment of the environment; it is also feeling the emotional and the physical toll on the body and experiencing it both individually and collectively.

Critical incident stress management is a process used by responders to recognize the limitations of stress. Members are trained to recognize stress in others as well as in oneself. Additionally, as members become more aware of the limitations of stress, they are able to collectively feel when other responders are experiencing stress, thus leading to more reliable response practices. Constant physical presence of stress in dangerous sites results in bodies experiencing pain, fatigue, emotional highs and lows, hunger and thirst. Continual stressors can lead to burnout and unsafe practices. Howard indicates, "All of the managers are trained in the signs and the symptoms of Critical Incident Stress." Recognizing signs and symptoms of Critical Incident Stress is not only collectively trained; it is collectively implemented during and after incidents. Chad states, "All too often, we have learned to push stress and emotions down and cover them with a layer of cement. Push them down further and cover them with another layer of cement… I have seen countless friends eaten with [post traumatic stress]… It is a real thing. You've got to be able to talk about these things." Whether "talking about these things" during the incident or between shifts during deployment or during after action reporting, stress is addressed by the collective. In this instance, feeling danger becomes a sign of danger, a symptom of organizing in danger, and a way of recognizing potential danger resulting from escalated emotions, physical fatigue, or other limitations to reliable response.

Feeling danger demonstrates that reliable practices are more than collective cognitions. Individuals and collectives physically experience danger through sensory mechanisms. Over time responders develop intuitive responses to material

interrelationships that they have experienced through sensory capacities or collective training and/or debriefings. Additionally, reliably accomplishing practices requires a communal awareness that is constructed and managed as individuals and collectives experience stress and physiological responses that lead to stress.

Protecting Self

To maintain safety and reduce risks, responders implement practices to prevent themselves from becoming victims during their search and rescue. Maintaining personal safety through proper safety gear, personal safety prioritization, hygiene, hydration, and adequate rest to circumvent sleep deprivation in self and others are illustrative of self rescue practices, practices that protect self, construct a tool to body relationship, and subordinate the body to its dependency on tools for health and safety.

Safety equipment. First, response team members are expected to have appropriate safety equipment on their person at all times. *Structural Collapse Technician 2* (TEEX, 2006) manual indicates that "safety boots, respirator, helmet/headlamp, spare batteries, ear and eye protection, gloves, protective clothing, and radio (optional)" should be on the responder at all times in collapse structure response. Swift water rescue requires that the rescue swimmer wear a helmet, wetsuit, flotation device, swim fins, and additional tools such as a rope and knife (Ray, 1997). An emphasis on safety equipment functions to provide responders the tools by which to diminish risk imposed by the site and to navigate sites to protect personal safety. Body to tool and tool to body in the context of site illustrates the complexity of BSO

relationships and how they become an extension of oneself during response as responders act to protect self.

Safety order. Second, the responder's health and exposure to risk is prioritized over victim bodies. Warren explains the order of safety as 1) me the responder, 2) we the team, 3) uninvolved parties, and 4) the patients or victims. If the responder does not prioritize his body and utilize the necessary tools to protect himself, then he places himself at risk and further risks the safety of his response team and the victims. Carl describes how he will not send a responder to perform a helicopter search and rescue in flooding if the person is not properly trained:

> Our primary objective when we do anything is to make sure none of our guys get hurt. That sometimes puts citizens at risk because sometimes that capability is just not there (Carl).

Carl affirms that the responder must protect his own body, even if protecting oneself has a negative outcome for the mission. Derrick clarifies why responders must be concerned with self-protection:

> If we can't save everyone, we can't lose responders and become a part of the incident, because we got people hurt and we put lives in jeopardy. So you have to take the measures to make sure that all of your responders are safe (Derrick).

Responders are trained to prioritize protection of bodies beginning with self protection, then protection of fellow responders, and finally to protecting victims. Responders depend on their tools to enact "responder first" safety practices. The knife that the swift water rescue swimmer carries with him is a tool that enables the simmer to cut the rope

that ties him to his victim during a rescue, if the rope becomes tangled or if the rescuer becomes endangered (Ray, 1997). While it seems counterintuitive, the prioritization of the individual responder's body first is what enables the responder to recognize and respond to risks that will protect other individuals. It is through this value system that a responder is capable of continued participation in search and rescue teams.

Hygiene. Third, responder hygiene mitigates the effects of exposure to unhealthy sites. Body-site relationship shows how responders must individually and collectively take measures to practice effective hygiene if their bodies are to remain healthy and able to perform search and rescue practices. Thus, the body-site relationship becomes intrinsically linked to the accessibility of objects that will facilitate personal hygiene practices, such as taking a shower, avoid drinking from containers that have come in contact with flood waters, and washing hands. Responders are accountable to their own bodies if they are to perform search and rescue of others bodies.

> We met challenges in New Orleans because on three separate occasions on the highest levels within FEMA, showers were denied to the emergency responders because they were viewed as a luxury item. What we were trying to explain is that this is a health issue. This is a health and hygiene issue. Again, after three days, after six days, we had no running water. We showered with bottled water. We had no showers… Being able to shower, being able to have clean hands, being able to use the restroom, if the responders who are there to make an impact on the incident are not healthy, how can you make an impact (Chad)

Responders' hygiene is dependent upon accommodations at the site and objects such as hand washing stations and restrooms. Since responders are not guaranteed opportunities to fulfill hygienic practices, responders often pool their knowledge and resources to innovate jointly as seen in port-a-potty procurement and as seen below in a makeshift shower unit.

> So we have a young man working here and the chief came to him and said, "can you design some type of shower system that you can hook into a garden hose?" And, he said, "Yeah. You can do it out of paper, PVC...". Then, he literally went and bought the stuff. He made a portable shower. Hung up tarps and we have a portable shower now (Howard).

Adaptive objects such as a makeshift shower in the site to accommodate responder hygiene is good example of self-protecting. While protecting self is the first priority, the protection of body in a hazardous site is dependent upon joint action and access to objects and tools. To perform self-protection, responders develop ways to safely overcome the risky sites in which they must operate.

Hydration and nutrition. Fourth, hydration and nutrition are emphasized to minimize adverse effects to the responder and his health. Bottled water is the preferred means of hydration because it has not been exposed to environmental hazards at the site nor has the bottle been used by anyone else. MRE's are often the only available non-contaminated food during the first week(s) of a disaster (TEEX, 2006). Keeping oneself healthy through clean water and food protects one's body and enables the body to perform reliably.

Rest. Fifth, sleep deprivation poses a threat to responder safety. Therefore, adequate sleep and attention to sleeping accommodations is prioritized in response.

> A long-hour-multiple-days operation soon leads to fatigue and increases the chances of injury to team members. Proper shift length needs to be enforced and appropriate rehab facilities should be provided if possible. These facilities (i.e. tents, bldgs) should be inspected to ensure quality rest can be obtained. Some things to consider are: individual sleep habits (snoring or talking in sleep), barking canine, pagers/cell phones, aircraft overflights, PA systems, noise from generators (TEEX, 2006, p. PM-57).

Rehabilitation facilities developed for rest must be adequately designed, maintained, and utilized, in addition to adhering to proper shift length. Rehab facilities must be equipped with tools that facilitate rest and recuperation, they usually are portable facilities so as to accommodate responders regardless of what the site is and its conditions.

In sum, through equipment, prioritization, hygiene and health, and rest, responders prioritize their own bodies and the bodies of other responders. Protecting self is primarily a tool to body relationship. By prioritizing tools (objects constructed to perform specific tasks), responders place importance on training, a communal activity, which prepares responders to effectively wield tools. Tools are safety equipment or procedures and function as a collectively agreed on mechanism used by responders to protect one's body from danger. Tools may also be constructed in situ as responders negotiate their self-protection needs and determine how to best protect oneself during deployment. Acting with material manifestations is enabled and constrained through

organizationally sanctioned practices that implement tool usage in specific functional processes.

Protecting Responders

Protecting responders or making sure other responders is second to protecting self. Like protecting self, protecting responders foregrounds bodies and their role in the search and rescue process. However, unlike protecting self, the priority shifts from a tools to body relationship to a body to body interaction through enacting collective safety practices. While tools are used, tools are communally wielded as an extension of the responder's body and subordinated to the responders' interpersonal relationships and abilities to enact safety first. Furthermore, the "responder first" culture of USAR emphasizes how safety and protection practices are joint enterprises of the response community.

Buddy system. First, buddy systems produced and maintained in training and deployment are directly connected to the "responder first" culture. The buddy system originates from firefighters requiring two comrades to enter a building together so that someone is always there to help navigate risk. As stated in training, "doing safety is more than thinking safely" (Sanchez). And, doing safety is a communal activity as the emphasis shifts from the individual responder to the response team.

> You don't think 'safety first,' you think 'I don't want my buddy to get hurt.' It is more about *not letting* your buddy get hurt, than we need to keep our safety record because we will get a safety day. It comes to *protecting* your friends more than an overall safety issue or slogan. That is why the training…puts most

> together all the time helps because you feel that bond that you don't want someone to get hurt. You are not *acting safe* because your boss tells you to. You are *acting safe* because you don't want your friends to get hurt (Carl, emphasis added).

Taking care of one another requires that a responder incorporates strategic protection to perform a mission reliably. It also entails interpersonal communication as evidenced through the buddy system. Carl comments, "If he sees something that our guys are not trained to do, we won't take the mission. We won't get any of our guys hurt."

What begins as a manifestation of the "responder first" and the buddy system becomes friendship. Carl describes the development of closer interpersonal bonds through humor. "One of the things I learned was that if you are not getting picked on, then you are not part of the group." Additionally, Chad describes the significance that a particular site has on a peer group who are deployed to the site: "As a peer group, those of us that responded to 911 formed a very unique bond." The joint experience of search and rescue becomes linked to the body-site. The body to body relationship is foregrounded as responders describe their interdependencies and interpersonal closeness. As responders interact over time through trainings and deployments, the "responder first" culture and the buddy system become discursively intertwined with material privileging of bodies. Responders become attentive to the verbal and nonverbal cues of their buddies. "When they are out there, they can read their buddies more and know that something is going wrong because of a funny look on someone's face" (Chad).

Safety officer. In addition to the friendships that develop through the buddy system, protecting responders includes the institutionalization of a safety officer who oversees the safety of responders' bodies. Safety officers provide big picture views of search and rescue practices to ensure safety. Two embodiments for safety officers arise in the data: 1) the safety officer as an assigned lookout and 2) the safety officer as an attitude all members should maintain. First, lookouts are conducted by "a site specific Safety Officer [assigned] to a single location (site) to monitor the existence of a special hazard" (TEEX, 2006, PM 23). Lookouts are the sole responsibility of the Safety Officer who ensures that the Lookout works "from a position of safety and clear visual access just outside of the direct work area (site)" and "should not become involved with the actual "hands on" portion of the operation" (PM 23).

> They [Safety Officers assigned as Lookouts] should be readily identifiable to all, by their radio designation and by wearing a Safety Officer vest or (objects) in a small group identified during the safety briefing. Team members tasked with this responsibility must resist the temptation to become involved in the tactical operations itself. This requires extreme self-discipline (body). Remember though that the direct success of the mission depends upon the ability to counteract hazards before they become problems (TEEX, 2006, PM 23).

Secondly, the safety officer is an attitude all members should maintain. Sanchez states, "Everybody is a safety officer." In other words, all members have an organizational responsibility and an expectation to monitor the safety of search, rescue, and training practices as they are enacted. Continually monitoring operations, regardless

of position, is a priority of the organization. Howard states, "I think seeing safety for everybody is probably the biggest priority, and then there are a lot of other fall-out pieces." Here, every*body* is prioritizing safe practices or safe ways of doing practices as they are performing their rescue tasks.

Summative Remarks on Enacting Safety

In sum, safety is an enacted set of practices that are a constitutive entanglement (Orlikowski, 2007) of social interactions, material relationships, and the interplay between them, simultaneously and continuously within dangerous environments. Enacting safety is accomplished by navigating risk, feeling danger, protecting self, and protecting responders. First, navigating risk requires assessing levels and types of risk, using communal and embodied understanding to take actions to decrease risk, and performing response practices. Navigating is interpreting and moving through risks that become apparent in the way that bodies, sites, and objects relate. Second, feeling danger is more than a cognitive response, whether individual or collective. It is a coordinated physical and psychological phenomenon in which the sensory experiences of individuals become a constructed communal awareness that is embodied and connected to sensory mechanisms. Thus, materiality and communication are intertwined and directly impacting each other in the collective construction of what is felt as dangerous. Third, protecting self and protecting responders centers on physical bodies and minimizing risks to self and other responders. In protecting self, this is done on an individual level based on a codified set of organization expectations that are communally constructed over time. In essence, protecting responders is a coordinated practice that places bodies

as the privileged material component to enacting safety. The next data analysis chapter examines training, search, rescue, and communication as the performance of specific response practices.

CHAPTER V

PERFORMING RESPONSES

Performing responses refers to embodied practices situated in environmental constraints and hazards, technologies, training manuals, policies, organizational expectations, and experience. Through training processes and deployments, responders jointly act and reflexively interpret the reliability of a practice in relation to its material manifestations. Thus, performing responses in a reliable way depends on adapting to the site while negotiating 1) dynamic physical environments, 2) technologies best suited for the situation, and 3) human needs and safety in action. This chapter focuses on the interplay of social and material manifestations in performances, such as performing swift water rescue practices in the midst of a collapsed structure. As Chad states,

> The physical aspects of dealing with the water, dealing with structural collapse incidents, or dealing with general disasters, you deal with those situations or those problems at that time…You know, the climate may be hot or cold, you adapt.

This chapter covers the findings on performing response in four areas of practices: 1) training bodies, 2) searching sites, 3) rescuing bodies, and 4) resourcing communication (see Appendix B: Performing Response Practices). Each of the arenas offers insights as to how the responders construct meaning in their dynamic, high-risk environments as they aim to maximize reliability and minimize the risk of human life. The discussion of each arena highlights the interplay of body, site and objects, and the degree to which

these practices are scripted or improvisational, and the implications of this interplay for communication. A brief overview of scripted versus improvisational practices sets up the discussion of these four arenas of performing response.

Scripted and Improvisational Practices

Performing response practices in a reliable way requires both scripted and improvisational practices. Scripted practices are governed by a pre-action set of guidelines shaped through training, organizational structures, and experience. For example, training develops skills, teaches expectations and provides guidelines for responders to use when engaged in performing response practices. Structures such as organizational hierarchy, cultures, policies, and histories offer guidelines to enact reliable or safe responses as defined by organizational expectations and governmental laws. Experience constructs routines and expectations that guide performances.

Scripted practices are routines that follow step by step guidelines for expected performances. They appear as stable and predictable and represent the best practices for a given disaster based on the accumulated knowledge of past responders. Scripted performances feature bodies with expert knowledge and experience that navigate through disaster sites with tools to coordinate response practices, ones that exert a high degree of control over the site. . The concept of scripted performance appears in the US Army Corps of Engineers Urban Search and Rescue's (2006) *Shoring Operations Guide* "expected performance" for different types of structural collapse (pp. 1-5, 1-7, 1-9, 1-11, 1-13, and 1-15). Through accumulated knowledge, the *Shoring Operations Guide* provides step-by-step guidelines as to how responders should enact the "expected

performance" to complement the shoring practice with the appropriate tools, guidelines, and technical information about the site and victim access. However, responders are not always faced with "expected performances," thus creating a situation that requires greater levels of flexibility since these practices are intertwined, influencing and building on each other.

Secondly, reliable responses require improvisational practices that blend together existing practices with the adoption of new ones . In other words, improvisation includes a merging of scripted practices to develop a new practice in a given site. Whereas responders use scripted performances when their bodies are able to predict and control sites and tools, improvisational performances call for adjusting or adopting practices to the dynamic nature of material interplay. Concluding a training section on self-rescue in swift water, Ray (1997) cautions,

> One idea rescuers must give up at the outset is the delusion that they can 'beat' the river with technology. They can, however, understand it and use its power to help them. The other essential concept is that swiftwater is different than other forms of water rescue, and that rescue techniques must be adapted accordingly (p. 34).

Swiftwater response practices necessitate training and education about water currents, self-rescue, equipment, and rescue practices, but swiftwater reliability depends on responders' abilities to improvise.

Rather than generating a categorical system to label practices either scripted or improvisational, the terminology is used to clarify how responders coordinate practices

in situ. Thus, drawing on scripts learned through training and deployments, responders reproduce reliable practices and improvise by combining, changing, and creating practices that result in process and outcome reliability. Hank exemplifies the performance of scripted and improvisational response in his description of preferred response:

> So, I want you to go down to Galveston and do ABC. Okay. If you tell me to go to Galveston and do ABC, that is what I'm going to do, but I may not accomplish what you really wanted. So if you tell me I need you to go to Galveston, here are the parameters, so give me my boundaries, you know, don't violate any laws, those kinds of things. But then you tell me the end state; at the end I want you to have found, you know, as many deceased personnel…in the Bolivar Peninsula. You utilize any assets you have; that gives me a lot of freedom in order to work (Hank).

Disaster performance, for Hank and other USAR members, is about enacting scripts for how to search sites, rescue bodies, signal, and train, but it is also about how improvisation allows responders to adapt to the site, innovate with objects, and save bodies.

In addition to scripted and improvisational performances, experience enhances response as well. How much experience an organizational member has with a disaster site plays an important role in the development of scripted practices and improvisation. As Derrick explains, "If it is a spontaneous event, a lot of those things don't get pre-planned… having experienced people and having the training that is provided all these

responders [is important]." Experience with different types of disaster sites, building materials, shoring techniques, water rescues, responder expertise, and institutional affiliations becomes a repertoire of scripts to draw on and adapt to fit the situational demands.

Experience, therefore, is central to responders' individual and joint decision-making.

> I base most of my decisions off past experience. It is not always good past experience. If I have done something before that worked out poorly, I won't do that again (Carl).

Integrating practices through training and experience becomes a way that responders learn collectively about performing responses. Howard describes how learning occurs in interpersonal relationships, in which "a lot of things have been passed down firefighter to firefighter, to firefighter" and "rescuer to rescuer." In sum, responders learn how to perform both scripted and improvised responses through training and deployment experiences. USAR members perform responses in four ways: training bodies, searching sites, rescuing bodies, and resourcing communication.

Training Bodies

Training bodies represents the corner stone of performing responses and is performed primarily in simulated disaster sites that are constructed to portray risks as real as possible. Training functions to prime USAR members for scripted and improvised performances or as Derrick puts it, "what you know" to fall back on. USAR requires that responders attend in excess of 90 hours of training per year, including full-

scale simulations at their training center. Initial and continued education training aims to "show it, teach it, do it" (Howard). Both collapsed structure and swift water training begin with demonstrations and classroom-type instruction, followed by hands-on, experiential learning in simulated sites. To enhance reliability, USAR members cross-train through simulation in realistic disaster sites.

First, cross-training focuses on the interplay between body and sites in which the body is accentuated in terms of gaining knowledge of tools, technologies, and sites that influence the implementation of scripted or improvised practices. Larry argues, "To me, I think the biggest aspect of all of this is that everybody should be cross-trained in everything." USAR members rally around the phrase, "Semper Gumby," to connote the value of teammates who are trained to respond with a variety of scripted practices and who can improvise and adapt practices to fit the response needs. A Gumby-like responder conditions his(her) body to enter icy water simulations and operate GPS to generate victim searches in a mock structural collapse. Whether positioning the body during rescue swimming or controlling heavy duty jack hammers in confined spaces, cross-training readies the body to enter diverse site conditions, utilize a variety of tools and technologies, and coordinate actions with other responders.

Cross-training is an organizational practice that increases the number of team configurations for deployments. Larry, like other USAR members, notes, "This happens all of the time when we get activated and we cannot find the people to fill the spot. They will go to someone that is not trained as well. They may ask a logistics guy to go out as a planner." Cross-training enables USAR greater organizational flexibility when

constituting teams. Cross-trained members not only better understand and appreciate one another's responsibilities but they are also able to perform one another's tasks and to contribute to a collective performance. Consider responder A, who has training in medical triage, victim location, breaching, shoring, lifting, HAZMAT detection, and helicopter rescue swimming. Responder A can be deployed in a variety of task force positions and to a variety of disaster sites. Responder A may be needed to replace a teammate who is sleep deprived or injured during response. As Wyatt observes, "There is a downside to the organization always changing because of the dynamic environment: burnout, going fast all of the time, so [USAR-A] cross-train so that each person can do each other's [job]." Cross-training provides safe guards in team deployment and it ensures that the task force can perform all necessary emergency response practices..

Second, training bodies also privileges a body-site relationship through re-creating disaster sites in authentic simulations. As Howard points out:

> I think your training needs to emulate that type of environment. You need to give them multiple things at the same time. They have to be able to do multiple things. And, you need to be able to change up your scenarios to meet that (Howard).

Simulating sites permits responders to train for a variety of disaster sites. Site differentiation exposes responders to a greater diversity of disaster types and site conditions that require responders to recall learned practices as well as create new ones. Additionally, site variation challenges USAR members to look for alternatives and coordinate decision making with other responders to select the safest and most effective

practice to accomplish the mission. Nathan states, "If you teach the same things so much, people won't look for alternatives." Training in realistic sites simulates unpredictability and, thus, challenges USAR to produce alternative practices.

Realism in training also helps to reconstruct the pressure, stress, and hazards of a deployment. To illustrate, my swift water rescue course took place in rapids with hydraulics that exposed me to risks such as being caught in an entrapment or recirculating current. The safety of the volunteer victim, my team, and my own body were at risk in the training course, but without such risks, responders do not have the "necessity [that] seems to breed a lot of innovation" (Carl).

Third, training bodies is a collective exercise that functions to enhance interpersonal relationships between responders and build trust for interdependency. In USAR "no one is a super rescuer, the team is needed" (Will). The interdependence among responders highlights the collective body learning, training, and responding together to accomplish reliability through a joint performance.

> Everybody works together to get the job done depending on your area of expertise…swift water boat operator, swift water rescuer, heavy rigging specialist, HAZMAT specialist (Larry).

Training provides an opportunity for responders who have different day jobs and are geographically separated from one another to interact with one another, share expertise, argue over best practices, and cross-train with one another. In this way, USAR's diversity is both an asset for improvisation and a hindrance for reliability, depending on how responders coordinate a collective response. For example,

> I think these two [logistics and canine handler] were having an argument. It turns out that they were saying the same thing in different ways. They did not understand each other because they did not both speak the same jargon (Carl).

Carl describes a lack of shared language, but even when language is shared, responders differ in terms of which type of knot is best for a tow or which type of shore will be the most efficient and safest. During my collapsed structure training, I observed responders from different fire departments arguing about these issues based on their past experiences.

Training bodies does not erase each responder's diversity of experiences, skills, and practice-based knowledge. However, training reduces negative consequences of mistrust or lack of appreciation for one another because it facilitates a shared language between responders, a common set of practices, an appreciation for other's task and mission, and an awareness of teamwork. Responders joke with one another, call each other names and tell funny stories from deployments. Training employs the buddy system to prepare responders for partner accountability and tracking responders who are in the field. Furthermore, responders socialize with one another by going out to eat together after long training sessions. In effect, training bodies provides face-to-face avenues for relationship development characterized by mutual respect and trust.

Training bodies enhances reliability in three ways: 1) cross-training for a greater variety of practices that serve multiple roles, 2) simulating realistic sites to prepare responders for dynamic, risky encounters with disaster, and 3) developing interpersonal relationships to enable collective performances. USAR recognizes the relationship

between trained bodies and their capacity for performing responses reliably. Nathan describes feedback from international responders, "The core values of the training became the core values of the incident." Through training, responders' bodies learn practices related to searching sites, rescuing bodies, and resourcing communication as they become scripted into their repertoires of practice and resources for improvisation. Training privileges body in situated experience, and as such, responders' bodies retain an embodied "know-how" that affects how incidents are approached – making practices mean something by making is material.

Searching Sites

The coordinated activity of searching sites, which is the inspection of the disaster site for bodies, depends on a team of responders comprised of hazardous material (HAZMAT) specialists, canine handlers, and others that represent a repertoire of skills, abilities, and tools by which to navigate through the sites to locate and extricate victims. While the nature of a disaster site significantly impacts the search process, management expectations and tools impact the implementation of practices. For example, searching is often performed at different levels, depending on the risk at the disaster site and the expectations communicated by managers. As Hank observes:

> There are different levels of search. We have a hasty, we have a deliberate, and then we have a thorough… One level of search is…go out there and do the best you can to find everybody quickly. The other level of search is…take everything apart until you can tell me with 100% surety that somebody is there or not. The more you do, the more risk you are going to assume. You know, if I can over-fly

> it, that is relatively low risk. Certainly the helicopter could crash and all that, but you know, I have reduced the risk by not putting people out on an island where they could be bit by a snake or alligator, they could fall and break an ankle, they could have a heat stroke or heat exhaustion, and there are limited ways to get them off the island, except for helicopters or boats, which take a long time (Hank).

Intrinsically determining whether to do a hasty or deliberate search depends on navigation of risks and the impact of those risks on responders . Site has significant bearing on what practices will be performed and what tools and personnel are necessary to accomplish the end goal. Expectations of what should happen during a search and how those goals are communicated play a role as well. As Hank puts it, "then you tell me the end state" because it is empowering to "make better decisions which affect safety and all those things." Knowing the desired outcome and being able to adjust to the demands of an incident simultaneously enables the responder to search the site at the least level of risk. While all searches consist of detection and location, searches are conducted in two major forms: hasty searches and deliberate searches.

Hasty searches. Hasty searching is the first level of search described by Hank, in which USAR members "go out there and do the best [they] can to find everybody quickly." A small crew that is equipped to search within a specific disaster type will enter the site and examine general building structure or swift water conditions, identify hazards, check atmospheric conditions and signal what was found (TEEX, 2006, p. PM-7). Howard illustrates how performing a hasty search in Hurricane Katrina was

complicated by directive from management and the ability to recognize if there were trapped victims in the disaster site.

> In Katrina…nobody was allowed to go into a building until day 17 or something heinous. That's a total geopolitical issue, local, state, federal, not being on the same page. And that was finally, I mean, it was the second tour that we were at before we actually went into buildings... Unless it was an emergency response to where we could see somebody literally trapped in a building that was alive, we weren't allowed to go into a building. So, we couldn't functionally do what we would consider a good search. Our searching was literally a, I'm going to use the term, "windshield survey," of the exterior of the building. So you drive around the building, you see what you can see. If you can't drive around the whole building, then you're not going to see everything. On day one, if we'd see a hand sticking through the eve in the roof or there was a flag coming out of a hole in the roof or whatever, we would breach that roof, and those, in my mind, were the only rescues that we performed. So we'd cut an access hole; we'd get the people out if they hadn't already broke through with an axe they had in their attic or something like that (Howard).

The complexity of disaster sites presents complications for response teams that are searching for live and dead bodies. As Howard describes, relying on scripted search methods, based on training or orders that are inadequate for the situation at hand rather than improvising, renders less effective and, thus, riskier outcomes. Because of the type of site, primarily flooded residential areas, trapped victims may not be visible without

more obtrusive search methods. Therefore, responders need flexibility to perform searches to match the complexity of the site and the complexity of search practices. Howard's frustration with prolonging hasty searches, which are typically quick, demonstrates how reliable search and rescue practices are dependent on more deliberate and thorough searches.

Deliberate searches. Deliberate searchers require responders to commit greater time, effort and technology to ensure that 100% of victims are rescued or recovered. Search teams usually include a search team manager, a canine search specialist, a technical search specialist, a medical specialist, a structure specialist, a hazardous material (HAZMAT) specialist, and a rescue specialist to provide an experienced collective eye. Searchers employ technologies (cameras and fiber optics, atmospheric reading devices, listening devices, marking materials) and canines to assist in being more sensitive to the specific situation and reliable at finding victims. Because deliberate searches increase the interaction between the responder's body and the risky site, deliberate searches often pose greater risk to the responder yet greater hope for the victim. Since searching is conducted before response practices begin, risks include high flammable gas levels, moving objects, smoke, and general safety threats that can go unnoticed. Without significant experience noticing risks within disaster sites and experience using search technologies, responders can pose a threat to themselves or others. To circumvent this, responders use simulated training where members work hands on with fiber optics, cameras, infrared/thermal imaging, electronic listening devices, canine handling, and other technological aids.

Features of the site constrain deliberate search practices. For example, responders utilize flexible fiberscopes in tight spaces due to the flexibility and size of fiber optics (TEEX, 2006). Flexible fiberscopes are used in conjunction with drills and hammers to bore small holes for fiber optic bundles to fit through and search small spaces for site assessment and victim identification. However, if dust, smoke or low light conditions prevent visibility with fiber optics, responders may elect to use infrared/thermal imaging to conduct search and rescue. Implementing helmet mounted infrared/thermal imaging devices serves double duty by not only identifying victim locations but also identifying hot spots to protect responders during searches. When responders employ these devices either in isolation or in combination with one another, searching sites becomes dependent on appropriate matching of site conditions with technology. The site-object interplay in deliberate searches shows how deliberate searches demand searching practices that exceed the scope of human senses. To accentuate human sight, thermal imaging, fiber optics, and cameras are used. To accentuate human mobility, these technologies are squeezed through tight spaces. In many ways, these technologies become extensions of responders' senses and generate a site-body-object interplay.

Canines are nonhuman bodies that are trained to use their senses and signal risks and victim location to their handlers. Deliberate searches usually include the skills of a canine team comprised of two canine search specialists and search canines (TEEX, 2006). Two canine search specialists and search canines functions to 1) permit one canine to rest while the other is searching and 2) build redundancy by having the second

canine confirm search outcomes of the first canine. Using a map and a search grid, the canine handler depends on a spotter to monitor risks at the site, on a search team manager to sketch features of the site's structure, and the canine to sense out bodies. Canine search teams depend on the coordination of responders to reduce risk to responders and search canines, produce a record/map of the search outcomes for information sharing, and assess the reliability of one another's assessment of the site and search. Canines are able to maneuver their bodies in confined spaces and use their enhanced sense of smell to enable search practices to exceed the capability of the human body.

Sites are also critical in the effectiveness of canines during deliberate searches. Optimal site conditions for canine searches are stable rubble, light rain, light winds, cool weather, and dawn or dusk. Because sites are in flux and difficult to predict, responders cannot depend on any one deliberate search method. Responders, who are trained in multiple methods, learn to collectively adapt the method and technology to fit the risks and site conditions. Furthermore, responders triangulate searches by using multiple methods to search the same grid area to confirm and disconfirm search conclusions. To achieve reliability, responders build in redundancies across methods and technologies but do so in a way that allows for flexibility.

Rescuing Bodies

Responders engage in hasty and deliberate searches to rescue live bodies and locate dead ones. The practice of rescuing bodies privileges the material features of responders and victims' bodies related to the disaster type. Practices that are geared to

rescuing bodies demonstrate how organizing is entangled with the material manifestations at the site and responders use rescue practices to ensure that bodies are preserved. While USAR performs responses based on a range of critical incidents, such as hurricanes to the shuttle explosion to terrorist attacks, each incident entails two primary rescue features that shape response practices: collapsed structure and swift water. Each type of disaster type has its own set of influences and complexities that impact how responders rescue bodies.

Collapsed structure. The vast array of engineering, technology, and communication practices associated with collapsed structure evidences how training and experience with fellow responders meld together to construct the social and experiential complexities necessary to perform response in risky, unpredictable sites. Site characteristics, such as confined space or metal vs. concrete structure, directly impact how responders must coordinate their search and rescue practices to extricate trapped victims. Cody describes,

> Structural collapse is kind of a different animal in the beginning for search and rescue, because it's really combining all the skills from water related incidents to rope related incidents to confined space to trench to cave to heavy machinery. (...) But in a structure collapse, it may be water dealt with, HAZMAT dealt with, confined space, heavy machinery involved.

To perform search and rescue practices reliably, responders must coordinate their experienced, trained bodies in confined spaces, flooded structures, and trenches while

transporting and using technology and tools for the extrication of victim bodies. Cody continues to explain the complexity and challenge of collapsed structure,

> All the aspects of all the other technician levels in the rescue set could be put into play or are requirements to be a good structure collapse technician. So, it's kinda, to me, the upper tier, upper echelon of the rescue folks to do structure collapse technician.

Considering Cody's description of collapsed structure, the site evidently demands that responder bodies engage in specialized training across multiple hazards understanding that a collapsed structure entails an amalgamation of skills and uses a variety of tools/technologies. Rescuing bodies in a collapsed structure site requires resilient responders. Carl describes the process that ensues in a collapsed structural response:

> If you have a structural collapse, then they send the structural collapse expert in because that is the specialty in their field. They assess the situation [to see] if they have to shore walls up or make it safe for the search people to come in and search for people. Then everybody has a job (Carl).

Responders are assigned to perform specific practices, or jobs as Carl puts it. Through training, responders learn essential breaching, shoring, and lifting practices to maneuver in collapsed concrete and metal in order to reach bodies and extricate them from the site. Clean breaches, dirty breaches, shoring, and lifting are dependent upon the tools, or objects, and training and field experiences needed to perform each of these collapsed structure practices (US Army Corps of Engineers, 2006). See Table 1: Collapsed

Structure Practices.

Table 1: Collapsed Structure Practices

Collapsed Structure Practice	Definition and Use of Practice Featuring Responder Bodies' Dependency on Tools and Technology
Clean Breach	• Breaching the concrete (stationary object) in a way that the debris comes out of the structure rather than in protects victim bodies close to breach site. • Clean breaches are used when victims are close to the breaching and breaking point of entry as identified by sight and sound (visually identified by camera and/or by victim calling out). • Saws and jackhammers are necessary.
Dirty Breach	• Dirty breaches are faster than clean breaches. • Material, or debris, goes into the collapsed structure and, therefore, victims should not be close to the breaching point. • Practice is contingent upon a large jackhammer.
Shoring	• Shoring is a process of building support to access and retrieve victims. • Shores increase the stability of the site and removes obstacles between responders and victims. • Shoring includes wooden structures built on site (i.e. laced post shore), pneumatic struts (i.e. "T" spot shore), and air bags.
Lifting	• **Manual leveraging** is the use of responder bodies to lift stationary and unstable obstacles to access trapped victims. • **Pulley systems** use ropes and pulleys in a variety of arrangements to leverage, pull and lift obstacles. • **Air bags** are inflatable tools used to lift objects off victims or provide lift for more permanent shores.

In collapsed structure training, instructional time is divided between classroom learning and onsite learning. Responders learn how to collectively assess the structure, search for victims, and perform these breaching, shoring, and lifting practices. Responders shift back and forth between operating the body jerking jackhammers, tying knots for a pulley

system, building a wooden shore, signaling to one another, and monitoring victim status. Each responder is able to learn from another's performance and experience their own with the tools necessary to perform collapsed structure rescue.

Searching for bodies motivates both USAR responders and volunteer responders. Rescuing bodies in collapsed structures present challenges that require technical training, appropriate tools and technology, and a coordinated implementation of rescue practices to protect responder and victim bodies. Untrained volunteers have the motivation yet lack necessary training and experience to perform rescue skills safely, which may lead to their entrapment and, subsequently, further endanger the volunteer, other victims, and responders.

> You know, in fact, this kid who just walked into the building – kid doing the right thing. He is out there volunteering to help, thought he was doing the right thing. He thought he would go in and search and look around, never understanding that his stepping inside that building may be the last little nudge that wall needs to come down, because its main support beam is missing. And not having the training of what to look for to determine whether this structure is going to hold. I think, you know, you have been through the course, it is kind of funny, to your day to day life, people do a lot of home remodeling, but there is a lot that is wrong. People just don't know the simple terms of a weight-bearing wall. If you tear that wall down, the whole house will probably come down. It is carrying the load of the roof. Oh, okay, now I get it. So it is just little things like that. To people who are trained, it is common sense (Derrick).

To rescue bodies in collapsed structures, specialized training and equipment is mandatory. The emphasis USAR places on initial and continued training of responders underscores the complexities and unpredictable nature of collapsed structures and the tools that facilitate reliable performance. Collapsed structure practices subjugate the highly trained responder bodies and the tools and technologies necessary to traverse through unstable buildings to the site conditions. Nevertheless, shoring, breaching, and lifting used to secure the site and technologies used to locate and extricate victims demonstrate the dependency on objects to reliably perform the functions of collapsed structure responses. The site-tool relationship is complex and often difficult to determine which is being privileged in training and response as the two are intertwined in collapsed structure practices.

Swift water. Whereas collapsed structure features a site-object relationship, swift water features a site-body relationship. Swift water rescue practices highlight the relationship between a dynamic and dangerous site and responders' trained and experienced bodies. During training, the instructors taught and trained in water to demonstrate the speed and shifting currents typical in swift water rescues. Swift water travels at 1.5 mph or more, and the responder and victims are 200x more likely to die in swift water than fire (Will). Therefore, swift water represents a highly unpredictable and hazardous environment for rescue. Site and responder bodies play key roles when interpreting the practices that will be used during swift water search and rescue. To assess water entry and appropriate practices, Will clarifies that responders must, "have a reason to be in the water." Entering the water limits situational awareness and can

situate rescuers' bodies unnecessarily in harm's way. Thus, he notes, "learn the physics and chemistry of the environment."

To learn about a perpetually changing site, swift water rescue training is required for responders. Vicarious learning is not enough to prepare responders with embodied knowledge necessary to weigh the constant and emerging risks that swift water exhibits. Trial and error during deployment is extremely costly and leads to death. Consequently, responders need training in actual swift water environments to interpret interrelationships between material manifestations and coordinated use of rescue practices. Derrick states,

> …we teach about the dynamics of swift water, so [responders] are able to identify the characteristics of fast moving water and the safety considerations of strainers and different things. So part of the requirements of training is to understand the situation that you are going into before you get involved in trying to respond to a situation. Because if you don't understand what is going to kill you, it is going to kill you, or it will hurt you. So that is why all training events, the first thing we do is not just safety in training, but understanding the hazards and the risks involved with the job you are going to be responding to (Derrick).

Understanding the site and the objects that fuse to construct formidable risks is equated with knowing how material manifestations interrelate. Knowing is embodied knowledge constructed through the blending of vicarious learning, observation, and experience. To reliably enact response practices within such environments, responders must decide whether the risks can be navigated or the risks pose threats to the safety of responders.

Once the site is entered, the responder is in a site characterized by its unpredictability. Thus, safety and effectiveness is dually contingent upon practice and threat. Simply put, responders act instantaneously as, or before, threats arise.

Just as with collapsed structure rescue, in swift water rescue the experience and embodied knowledge of responders is juxtaposed with the well-intentioned yet inexperienced and ill-equipped volunteer. For example,

> There was flooding in one of the areas during Ike and there was water up to [a guy's] neck. He was about a foot away from the drain. And, you know, you have seen if water is draining out of a toilet or draining out of a bathtub, you've got the drain and the swirling motion with the nice little eye – just like the eye of a hurricane. And he is trying to unclog that drain. Well, Mr. Do Good had no training in looking to know that that is not a safe place to be. It is not a smart place to put himself. But he was trying to do the right thing – and untrained in the fact that, yeah, if you unplug the drain that is a good thing to do, but are you aware that you are going down that drain with it? You will get stuck in that drain and all the water that is forced through the drain, no one will be able to pull you out of there and you know those are the things that you learn in water rescue training (Derrick).

The motivation of USAR members to save lives is mirrored in "Mr. Do Good." However, as in the aforementioned case of collapsed structure rescue and in this case of swift water rescue, the site dictates specialized training and embodied knowledge that primes responders to enact rescue in such a way as practice, site, and risk are

instantaneously assessed in tandem with one another. Responders are able to collectively identify hydraulics and man-made hazards, determine the type of response – ranging from shore-based to helicopter – to match dynamic site and victim needs, utilize appropriate gear and equipment, and intercept victims.

> Three inches of water moving at a high rate of speed can actually sweep your car down the river…But the first responder who jumps out there, he is untrained or she is untrained, may put themselves in a very unsafe situation. You have gone through the training and you see things – like when you pull up next to a river and you look at a river differently (Cody).

Given the emphasis on training responder bodies in swift water conditions, USAR members learn how to implement in-water rescue practices (see Table 2: Swimming Rescue Practices) during their swift water training. See the chart for a synopsis (Ray, 1997).

Table 2: Swimming Rescue Practices

Swimming Rescue Practice	**Definition and Use of Embodied Practice Dependent Upon Site Conditions and Victim**
Self-Rescue Swimming	• Self-rescue practices include: feet-first and head-first techniques, catching throw ropes, wearing proper gear, using a flotation device, and understanding hydrology. • Self-rescue swimming practices are necessary due to 1) dynamic site conditions and 2) victim panic.
Combat Swimming	• Combat swimming requires no equipment or technology to implement, but swim fins are recommended. • Responders swim aggressively to intercept victims. • Responders are able to choose timing, approach, and spot for rescue. • Calm spots are ideal spots for responders to aim their combat swimming.

Table 2 Continued

Swimming Rescue Practice	Definition and Use of Embodied Practice Dependent Upon Site Conditions and Victim
Tethered Swimming	• Tethered swimming or live bait swimming uses a rope system to connect the shore-based, boat, or helicopter responder to a rescue swimmer who will then connect with the victim. • Tethering increases control over site. • Tethering depends on site obstacles.
Rescue Swimming	• Rescue swimmer positions the victim using a "reverse and ready" so that victim faces away from responder on the downstream side. • The "reverse and ready" allows the responder to use one arm across victim's chest to hold the victim and one arm to swim.
Tow Rescue	• Tows reduce threat of victim compromising responder safety by creating a barrier between victim and responder and allowing responder to remain on shore. • Tows can be made using rope or even a belt to extend to a victim. • Best tow practices utilize a rescue flotation device, like a buoy, to calm the victim and assist with flotation.

Despite the desire to refrain from USAR entering the water in swift water rescue, the bulk of swift water rescue training is spent in the water prepping and practicing in water rescue practices such as self-rescue and combat swimming. The emphasis remains on the rescuer's body and the practices that the body must learn, perfect, and adapt to enact reliable performances.

Calming victims. Calming victims trapped in collapsed structures, stranded by flood, or engulfed in rushing water is a distinctive subset of rescue practices. This set of practices illustrates a dynamic body-body relationship that clearly privileges body. Responder and victim safety is paramount in all types of disaster response, but to

enhance reliability, USAR is highly dependent upon responder-victim communication. The following section demonstrates practices and complexities associated with calming victims.

One of the primary concerns noted in USAR training and by USAR responders is the interplay of victim cooperation and response practices. Calming victims stranded by floodwaters or drowning in rapids encompasses an assessment of a victim's emotional state, communicating the rescue plan, and maintaining open, ongoing communication. First, USAR members must assess the mental state of the victim if they are to perform rescue practices reliably. Ray (1997) notes that, "The success of the rescue, and the safety of the rescuer, depend on it" (p. 131). In particularly, the mental state of the victim can lead to panic or counterpanic due to perceptions of immanent death, lack of site knowledge, and sensory overload. A panicked victim exhibits random behaviors that are counterproductive for rescue. In swift water rescue, panicked victims display instinctive drowning response behaviors such as arms thrashing in unison and head bobbing up and down while mouth is open. This poses a challenge for responders who must intercept and retrieve the drowning victim, but who must also prevent the victim from grabbing and climbing on the responder, thus drowning the responder too. Combat and rescue swimming practices that utilize strategies such as the reverse and ready enable responders to utilize their bodies to control the instinctive drowning response of panicked victims. While verbal interaction between rescue swimmer and victim may be limited during victim interception, the nonverbal interaction between the two becomes a means of controlling the victim behaviors to better facilitate calming social interaction

during the remainder of the rescue. The body-to-body positioning functions to protect the safety of responder and victim, restore a sense of control over the site to the victim, and build a trusting relationship between responder and victim.

For counterpanicked victims, their behaviors are typically passive and unresponsive to responder communication and rescue efforts (Ray, 1997). In swift water rescue, a counterpanicked victim may be easy to intercept using rescue swimming practices but difficult to intercept if rescue practices depend on victim cooperation such as in the case of a victim grasping a tow. Whether a swift water responder encounters a panicked or counterpanicked victim, victim psychology influences rescue practices. USAR members must assess the level of panic, counterpanic, and shock that the victim is experiencing in order to act in such a way as to protect one's own body and protect the victim from him or herself.

Furthermore, Taylor describes how the rescue mission itself may be altered based on the assessment of the victim's ability to cognitively process and emotionally control his or her mental state.

> I was the lead story, standup lead story [on Hurricane Katrina], for CBS Nightly News… And I was the first person that said, "These people don't want to come out of their houses. We cannot rescue these people because they're not coming out of their houses." And this was on day four. They weren't leaving. They had heard all the shenanigans that were going on, and they weren't leaving. "We want to stay here. Can you bring us food, water, and ice?" "O.k. we'll bring you food, water and ice." You know, we're going to take care of you one way or

> another. We're just going to change our mission because what we're doing is not working out. You know, there is no evacuation. We got everybody off the rooftops. We got everybody out of the buildings that we could get out, and there wasn't anybody else to get out because they didn't want to come. They heard or saw or whatever that it was worse where they were going than where they were then. Even in chest-deep water (Taylor).

Floodwaters positioned residents at the disaster site in geographically isolated structures. Responders entered the disaster site with the mission to locate and extricate victims trapped by floodwaters without access to survival necessities like clean water and safe food. As Taylor expresses, these victims perceived that rescue by relocation may be worse than remaining in the disaster site. Because reliability privileges the safety of victim's bodies, responders altered their mission by supplying victims with basic necessities until floodwaters receded. USAR emphasizes the relationships between responders that capacitate coordinated reliable practices, but they also emphasize the relationships that responders develop with victims that shape rescue practices to calm and assure victims.

In addition to verbally and nonverbally assessing victim psychology, responders must communicate the rescue plan to the victim. News photographer Bill Perry narrates a disaster story in a swift water rescue manual to warn responders about the relationship between reliability and communication with victims (Ray, 1997). Capturing images of rising floodwaters, Bill Perry found a family trapped in their car between a tree and rapids. Mr. Perry yelled to the two women and three young children to stay until he

returned with park rangers. Unbeknownst to Mr. Perry, passersby also found the trapped family in his absence and attempted to rescue them with a rope. When the rope was thrown to the seven-year old who exited the vehicle and entered the icy water to be towed to safety, the five and three-year old siblings followed with no rope tow and were swept under the icy rapids of the Merced River. A great aunt rushed in after the children. By the time the park rangers arrived, only one adult remained at the vehicle. Not only does this story function to support the need for clear communication with victims about the plan, but the story also functions to reinforce the necessity of trained responders to conduct rescue operations. By communicating the progression of rescue to victims in a manner commensurate with their level of understanding and mental state, responders are able to reduce uncertainty, thus calming the victim.

Finally, USAR understands the value of open, ongoing communication with victims. After initial contact with victims, maintaining ongoing communication is challenged by such factors as noisy rescue practices (i.e. breaching with saws and jackhammers or the roar of rapids), physical and mental state of the victim, and responders' focus on performance. During a collapsed structure simulation in which I played the part of a victim, I recall 20-minute intervals with no contact with USAR members while they breached through concrete and constructed shores. When they would switch responders on the jackhammers or have a break, one of the responders would check on me and give me a progress update. Ongoing communication with victims assures victims that rescue practices are continuing and that progress is being made toward extraction.

Calming victims is an integral set of practices formalized in swift water rescue manuals and reproduced in trainings and deployments. Sections on victim psychology and matching swimming practices based on victim psychology are taught explicitly in swift water. On the other hand, collapsed structure manuals used in training are void of discussions related to calming victims. The absence of written practices related to calming victims is misleading. In actuality, collapsed structure training and deployment stories emphasize the need to practice open, ongoing communication with victims to assure them of the pending rescue and to facilitate safety. In sum, USAR's rescue is highly dependent on the level of victim cooperation and the response team appropriately matching victim psychology with rescue plan. The privileging of the body demonstrates how a team's rescue mission and complementary rescue practices are subordinated to and determined by body.

Resourcing Communication

Resourcing communication is a subset of practices that encompasses signaling, marking, centralizing, and codifying. Information sharing during deployments is often dependent on responder capability (i.e. ability to be heard at the site) and technology (i.e. short wave radio) as evidenced in signaling and marking practices. First, signaling is a communicative practice that privileges bodily capabilities and technology as a means of overcoming site and tool barriers to effective communication. Communications is the second step in the multi-hazard safety plan, which emphasizes signaling during search and rescue. The plan prescribes the following Emergency Alerting System in the event of problems at the collapsed structure: "evacuate – 3 short blasts (1 second each), cease

operations – 1 long blast (3 seconds duration), resume operations – 1 long blast and 1 short blast" (TEEX, 2006, p. PM 25). Training ensures that responders have a shared signaling system to enhance safety in collapsed structures. To further illustrate how the blasts are accomplished using objects, consider this excerpt from the training manual:

> As an example, by placing two radios together, speaker to microphone, and depressing the transmit buttons a loud tone is heard on all other radios tuned to that frequency. Air horns, car horns, whistles, the P.A.S.S. device and clear text over the radio are all excellent methods for signaling. The point is that during the safety briefing, before beginning to work, identify the specific methods of signaling that will be used at the work site should a problem arise during that operational period (TEEX, 2006, p. PM 25).

Thus, horns blow to indicate: 1) a work stop for silence to speak with or hear victims, and 2) return to work using machinery. Signaling is contingent on tools and technology ranging in complexity from a whistle worn around the neck to the P.A.S.S. device. Site conditions and search and rescue practices preclude responders from simply raising their volume to be heard or waving their arms to be seen. When debris and dust are swirling around and the sound of a saw pierces through the earplugs, one quickly realizes the need and value for communication signaling. Furthermore, signaling is employed by a small team breaching through concrete to reach a trapped victim and by response team members dispersed throughout a site. Signaling becomes a process that enables communal activity.

Second, collective response is also dependent on marking. Marking practices include marking the site to indicate hazards, search assessment, and victim location (US Army Corps of Engineers, 2006). For example, if a response team comes upon a department store in their search grid, they look to see if a slash marks an entry point to indicate a search in progress or if the slash is crossed to indicate the response team has exited the premises. Orange spray paint or crayon is used to differentiate the USAR marking system from random markings and, subsequently, is dependent on responders carrying paint or crayons on their person. Marking practices serve several functions for performing response. First, marking is a system of abbreviated symbols for efficient communication in the field understood through training. Second, marking enables responders to communicate void of communications technologies. Third, marking enhances reliability by identifying risks for other responders to navigate safely through hazards. Finally, marking becomes an organizational text for decentralized tracking of response activity in search and rescue grids.

Third, while signaling and marking are decentralized communicative practices that facilitate reliability in the field with limited communication between responders, USAR primarily aims to centralize information sharing. Tracking equipment allocation through barcodes, moving sticky notes representing response teams on a Gulf Coast map, and monitoring response team needs via radio or satellite phones are illustrative of centralizing practices. In particular, USAR has established a coordination center at their headquarters as the nexus of information sharing:

> What the coordination center does is information triage. We are in contact with everybody in the field that we need to contact. We triage the information and then we turn around and send it back out. And what it does, it allows one central point for communication. If somebody needs to know, say in Orange County, where the task force is currently working, often times it is easier for them to contact us to get that information versus trying to work from Galveston Island. (Cameron).

For USAR the coordination center stemmed from the response to Katrina with a makeshift space and grew into a space designed to keep foot traffic flow out and minimize interruptions as coordination center employees focused on tracking, mapping, recording, and communicating. The coordination center features a wall-sized map of the Gulf Coast region, to which sticky notes and pushpins mark emergency response activity and locations. As a site embodiment of centralizing practices, the coordination center demonstrates how space arrangement, communications technologies and objects (i.e. map with sticky notes) intertwine in the fabric of communicative activity.

Fourth, resourcing communication entails hot wash and After Action Report (AAR) practices in the production, reproduction, and transformation of search and rescue practices. In other words, hot washes and AARs are codifying and scripting response practices. Codification emphasizes communication between responders as they negotiate what constitutes reliability and how to achieve it given the complexities of body, site, and objects. Codification, therefore, explains how improvisational practices

become scripted. The overall objective of hot washes and AARs is to enhance reliable performances.

> So, you know the after action process is a way for us to satisfy the need to perform at exceptionally high levels and to understand that that high jump bar is very high but it continues to get higher and how do we improve. And the only way that we improve is to learn from either mistakes or opportunities and apply those for future lessons (Chad).

To achieve process and outcome reliability through response practices, responders negotiate a collective record of three positives and three negatives related to performing response. Hot washes are informal reporting processes that resemble a similar format as AARs but take place in the field with smaller groups of responders. Derrick clarifies what constitutes a hot wash versus an AAR:

> From a quick perspective, you know the hot wash is just that, it is done very quickly, very spontaneously, and it is what is most permanent on your mind, so I think you would get a lot of fresh thoughts on the incident. I also see that potentially you might have people who are in a hurry to leave and they just don't give you much input at all [in the After Action Report]. So I can see where it could be advantageous that you put a lot into it. I think the best information would be from the hot wash. That the after action report gives people time to actually sit down and bounce ideas off of each other and having that open discussion. It also allows other people to see different perspectives. Where the

> hot wash is not necessarily done with the entire group, the hot wash is the individual group and the field teams (Derrick).

Hot washes are the "quick down and dirty" assessment processes used by teams such as a medical team in the field. On the other hand, AARs include USAR as a whole and reconstruct a big picture perspective either after a training event or following a deployment. Hot washes and AAR's reflect on the complexities of body, site, and objects in co-constructing reliable practices, but they also may be affected by material constraints. Carl notes how responder bodies constrain the AAR process:

> We try to do a good job and capture those things but usually at the end of deployment everybody is tired and wants to go home. They miss their families (Carl).

In sum, both hot washes and AARs are recorded and result in formalized documentation for organizational learning and the codification of practices. AAR's and hot washes are conversational practices that solidify a shared social reality. When AAR's and hot washes result in rigid or ineffective practices, improvisation in training exercises and fieldwork reconstruct the shared social reality to reconstitute reliability. When fieldwork (re)produces or transforms a practice, AARs and hot washes codify the practice so that the most reliable practice is integrated into organizational training and performing. Consider Nathan's example:

> The buddy system is a good example. I think a lot that happens on the day-to-day response is so effective that it becomes practice. You know the after action opportunities allow you to look back… (Nathan).

Codifying practices are valuable communicative activities that demonstrate how USAR is "rewriting manuals" and "improving upon [their] mistakes or [their] shortfalls" (Nathan). Because hot washes and AARs both use a best practices format, these communal activities are reflexive opportunities to question the reliability of response practices, reproduce practices perceived as reliable, transform practices to enhance reliability, and validate emerging practices as reliability seeking or producing. Or as Derrick puts it, responders decide what "to keep, fix, or throw away."

Summative Remarks on Performing Responses

Performing response illustrates the role training plays in priming responders' bodies with embodied practices to enact searching sites, rescuing bodies, and resourcing communication. To ensure that improvisational practices that enhance responder reliability become scripted and integrated back into training, USAR employs codification practices. Teasing out the BSO interrelationships, site is privileged when disaster type and the environment are highly unpredictable and risky; whereas, body and object are privileged when embodied knowledge or tools and technology empower responders to assert control over the site. This is evidenced in collapsed structure when USAR uses tools to construct shores and lifts to reach victims and in swift water when USAR uses combat swimming to intercept a victim. The pressures, constraints, and risks presented through interaction with the site yield improvisation in search and rescue practices that are, in turn, codified into scripts during hot washes and AARs.

Training bodies, searching sites, rescuing bodies, and resourcing communication further highlight the collective accomplishment of reliability. Emergency responders

learn to perform response through a nexus of sociomaterial interactivity. Training positions responders to interact with one another, instructors, and organizational manuals in classroom-type learning environments and to interact with one another, instructors, and BSO in simulated disaster sites. Thus, training in disaster-specific simulations where risk is real and material interrelationships are negotiated enables experiencing and navigating the forces of the site together; thus, practices and social and material realities cohere. Next, searching sites positions responders to interact with one another, victims, victim locating devices, and sites. Close observations of these practices demonstrate how social and material components are indivisible. Yet, without real consideration of how bodies are being impacted by environmental and physiological constraints and how technologies are often central to the accomplishment of searching sites, these organizational practices may be reduced to conversation.

Third, rescuing bodies positions responders to interact with one another, victims, tools, technologies, gear, and sites. As with searching sites, this section portrays a more robust inclination of practices that supports how negotiating BSO interplay is central to organizing in high-risk environments. Lastly, resourcing communication positions responders to share information in centralized and decentralized practices and codify practices through interpersonal and small group communication. Inevitably, responders negotiate reliable performances because social interactivity is the means by which embodied knowledge is learned, experiences with natural forces are described and considered, practices are selected and employed, and reliability is assessed.

The following chapters have employed a constant comparative approach (Charmaz, 2000, 2005, 2006) with an ethnographic privileging to develop a thick description (Geertz, 1973) of how material interrelationships are central to the performance and production of highly reliable organizing practices. In doing so, both chapters provide a descriptive basis by which to consider implications of material interrelationships within the discussion of communication and materiality. In the following chapter, these implications will be examined and will then be used to decenter mind in the extant HRO literature.

CHAPTER VI

IMPLICATIONS

Integration and Implications for CCO and HRO

Findings in interview, fieldwork, and organizational document data revealed through thick description (Geertz, 1973) a number of persistent themes. These themes pivot on how a "multiplicity of forces" entangle with one another and how they "participate" in the communicative enactment of search and rescue practices (Putnam & McPhee, 2009, p. 203). This chapter will thread together key lessons learned about the entanglement and participation of bodies, sites, and objects in the construction of highly reliable organizing processes. The focal point of this chapter centers on the study of body, sites, *and* objects rather than isolating particular material manifestations. Interplay of bodies, sites, and objects demonstrates complex interactions that affect each other and "alter the nature of organizing in unpredictable and nonlinear ways" (Putnam & McPhee, 2009, p. 203). This chapter will integrate key findings from Chapters IV and V into a theoretical discussion that will draw new insights into 1) Communication Constitution of Organizing and 2) High Reliability Organizing literature.

Transforming Traditional CCO

> RQ 3: In extending constitutive entanglement to include the interplay of bodies, sites, and objects, how might this transform traditional CCO literature?

Taylor (2009a) argues that organizational communication theory centers on two fundamental questions: "(1) what communicators do *with* language, and (2) what language does in, and to, communication" (p. 157). Such questions situate language as the medium of collective action and emphasize ideation over material. The underlying argument of this study is to reconstitute the two questions posed by Taylor (2009a) by confronting linguistic primacy and demonstrating communication as a sociomaterial phenomenon that is the constitutive entanglement (Olikowski, 2007) of discursivity and materiality. What are the implications for foregrounding materiality in organizational communication theory? Or another way to think about it is to reword Taylor's questions: (1) what do communicators do *with* material relationships, and (2) what do language, bodies, sites, and objects do in, and to, communication? To flesh out answers to the questions posed, the need exists for a model of communication that adequately accounts for BSO interplay.

The next major section and sub-sections explain the following key contributions to traditional CCO theorizing and research: 1) the triadic CCO model (coorientation) is extended to account for the complexities of body, site, *and* object interplay; 2) BSO interplay casts natural forces as authoritative, especially in relation to site and body; 3) site exigencies construct improvisational needs that scale up; 4) improvisation coupled with codification practices show how BSO interplay enables scaling up; 5) communities of practice, the imbricating of sociomaterial interplay in joint activity, constitutes the body *as* the site; 6) communities of practice illustrate the role of authority in BSO interplay. The final discussion of BSO interplay in the communicative constitution of

organizing section re-inserts language into exploring communication and BSO interplay. The final re-insertion of language will bring into focus the contributions of foregrounding materiality, centering BSO interplay, and exploring the constitutive space in between.

Ecological Coherence

The text-conversation approach to CCO advanced by Taylor (2009a,b) aptly exemplifies the interaction of two actants in joint activity yet insufficiently accounts for the interplay of materiality in the triadic model of coorientation. While an actant may be an object like a reminder note, the model does not provide the framework to account for interaction between multiple material arrangements. As an outgrowth of coorientation, a quadric model of *ecological coherence* is proposed. In Chapter II, Newcomb's (1953) triadic model of communication was discussed as theoretical grounding for Taylor's (2006, 2009a,b) coorientation. Coorientation is an imbricating, episodic, view of the interaction of a minimum of two actants (A and B) with an object (X), which is a shared activity or focus. Remaining fixed on ideation, Taylor specifies language as a resource and agent that capacitates coorientation. Thus, methods used to study coorientation remain positioned on language (text or conversation). The data present set argues something altogether different.

In each of the segments of data analysis as human actants perform practices, the triadic coorientation model incompletely accounts for the complexities of organizing in high-risk environments. Coorientation relegates Ashcraft, Kuhn and Cooren's (2009) body, site, and objects as symbolic or excludes them in the premise. Consideration of

how bodies, sites, and objects relate with one another and how those relationships are intertwined with social processes is lacking. A quadric model that identifies human actants as *embodied becomings* interacting within material interplay will give voice to the silenced material interplay. As illustrated in Figure 1, the quadric model encompasses two embodied actants (B_1, B_2), site (S_n) and objects (O_n) with interconnections represented by the outline of a square and crossing diagonals.

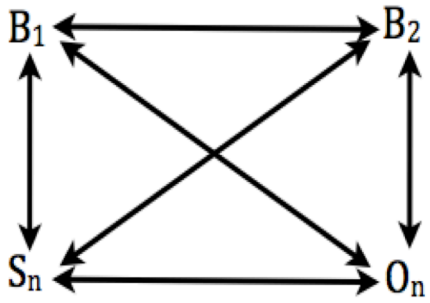

Figure 1: Ecological Coherence Model

To illustrate how the Quadric CCO Model works, reconsider Chad's story from Chapter IV Enacting Safety. Chad and his co-instructor represent B_1 and B_2 simulating extrication from a strainer, a swift water obstacle that permits water circulation but prohibits larger objects such as rescue swimmers from passing. The strainer, in particular, in combination with the river, more generally, represent a natural site, S_n. Rescue swimming gear worn by swift water rescue swimmers is represented as objects, O_n. The co-instructor (B_2) utilizes the wet suit (O_n) to insulate and protect his body from the strainer (S_n) and swim fins and goggles (O_n) to navigate more efficiently through S_n.

The crossing diagonals that interconnect B_1-B_2-S_n-O_n represent the shared activity or focus, which in this illustration is training swift water rescue practices. However, B_2 becomes trapped in the strainer during the simulation, which demonstrates the unpredictability and risk-inherency of a fluid site (S_n). Chad (B_1) has a "gut feeling," an interpretation bound to personal experience and practicality, that the simulation has transformed into a real rescue scenario by observing the S_n and B_2's reaction in and to S_n. The interplay of B_1-B_2-S_n-O_n in swift water training 1) co-construct a transformation of meaning of the simulation into an emergency and 2) constitutes the impetus to enact self-rescue swimming practices of B_2 and rescue swimming practices of Chad (B_1) to intervene.

As these material components interact, they are simultaneously in and creating ecology where bodies, sites, and objects are not devoid of their symbolic other, but they are equally not devoid of their physical nature. Intertwined, the ideational and material are in dialogue. *Ecological coherence*, then, is the constitutive space in which ideation and materiality intertwine with one another to become an embodiment of individual and collective activity. Consequentially, the complex relationships diversify epistemologies (ways of knowing: i.e., observation or interpretation) and ontologies (the nature of being: i.e., material, discursive, and cognitive realities) to unite, cohere. Thus, *ecological coherence* is a model of recursive relationships that entangles ontologies making, a multiplicity of voices (BSO) unite to form meaning. Rogers (1998) argues,

> Considering ontology as a conversational partner and the relationship between the ideational and the material as a dialogue – a relationship that has been hostile,

> hierarchical, confrontational – is radical, gives "the real"/ "woman"/ "nature" a voice of sorts. (p. 255)

By decentering (Derrida, 1976) the ideational, the material becomes "seen" and given voice. Reconsider Chad's story once more. A focus on storytelling rather than on materiality might overlook the material complexities that co-constituted the transformation of meaning and change in practices. But, the story is clearly functioning to warn trainees about the dangers of the site and to assert his authority as an instructor with specialized embodied knowledge (i.e. "gut" level instincts). Nevertheless, attending to only ideation would fail to recognize the complex BSO interplay in which Chad's embodied experience is situated. A post-dualistic practice perspective provides the researcher an entry point by which to capture sociomaterial relationships, as practices are "materially mediated nexuses of activity" (Schatzki, 2001, p.11). Therefore, gaining the material provides a lens by which to examine *ecological coherence* as a model of the communicative constitution of organizing.

Importantly, this empirical study examines the state of disaster response in urban search and rescue "in such a way that non-preexistent concepts can be extracted from them" by examining multiplicities grounded in the inseparable relations between all that is social and natural (Rogers, 1998, p. 264; Deleuze and Parnet, vii). Building on dialogic relationships between common binaries promotes the "recursive, interdependent, and fluid" (Rogers, 1998, p. 268). This research specifically sets the ideation-materiality and discourse-materiality on tilt by exploring what it would mean

for CCO to focus on 1) the interplay of bodies, sites, and objects, and then, 2) by reinserting language into the conversation.

Grounding *Ecological Coherence* as a CCO Model

Practices are a constitutive entanglement (Olikowski, 2007) of social and material interrelationships. The multiplicity of forces (Putnam and McPhee, 2009) represented in BSO interplay precludes casting materiality as a sign. Cooren (2006b) argues for a plenum of agencies, thus reconceiving non-human forces as capable of agency, but often the notion of including non-human agents is not extended sufficiently. Agency remains situated in the representations of the material. However, as a construct, a plenum of agencies (Cooren, 2006b) provides a framework to extend what is categorized as having agency in the performance of scripted and improvisational practices within dynamic sites where multiple nonhuman agents relate to one another. Under such an umbrella, body, site, *and* object become agents in the enactment of safety and performance of responses. The following section focuses on 1) the role of natural and embodied authority, 2) improvisation to scale up, 3) body *as* site in CoP, 4) the role of authority in CoP, and 5) language *and* BSO interplay.

Natural and embodied authority. BSO interplay casts natural forces as authoritative, especially in relation to body and site. Given the BSO interplay studied in Chapters IV and V, site and body are repetitively fore grounded as responders maneuver physical bodies in rescue swimming to navigate through changing currents or as responders shift between embodied practices and tools to search flooded and/or

collapsed structures for trapped victims. First, USAR-A's site accentuates the roles physical forces play in shaping activity. As Rogers (1998) asserts,

> Understanding humans' immersion and participation in natural systems necessitates dismantling boundaries that exclude "nature" from communicative and other social processes. (p. 247)

Natural forces are consistently ignored in much of communication research and often neglected in materiality research. However, this study demonstrates how ignoring these forces silences their influence in organizing and reduces natural forces to ideation, either discourse or cognition. Nevertheless, natural conditions enable and constrain organizational life in situ. Furthermore, they provide a way to examine organizing in environments in perpetual flux and, subsequently, demand that their organizational members improvise to collectively accomplish activity.

Rogers (1998) refers to this phenomenon as transhuman dialogue, in which nature is regarded as a participant in dialogue. Transhuman dialogue deconstructs the ideation-material binary. Looking for "models of dialogue that offer guidance in walking the line between the reification of nature inherent in objectivism and the possession implicated in humanism" (Rogers, 1998, p. 263), *ecological coherence* argues that nature has authority (Taylor, 2009b). For example, tide surges that cause a rise and fall of floodwaters following a hurricane are entangled with the type of extraction practices that can be to safely implemented and, subsequently, the type of objects enable responder bodies (i.e. ropes, boat, helicopter, and/or vehicular). The changing readings in water level become integral to the negotiation of joint activity and

navigating risks. The fluctuations complicate organizational practices like assessing risk and naming acceptability. As site conditions shift, so must assessments and labels if sites are to be navigated safely.

Similarly, Michelle Sawyer's (2004) work on nonverbal communication with the natural world positions humans in co-participation with natural phenomena. The cooperative relationship between humans and the organic site and animals is cultivated and contingent on "being in it" [natural world] (p. 237). As Sawyer describes, immersion in the natural world sensitizes us into the "rhythms of nature" (p. 241), which echoes USAR-A's mantra that experience is the best teacher. Afterall, both training and feeling danger hinge on body-site interplay that cultivates embodied experiences and know-how. Site immersion is not aimed at developing causal and predictive explanations for the natural world, but instead, this immersion is a multisensory appreciation for and interaction with nature. This type of cooperative relationship between responders and the site is imaged in the term "navigation." Navigation acknowledges that to safely maneuver through a site, the site may need to be transformed (i.e. lifting and shoring to extract a victim). But, navigation also acknowledges practices in which the responders use their bodies to work with the site and its fluctuations they must maneuver (i.e. hasty collapsed structure searches and combat swimming). From this cooperative image, the natural world is a trainer of sorts. Immersion in the natural environment, secondly, trains USAR-A's bodies to interact with, react to, improvise because of, and learn from these forces. Transhuman dialogue (Rogers, 1998) and nonverbal communication with the natural world (Sawyer, 2004)

envisage the B_1-B_2-S_n-O_n interactions that co-construct meaning, especially in regard to the natural changes of site during emergency response.

Improvisation. Much was learned about improvisational performance from USAR-A, in particular how site exigencies shape practice needs and scale up. Improvisation illumines a complex Site-Body-Tool interplay. When situational exigencies exceed the scope of planning and scripted practices, responders must react to adjust and adopt reliable practices. For instance, USAR-A's training teaches, shows, and applies a variety of search and rescue practices relevant to natural disasters. But what happens if USAR-A travels to a staging location to wait for a hurricane to pass and the hurricane shifts direction, making them victims? In these situations, USAR-A uses embodied skills and capabilities and improvises with tools to restore reliability and fit the situational needs.

Furthermore, improvisational practices exhibit dynamic, pre-utterance qualities that further afford a construction of organizing not overly dependent upon language (Shotter, 2009). To clarify, improvisation is not solely contingent on language to discuss, name, and negotiate a practice prior to use, albeit this happens frequently. The pre-utterance properties of some improvisational practices are lived out (Barge & Fairhurst, 2008) in adoption and adjustment of practices to fulfill the contextual demands presented in the site. Intuition or a "gut" feeling may prompt an adjustment mid-action of a practice to fit situational needs. This adjustment may never be explained or discussed, or the adjustment may be explained and discussed to the end that it becomes a scripted practice.

Improvisational practices are constructed through embodied performances that break through challenges posed by material interplay. Conquergood (2000a, 2000b) argues that performances of embodied practices are constitutive of embodied experience. Simply, it is through performing response that embodied experience is expanded and through dialogically responsive listening (Shotter, 2009; Conquergood, 1982) that creativity is enabled (Madison, 2005). As "determining surroundings" (Shotter, 2009, p. 40) are shared with responders, new insights are developed as a dialogue within and with material interplay ensues. In a swift water training exercise the members of my training team were required to flip a pontoon boat we were safely navigating in through swift water. We were challenged to secure other responders, flip the boat right side up, and reenter the boat. All the while, we were moving rapidly through the current. In the frigid moving water, members worked together to maneuver the boat into the correct position for us to assist each other out of the water. None of the members were trained in swift water prior to this exercise. In a matter of moments, we flipped the boat upright and exited the water to its safe confines. Few words were said. As members grabbed each other and maneuvered the boat, we all started helping - coordinating. The site, swift water, posed a challenged for our bodies and the boat. Members used active, dialogically responsive listening to notice improvisational practices that worked in situ. As bodies, sites, and objects interrelated, to construct a creative solution. To adapt activity based on material interplay is to embody understanding of practices that work in "determining surroundings" (Shotter, 2009, p. 40). What is learned from USAR-A's improvisational practices is a process by which body, sites, and objects entangle in unpredictable ways to

adjust and adopt practices that constitute reliability. Improvisation is the possibility of organizing, in that material interplay generates new ways of "doing" to scale up to new practices. The next section teases out how scaling up plays out.

Sociomaterial practices (Olikowski, 2007) scale up through improvisation and imbricate through scripts. Improvisational practices illustrate productivity, especially in regard to the site constraints and dynamics that generate the need for adoption and adjustment of practices. Consider the portable shower unit described in Chapter IV. The lack of access to personal hygiene for responder bodies and exposure to risks in the site (S_n) prompted a USAR-A member (B_1) to request another responder (B_2) build a makeshift shower unit (O_n). Made of PVC pipes, garden hose, and tarp, the improvised shower unit materials became standard objects for logistics to log and pack in deployments. Scripted practices illustrate imbrication as they layer upon one another and become shared in a wider community of practice (Taylor, 2009a). How to construct a makeshift shower unit became a scripted practice for USAR-A, performed at various disaster sites by various response teams, and shared in the greater response community as a best practice. Improvisation produced the practice, and codification of the practice facilitated the repeated use of the practice by other B_1-B_2-S_n-O_n quadrics. The codification of practices in after action reports (AAR) and hotwashes demonstrates the relationship between improvisation and scripted practices scaling up and implicates the constitution of a community of practice. Hot washes are situated communicative practices that facilitate problem solving and reflexivity (Barge, 2004) while responders are acting. As the responders assess the degree of reliability or "success," they are in a

sense preparing for the AAR to follow the mission. The AAR is a more formalized communicative practice that materializes the best practices into scripts. The recursive process pictured in improvisation becoming codified into scripted practice and subjected to further adjustment in situ is generative of organizing processes and the organization (Fairhurst & Putnam, 2004).

Communities of practice: body *as* site. Communal and embodied experiences function as communities of practice (CoP) (Wenger, 1998; Iverson & McPhee, 2002; Kuhn 2002). To clarify, a community of practice is comprised of a group of interdependent people that focus on a joint activity and share a patterned set of practices in order to act (Wenger, 1998). CCO literature discusses CoPs in terms of the four flows (Iverson & McPhee, 2002) and in terms of coorientation. Coorientation's discussion of CoPs is primarily to illustrate the imbrications of practices across space and time to constitute a community of practices and to illustrate how organizational identity emerges. Specifically, USAR-A, as a community of practice, positions body *as* site. Training practices emphasize the body *as* the site of know-how, experience, skill, intuition, sensing, and activity. Training illustrates the process of learning and performing practices shared by the USAR CoP as a collective body. Training positions responders' bodies in simulated risky sites and instructs them in search and rescue practices while they simultaneously perform the practices. Responders engage in joint activity as they interrelate with BSOs to accomplish search and rescue missions simulated in training. Because responders are learning and performing similar scripted practices in relation to searching sites and rescuing bodies, a community of practice

emerges over time and becomes an actant in the communicative constitution of organizing, signified as a B_1 or B_2 in the *ecological coherence* model.

The community is both a context for understanding the ongoing codification of scripted practices as well as the outcome of practices (Taylor, 2009a). Training evidences that BSO interplay has cohered in joint activity and developed a common set of practices by which to engage in the joint activity. Yet, after a responder is trained in the shared practices of a CoP, USAR requires continued yearly training. The *ecological coherence* model illustrates the need for continuous training. The dynamic disaster sites coupled with codification of new practices warrant training that simulates the diversity of site characteristics and permeations that responders may encounter. Ongoing training provides responders with in situ experience wielding tools and performing practices. Therefore, despite the designation of a CoP as an organizational entity by organizational members, which is an act of closure, the CoP remains in a perpetual state of becoming and, as such, requires its membership to evolve in practice procurement and implementation.

At one level, communities of practice develop around a specialized activity such as medical triage or canine handling and at a more general level, emergency response. Cross-training of USAR-A members demonstrates a recognition of the CoPs that comprise search and rescue and the efforts to have responders engaged in inter-community coorientation. Inter-community coorientation is defined as the "bridging of inter-related communities of activity and sensemaking" (Taylor, 2009a, p. 156). Bridging communities, responders' bodies are diversified with a wider range of skills,

activities, and site exposure. Consider how bridging impacts individual and collective bodies (i.e. search team CoP). When a safety officer, who primarily deploys on search teams, is cross-trained in medical triage, the safety officer bridges the specialized CoPs that make up the search and rescue community. The safety officer (B_1) trains with a medical triage CoP (B_2) by rehearsing the practices (which involve the use of objects like bandages, needles, and blood pressure cuffs) associated with medical care that will manifest in disaster sites (S_1). The safety officer develops a different set of embodied experiences and exposes his or her body to a different set of site forces. As noted earlier, USAR-A members appreciate the benefits of bridging, that is appreciate of alternative practices and USAR roles and the resultant increased flexibility in response team composition. Bridging is a process that produces organization by interacting with the organization, talking about the organization, and structuring activities in subjugation to the organizational identity, which is a means of closure. Therefore, cross-training becomes a sign of closure of organization but also a sign that the organization is in a continual state of becoming because training exposes USAR to newly codified practices.

Communities of practice and authority. Authority in a CoP emerges and shifts in a dynamic entanglement of BSO relationships. Applying *ecological coherence* to CoPs provides an explanation as to how actants and specialized communities within USAR-A influence the adoption, adjustment and (re)production of practices and how material interplay influence this process. How do B_1-B_2-S_n-O_n interactions become recursive, thus cohering one to another, to generate a community of actants who share the repertoire of practices? When considering a CoP through the building blocks of

ecological coherence, the role of authority emerges. Authority situates B_1 in hierarchical, or power differential, relationship to B_2 or vice versa (Taylor, 2009a). As B_1 and B_2 interact with material manifestations in joint activity, power is influenced by the CoP, inter-community relationships, and ecological cohering. For example, in collapse structure training, the instructor (B_1) introduced a set of practices related to a shared activity by telling the trainees (B_2) that, "There is more than one way to do this, but this is the way we are going to do it in training." The instructor's (B_1) power emanates from his position in the CoP as an authority on collapse structure, from the, CoPs process of codification that shapes training, from the recognition of USAR-A by inter-community coherence as having authority to train (i.e. FEMA recommending USAR-A to other emergency responders for training), and from trainees' need to learn the practices to accomplish the shared activity in simulations. The instructor, as an authority, plays a vital role in the reproduction of search and rescue practices that afford recursivity.

Moreover, BSO interplay exhibits authority in the CoP. Reconsider swift water rescue training. The first educational component of this training is to learn hydrology. Instruction highlights the complexities of water with full endorsement to conduct shore-based rescue if possible. Yet, training positions responders in the water to develop embodied know-how of swimming practices, tethering, boat handling, and self-rescue. The fast-moving water has authority in practice selection and performance. For example, even if I know the scripted practice for flipping a boat, the performance of boat flipping is shaped by the site in which the boat is being flipped.

With that said, Taylor's (2009a) discussion of authority in a CoP also explains power shifts. *Ecological coherence* provides a model that can account for the influence material and social forces play in shifting authority. Know-how associated with tools intrinsic to the performance of a practice can shift authority from a B_1 to B_2. Experience with site risks, such as hazardous materials, can shift authority from a B_1 to B_2 as a HAZMAT specialist becomes the authority in practice selection and implementation over the rest of the search and rescue team. Overall, experienced bodies, site exigencies, and relevant tools co-construct authority in CoP interactions.

RQ 4: How do the interplay of bodies, sites, and objects relate to language and meaning?

Language and BSO interplay. By decentering language in the analysis of BSO interplay, the goal was to place material as figure to tease out how various material manifestations cohere in action. The goal was not to erase USAR-A's symbols systems, vernacular, or other language forms from the study or to assert that they are unnecessary in the examination of CCO. Language is featured in joint risk assessment, naming risk, plotting action, expressing emotion, training, codifying improvisational practices, and reflexive acting (i.e. hot washes), to name a few. As a caveat, it is assumed that language can but does not have to play a significant part in cohering. In other words, if only language is considered in research, the constitutive contribution forged from BSO interplay is dropped. The role of language is already evidenced in such practices as marking where the symbol system is used to represent a message, warn responders, and transform the site. This is also alluded to in practices like hot washes and after action

reporting that are primarily linguistic in how they reflexively assess activity. However, this final section on CCO and BSO interplay demonstrates how language 1) is shaped by embodied action and reflects back on embodied action and 2) evidences coherence.

First, there is a reflexive relationship between language and embodied action as the two shape and reflect back on one another. To illustrate how language is shaped by embodied action, consider the phrase, "Semper Gumby." Melding together the Latin word "Semper" with the popular culture reference "Gumby" (the Claymation figure known for flexibility), responders call one another to be "ever flexible." Reliable bodies are Gumby-like. The language evokes a sense of flexibility in terms of body (i.e. contort one's body to position effectively in a confined space or moving water) and improvisation (i.e. be willing to adjust and adopt practices to fit situational needs). Such a phrase is made relevant in the BSO interplay that necessitates improvisation. Site forces that exceed the scope of scripted practices reify "Semper Gumby." "Semper Gumby" is also vernacular that helps responders reflect back on embodied action and give it a certain quality - improvisation in this example.

"Safety first" and "responder first" also demonstrate this reflexive relationship. The vernacular refers to a group of practices that emphasize navigating risk by actively engaging bodies with sites, yet prioritizing safety. The language embodies the activities associated with it and point responders to a set of activities. As a trainer walks through a simulated site, he or she yells, "Safety first." The language initiates bodily action – heightened senses, attentiveness to details, tugging on a mask or whistle to ensure it is there, and buddy monitoring, to name a few. "Safety first" and "responder first" also

becomes a way to reflect on completed activity and describe how practices were reliably accomplished. Organizational sayings are shaped by embodied action and, in turn, reflect back on action.

Additionally, language evidences ecological cohering. If the cohering of bodies, sites, and objects occurs in the performance of joint activity, language is one way to see this process. Consider naming. Naming is a practice that involves labeling a risk acceptable, unacceptable, or calculated/manageable. To name is to use language to negotiate a shared label for risk. The practice of naming and the outcome of a label are evidence that responders have used embodied site experiences, centralized information, senses, intuition, and feeling to assess and monitor site. Naming presupposes BSO interplay, and BSO interplay, thus, shapes the naming practice. To further see how language demonstrates coherence, consider a hot wash. Hot washes are in situ or in-action reflection on the joint activity and practices needed or used to accomplish it. The site impacts the hot wash by contextualizing the practice. Responder bodies must navigate site risks and perform hot washes simultaneously. Because hot washes are documented on paper, these situated, reflexive discussions materialize and are re-negotiated in the after action reporting practice. The hot wash simultaneously demonstrates BSO interplay and language that has cohered in action and that is cohering in the hot wash. The record of the hot wash evidences coherence. In sum, focusing on BSO interplay permits research to tease out body, sites, and objects, but reinserting language into the analysis further clarifies how BSO interplay and language cohere,

reflect back on one another, and evidence coherence. Next, attention will shift from what BSO interplay does to extend CCO research to examine what HRO research learns.

Implications for HRO

RQ 1: How does communication offer the potential to decenter the mind in HRO?

Collective mind (Weick & Roberts, 1993) research places ideation as figure by focusing on mind, cognition, within social interaction. In this section, we see that decentering (Derrida, 1976) mind engenders a more complex reading of high reliability practices within USAR-A. In doing so, new insights into the complex operations of organizing within high-risk environments shifts to privileging BSO interplay. As a result, a more action-oriented, practice-based approach establishes the priority of bodies in search and rescue practices. For example, responders overcome site constraints to enact safety and perform response. When site constrains reliability, responders use their bodies and tools as extensions of their bodies to restore response capability. At times, transforming the site, as in the case of breaching, breaking, shoring, and lifting in order to maneuver through the site safely, restores reliability. At other times, reliability is restored by removing the responder from the site constraints, as in the case of helicopter rescues and thermal imaging searches. Site transformation is dependent upon tools, which exhibits a body-site-object interpenetration.

Making the shift from collective mind to collective body is a linguistic shift. The lexicon associated with collective mind retains a cognitive focus antithetical to the situated activity focus assumed in this study. Furthermore, making the shift from

collective mind to collective body more aptly images the BSO interplay and body *as* site. Thus, *ecological coherence* provides a means to decenter mind and notice the "multiplicity of forces" (Putnam & McPhee, 2009, p. 203).

Managing the Unexpected (Weick & Sutcliffe, 2001; 2007) categorizes collective mind into two categories: anticipatory and containment processes. While privileging collective mind by focusing on collective sensemaking capabilities, these two categories can be recast as sets of sociomaterial practices that aid in the construction and maintenance of reliability. Appendix C: Soicomaterial Practices in HROs delineates the classification of sociomaterial practices from Chapters IV and V in terms of anticipatory or containment and in regard to how B_1-B_2-S_n-O_n interact. Additionally, analysis of enacting safety and performing response illustrates the permeability of Weick and Sutcliffe's (2001; 2007) anticipatory and containment categorization (see Appendix C: Sociomaterial Practices in HROs).

Extending Anticipatory Processes

Anticipatory processes include subsets of collective mind processes that describe high reliability by focusing on error, complexity, and awareness (Weick and Sutcliffe, 2007). This study argues that anticipation is more than a mindful process; instead, it is an embodied set of practices that are both individually and collectively constituted through organizational discourse (i.e. in management expectations and training manuals) and, even more so, through the interaction within material interrelationships in simulated training and deployment experiences. Training and deployment are the primary ways in which USAR-A members gain experience with ideational and material

interrelationships. Training simulates the types of disaster sites to which USAR-A has responded in the past as well as possible future responses (i.e. bombing resultant in a structural collapse or fast moving water from an overflowing dam) and emulates conditions under which disaster response is likely (i.e. 12-14 hours per day of training for 5 consecutive days). Embodied experience enables responders to "stop things" before they happen (Chad), which is enacting safety: navigating risk, feeling danger, protecting self, and protecting responders.

The following sections examine the three mindful processes of anticipation by folding them into USAR-A's sociomaterial practices and argues that the classification system of anticipation is steeped in cognitive language and assumptions that inadequately account for a post-dualistic practice-based approach. While collective minding, in terms of shared ways of thinking and understanding, are evidenced, the interplay of bodies, sites, and objects are fundamental to the enactment of safety and performance of response.

Enacting Safety in Conversation with Anticipatory Mind-Centered Processes

Extending preoccupation with error as enacting safety practices. Rather than honing in on and celebrating successes, Weick et al. (1999) and Weick and Sutcliffe (2007) have observed HROs honing in on and reporting errors. Preoccupation with error is evident in USAR-A's enactment of safety as organizational members regardless of official roles on the response team become a safety officer. The "responder first" culture disperses the activities of the safety officer to all team members while retaining a single responder who has no other response duties other than that of the safety officer

position. While the designated safety officer, or lookout as it is sometimes termed, refrains from search and rescue practices to maintain a birds-eye view, all responders engage in monitoring sites for hazards and operations for error. The act of monitoring presupposes that responders will forestall threats to safety. The buddy system is an informal means of protecting other responders from emergent threats and ensuring that your "buddy" is performing response at the highest level of reliability. Through the buddy system and safety officer role dispersion, USAR-A members demonstrate responsibility for one another's safety and reliable performance amidst hazardous site conditions. These sociomaterial practices depend upon responders feeling danger, navigating through risks, and protecting self and one another by taking countermeasures and implementing practices to circumvent an incident within an incident.

Extending reluctance to simplify as enacting safety practices. The reluctance to simplify is evidenced in highly reliable organizing through practice complexity matching context complexity. The heterogeneity of experiences and practice know-how contributes to a more nuanced set of expectations and how to approach search and rescue. USAR-A utilizes training and cross-training to advance a diversity of practices and facilitate an approach to practice selection that encompasses the components of the *ecological coherence* model – bodies, sites, and objects. For example, in swift water training, instructors and training manuals emphasize how hydrology complicates the approach to water-based rescues. As a force of nature, swift water is fluid and unexpected. Subsequently, responders cannot lapse into the myth that they will be able to accurately read the water; instead, they must learn to approach swift water through its

complexities. Training responders in realistic swift water dynamics, such as creating strainers to navigate around and tethering trainees to one another to swim, accomplish this aim. To create a good fit between practices and material interrelationships, complexity is achieved by "walk[ing] into the situation" and "see[ing] the devastation" first hand (Larry). Immersion in the unexpected dangers of the disaster site prompts a reluctance to simplify.

HROs monitor their expectations by complicating their categories (Weick et al., 1999). Despite its embodied approach to enacting safety, USAR-A also experiences static "categories," as Weick and Sutcliffe (2007) would describe, that influence practice selection regardless of context complexity. Examples include categorizing showers as luxury items and dictating search team size, regardless of search type. Interestingly, USAR-A members recognize the need to match practice complexity with context complexity and, in the case of showers, new practices were negotiated and adopted. HRO theorizing argues that constant interaction (Weick and Sutcliffe, 2007) precludes the development of static, nondescript, or ambiguous categories and, therefore, promotes a reluctance to simplify. From an *ecological coherence* perspective, constant interaction is specified as interaction between responders and material interplay. Therefore, reliability is constructed as bodies interrelate with one another, their environment, and tools. USAR-A's use of teams on deployments and dependence on roles such as safety officers generates continual interaction between responders to enable practice complexity and appropriate fit between practice, activity, and material interrelationships.

Extending sensitivity to operations as enacting safety practices. HROs, specifically USAR-A, exhibit sensitivity to operations in multiple fashions including: heedful attention in routine practices, developing big picture and close up understandings simultaneously, valuing information and accurate estimations of organizational capabilities (Weick and Sutcliffe, 2007). First, by simulating realistic sites and utilizing actual tools during training exercises, USAR-A reconstructs the pressures of deployments in order to prevent responders from engaging in trial and error learning or becoming comfortable in a routine. USAR-A recognizes the dynamics of sites. Recall in Chapter IV when a training instructor became trapped in a strainer. The site demands perpetual scanning and forestalling to navigate through it safely and implement reliable practices.

Second, USAR-A utilizes diverse response teams who are in communication with the emergency operations center to share information about site conditions, track search and rescue teams, and coordinate activity. Furthermore, the phrase, "Everyone is a safety officer," demonstrates the emphasis USAR-A places on big picture and detail orientation. With that said, this type of sensitivity to operations is collectively, not individually, achieved. What this means is best illustrated in a collapse structure training experience. Alongside other members of the search and rescue team, I recall the tunnel vision that emerges while holding and steadying a heavy, pulsating jackhammer. With careful attention to body positioning, muscle fatigue, and debris field, I lost most of my sense of place in the structure I was breaching. I was monitoring and adjusting to the debris, breaching progress, safe equipment handling, and my physical capabilities, but I

was not monitoring the stability of the room, thermal imaging of potential hotspots, or other environmental cues. Yet, I fully trusted that other members of my response team were. Clearly, I did not construct a big picture of the site, but collectively the response team accomplishes big picture, small picture perspectives.

Third, USAR-A values different types of information as it permits responders to complicate their shared perspectives and match practices to the needs of the joint activity. The phrase "triaging information" is used to refer to the integration of information from various response teams and emergency response agencies, which is disseminated back to teams so they can adjust and adopt reliable response practices in situ. Information triaging is ongoing and dispersed. The coordination center, which is used for centralizing and tracking information, integrates BSO interrelationships in its lay out. The design of the coordination center is constructed to decrease foot traffic, and a wall-sized map with pushpins tracks response team searches. The coordination center, then, reflects an intention to limit the flow of bodies through space and use objects to document collective bodies and their activities. Fourth, USAR-A aims at accuracy in estimating organizational capabilities. For example, responders were reluctant to conduct helicopter based rescue during Hurricane Katrina because the training and tacit understandings were not previously developed; whereas, USAR-A was eager to conduct boat-based rescue. Consequently, practices that are not grounded in collective, embodied experiences and institutionalized through training are looked at with suspicion. While together members may perform flexibly in the spirit of "Semper

Gumby," it is done with caution and a deep-seated organizational sensitivity to operations.

Performing Response in Conversation with Anticipatory Mind-Centered Processes

Extending preoccupation with error as performing response. As a mindful process, preoccupation with error is a way of thinking manifest in shared practices that promote organizational learning by communicating about and examining error (Weick and Sutcliffe, 2007). Barge and Fairhurst (2008) claim that, "Concepts such as a preoccupation with failure can serve as tools that simultaneously facilitate diagnosis and description as well as generate subsequent actions to create mindfulness in high reliability organizations" (p. 230). Hot washes and AARs illustrate the dual function of describing and acting on failures or weaknesses.

USAR-A integrates a preoccupation with error through hot washes and after action reporting. The informal hot wash and formal AAR employ reflexive practices to identify collectively agreed upon strengths and weaknesses of the search and rescue response and, in turn, develop a set of best practices to determine future training and deployment practices. Because hot washes transpire spontaneously in the field, the reflexive process has implications for immediate modification of practices and for long-term adoption and adaptation of practices. In her work with an anesthesiology department, Silvia Jordan (2010) labels organizational learning in-action as reflection-in-action. It is through action that embodied experience with BSO interrelationships capacitates reflexivity. Hot washes involve responders engaged in a shared activity communicating about the pros and cons of the practices being used to act while they are

enacting them. A hot wash, then, is a scripted practice that enables responders to question the routine of other scripted practices, select practices they deem most appropriate given the social and material interrelationships, and improvise to enhance reliability in-action. The process and outcome of hot washes are influenced by the site conditions and objects that contextualize these conversations, affect available choices of responders, and impact how safety is enacted and response is performed.

On the other hand, AARs would be more akin to Jordan's (2010) use of the term reflection-of-action and Weick's (1995) idea of retrospective sensemaking because an AAR is conducted at the culmination of a deployment to invoke a formal and documented analysis of the mission. AARs are not conducted in situ but are nonetheless constructed from social and material interpenetrations. To clarify, the duration of an AAR is noted by USAR-A members to directly relate to levels of physical and mental fatigue. Hot washes, as a practice and as an outcome, affect the process and outcome of AARs. As a practice, hot washes mimic the strengths and weaknesses format adopted in the AARs, and as an outcome, the decision making and talk of hot washes recirculates during AARs. The recursive nature of *ecological coherence* is pictured in the relationship between hot washes and AARs – that is, hot washes are embedded in a larger CoP that values and institutionalizes reflexive practices in and after action.

As a point of divergence, USAR-A may be preoccupied with error, but it is equally as accurate to claim that USAR-A is preoccupied with success. These reflexive practices aim to document a relative equal number of strengths and weaknesses. The codification of reliable practices through the production of a set of best practices is better

termed reflexivity. As an analytic category, preoccupation with error narrows the scope of organizational learning to near misses, weakness, and failures, but reflexivity aptly encompasses a broader scope of learning practices that impact reliability. Hot washes and AARs are two practices that simultaneously embrace preoccupations with error and success by focusing on best practices. Preoccupation with error, recast as reflexivity, highlights the role of language in *ecological coherence*. Reflexive organizational practices depend upon the B_1-B_2-S_n-O_n communicating in-action about the social and material interplay and of-action about how this interplay enables and constrains reliability. They communicate how to enhance sociomaterial practices to ensure future reliability.

Extending reluctance to simplify as performing response. Complicating categories may be misperceived in resourcing communication as responders engage in signaling, marking, centralizing, and codifying. Using pre-determined communication signaling practices and marking practices, analysis may view these scripted practices as limiting categories that simplify in a complex site. However, each of these resourcing communication practices involve nuanced, detailed action. Marking, for instance, uses a complex code system to communicate specific HAZMAT conditions. Furthermore, where one resourcing communication practice may be incomplete or insufficient to act reliably, these practices imbricate as response teams in various locales move through sites marking, signaling, and codifying and as different groups of bodies communicate with one another to collectively complicate response practices.

Extending sensitivity to operations as performing response. Awareness of individualized (either as a response team or as a responder) actions in the overall context of the disaster site and emergency operations is collectively accomplished. In particular, searching sites relies on sensitivity to operations. Whether thermal imaging or canine handling is used to initially locate a victim, USAR-A will verify victim locale by conducting a secondary search. Repetition and confirmation serve two functions: 1) to confirm victim locale and health and 2) to enhance risk assessment of site. This multi-level search practice primes response teams with a sensitivity to the site in which the rescue practices will be performed.

There are two summative points argued in relation to anticipation: 1) anticipation as a process is better conceived as a navigating practice and 2) anticipation is action-oriented. First, anticipatory processes, such as preoccupation with error are more accurately conceived as navigational practices. USAR-A builds support for reconsidering the preoccupation with error more generally within reflexive in-action and of-action practices to promote wider scale reliability in organizational performances. HROs are reflexive organizations that consider body, site, and object interplay in the ongoing enactment of safety and performance of response and in retrospect after operations have ceased. Multiple layers of reflexive practices ensure that HROs adapt to fluid, risky sites in ways that promote reliability. However, like other emergency response organizations, the ways in which anticipatory processes are experienced and utilized become muddled and overlapping into containment. The anticipation process becomes a navigating practice through the risky environment by detecting plausible

errors, developing a complex view of disaster sites, and enacting "safety first" in light of the ongoing search and rescue operations.

Second, ethnographic data provides evidence for sociomaterial practices and how they manifest in complex disaster response sites as anticipatory, in the sense of cognition and action. Collective mind couches anticipation in the language of cognition, but anticipation connotes action. The *Oxford American Writer's Thesaurus* (2004) uses the terms "anticipate" and "forestall" interchangeably, and definitions encompass acting prior to another acting, as well as enacting countermeasures. Anticipation includes monitoring risky sites for emerging threats, mapping responder movement, experiencing sites to negotiate risk acceptability, and employing in-action and of-action reflective practices. Anticipation suggests both a collective mindset and collective action in the forestalling of threats to safety and implementing countermeasure practices. By decentering mind with collective body, the embodied experiences that prime responders in training and deployments to navigate, monitor, account, forestall, and secure become central to understanding how anticipation functions in reliable performance.

Extending Containment Processes

Weick and Sutcliffe (2007) argue that HROs "understand that reliable outcomes require the capabilities to *sense* the unexpected in a *stable* manner and yet *deal with* the unexpected in a *variable* manner" (p. 67, italics in the original). Containment encompasses managing unexpected events as they unfold and mitigating risks and negative outcomes. Whereas anticipatory responses are proactive, containment responses are reactive. Commitment to resilience and deference to expertise (or

underspecification of structures) afford HROs the *variability* to *deal with* unexpected events.

Enacting Safety in Conversation with Containment Mind-Centered Processes

Extending commitment to resilience as enacting safety practices. Resilience permits USAR-A the flexibility and creativity to improvise from scripted practice while in-action. Feeling danger overlaps with containment in that feeling danger is used in-action to adopt and adjust practices to mitigate negative outcomes and contain incidents. Improvisation is often linked to the sensory and intuitive cues that responders feel when enacting safety. The need to improvise "can start with a feeling (for example, you have a feeling that something isn't right, but just how right or wrong is a tough call to make)" (Weick and Sutcliffe, 2007, p. 47) and manifest in improvisational performance.

Extending deference to expertise as enacting safety. Despite the traditional hierarchical decision-making flow from top down during day-to-day operations, during a crisis HROs exhibit decision-making migration from bottom to top and top to bottom. The underspecification of structures that emerges in unexpected events is attributed to deference to expertise. Assumed within containment are a set of practices that would protect responders' bodies as they interact with dangerous environments and powerful tools to ensure disaster site containment perpetuates. In Derrick's words, "We can't lose responders and become a part of the incident." Thus, site management and risk mitigation are functions of containment that envelope protecting self and responders as subsets of enacting safety.

To perform such functions, responders must defer to one another's expertise in relation to safety and role. In terms of safety, responders disperse the responsibilities of safety officer to one another while retaining an official safety officer who can halt operations at any time based on reliability threats. In terms of role, responders trust that each is trained and cross-trained to reliably wield tools and navigate through sites. During an incident, site fluctuations may place a particular role in greater authority for a period of time before shifting authority to another role. For example, a HAZMAT specialist may be bestowed greater authority when an earthquake compromises a gas line in an apartment complex. After a technician repairs the gas line, a structural engineer may be bestowed greater authority as the team navigates through the unstable apartment complex to locate and extract victims. Enacting safety demonstrates how protecting self and responder results in changes in leadership based on expertise in relation to BSO interplay.

Performing Response in Conversation with Containment Mind-Centered Processes

The focus of performing response is on the shared activities and specialized practices bound up in searching sites and rescuing bodies during an incident. Because search and rescue practices are performed at either simulated or unfolding emergencies, performing response and containment mutually implicate one another.

Extending commitment to resilience as performing response.

Resilient people think mitigation rather than anticipation. They are attentive to expanding general knowledge, technical facility, and command over resources

> that relieve, lighten, moderate, reduce, and decrease surprise (Weick and Sutcliffe, 2007, p. 69).

The phrase "Semper Gumby" aptly describes the commitment to resilience integrated into USAR-A's organizational values and practices. The emphasis on improvisational practices, that is, ways of doing generated or reconfigured in-action, demonstrates resilience. USAR-A responders are exposed to social and material complexities that enable or constrain the implementation of the expected practice. For example, driving a tractor-trailer with supplies in New Orleans while deployed to Hurricane Katrina, USAR-A members recall rising flood waters causing routes to change and a supply drop-off zone vanishing between deliveries. Adjustments in action helped USAR-A members accomplish the mission but with a different plan and set of practices that more appropriately accounted for BSOs. These adjustments and adoptions were negotiated between responders and, at times, integrated into a hot wash, which is documented for further assessment during an AAR.

Extending deference to expertise as performing response. Deference to expertise empowers HRO members in the hierarchy with the most know-how or knowledge to implement the most reliable practices. For USAR-A, performing response is dependent on search and rescue teams being given latitude or autonomy. USAR-A responders, like Hank, want "a lot of freedom in order to work." Amidst risks and the changing site characteristics, responders have ground-level knowledge and experience that effectually shape search and rescue practices. Training bodies facilitates the BSO

interplay needed for embodied experiences to prime responders' bodies to perform at reliable levels and be trusted with the "freedom" to work.

It is important to consider how expertise is determined. Ecological cohering provides the framework for responders (B_1 and B_2) to defer to one another in the instruction about and implementation of practices, but the framework also accounts for how BSO interrelationships influence attributions of expertise. Consider the following hypothetical illustration regarding objects. B_1's skillful wielding of tools in training and deployments to build shores constructs authority in relation to other responders with less experience. During a deployment other response team members (B_2) defer to B_1 to determine what type of shore to construct in wooden and concrete structure. Authority is generated through B_1's past and present reliable implementation of tools to construct the appropriate type of shore, but just as meaningfully contributing to the perceptions of authority are the situational demands that call for the shore to be built for the mission to be completed.

Hierarchical decision-making may result in unreliable outcomes. Nevertheless, USAR-A has experience with command and control trumping expertise. While not specifically noted in Chapters IV or V, USAR-A members recounted Katrina search and rescue operations in their interviews. They described the need for boat-based practices due to flooding. Because one USAR group was not operating under a state-state request but under a federal government directive through FEMA, boat-based rescues were not incorporated in their orders and would not be refunded. Yet, even local residents were using their private boats to extricate trapped victims from flooded areas. This noted

deference to authority and bureaucratic structuring influenced extraction timing and ability to match context and practice complexity reliably. Even HROs, such as USAR-A, experience hierarchical contestation over decision-making about practice selection. For USAR-A, they note the need for responders in the site to be granted authority to perform practices complementary to BSO interrelationships and aims of the mission.

"Containment differs from anticipation in that it aims to prevent unwanted outcomes after an unexpected event has occurred rather than to prevent the unexpected event" (Weick and Sutcliffe, 2007, p. 65). The nature of the reaction ranges in terms of its reliability. Mindful reactions are categorized as resilient and deferring to expertise by emphasizing the collective agency of HROs to contain and control unwanted outcomes. What comes under scrutiny from an *ecological coherence* CCO perspective is the narrowing of containment practices to control. Consider the differences between "control" versus "controlled by" represented along a continuum. Control privileges the collective body's ability to manipulate the disaster site through the use of tools and corresponding practices that restore agency to the responder. Controlled by, conversely, privileges the disaster site and ensuing chaos that circumvents heedful interrelating. Yet, the space in between must be explored. The space in between is navigation, a concept argued in this study as valuable for conceptualizing the symbiosis between fluid, risky sites and tool wielding bodies. Navigation conjures images of sailors using practices culminating in centuries of astronomical and mapping data to maneuver through the seas. It is similar for USAR-A whose imbricating and recursive practices have scaled up over time, generating a community of practice that navigates through and in hazardous

environments to enact search and rescue. Blending language with BSO interpenetrations, *ecological coherence* escapes the illusion of control granted by language (i.e. formulating of plans, constructing meaning, organizing teams, manipulating matter for utility, etc.), but neither is it controlled by the chaos.

In conclusion, this chapter used BSO interplay to decenter language in CCO and mind in HRO. In doing so, CCO, specifically the model of coorientation and plenum of agencies, were extended to account for ecological cohering of bodies, sites, *and* objects. The model of ecological coherence was presented as a B_1-B_2-S_n-O_n quadric connected by a nexus of doings and sayings centered on a joint activity, namely sociomaterial practices. By examining Chapters IV and V, extensions and clearer understandings of CCO focused on natural authority, improvisation, scaling up, CoPs, bodies *as* sites, and authority embedded in CoP. Then, language was reintroduced to the dialogue with three key observations about language and material entanglement. Language 1) is active in coherence, 2) embodies BSO interplay and reflects back on BSO interplay, and 3) evidences coherence. Finally, the chapter returned back to the HRO literature that was introduced in Chapter I. Collective mind, the key construct in HRO, was recast as collective body to emphasize materiality, activity, and constitutive entanglement. The implications for collective body were explored by examining BSO interplay in mindful processes. The analytic move to remove language and mind as figure were not to negate their utility. Instead, the analytic strategy pointed to theoretical extensions by exploring material interplay and adding muscularity to the dialogue.

CHAPTER VII

CONCLUSIONS

At the outset of this study, the aim was to integrate CCO, practice theory, and materiality to study the HRO construct of collective mind. The central concern was how to take material arrangements seriously in the communicative constitution of organizing. And, in turn, use such a view to decenter (Derrida, 1976) mind. Using a grounded theory approach (Charmaz, 2000, 2005, 2006), participant observation, interview, and organizational document data were coded by identifying emergency response practices and BSO interplay. The results are reported in Chapters IV and V. As presented in Chapter II, most CCO and practice-based research make one of the material manifestations figure, such as body, or silence materiality altogether. Conversely, this study demonstrates how bodies, sites, objects, and ideation constitutively entangle in activity to produce collective reliability. Thus, the approach reflects language, bodies, sites, *and* objects, not *or*. The next few paragraphs make clear what this post-dualistic approach revealed.

Enacting Safety

Enacting safety practices were examined in Chapter IV in terms of navigating risk, feeling danger, protecting self, and protecting responders. Key findings from this chapter follow. Through education, occupational background, training, and embodied experience, responders cultivate more reliable enactments of the following practices: assessing risk, naming acceptability, plotting strategically, sensing danger, intuiting risk,

feeling danger, and becoming a safety officer. The body-site interplay is privileged in these practices. Through the body, an amalgamation of experiences frames how bodies enact safety. Of interest is the irony in how responders enact safety: to do so reliably, body-site interaction is requisite. Or another way of expressing the irony is: to enact safety, responders must place their bodies at risk, embody understanding of the risks, and collectively feel danger. For example, responders train in realistic environments and deploy to risky sites, understanding that senses will heighten with repetitive body-site interaction. Reliability is produced in the possibility of unreliability. The juxtaposition of risk and safety is re-imagined in a navigational metaphor. Navigating risk is about bodies maneuvering *through* sites and working *with* situational exigencies to enact safety.

To counter act negative outcomes of risk exposure (i.e. contaminated flood waters, natural gas leak, fatigue, etc.), responders use objects to protect their bodies and transform the site. Protective objects include facemasks, work boots, personal flotation devices, and gloves. Protective objects provide a buffer between responders' bodies and the hazardous site, thus mediating body-site interactions. Transformative objects enable the responder to protect self, other responders, and victims by changing the site conditions. Transformative objects may create a site within a site by constructing a rehab or shower facility for hygienic practices at the disaster site, constructed with PVC pipe, garden hose, and tarps. Or, transformative objects may change the site conditions to reduce risk or harm (i.e. construction of a shore referenced in Chapter V). Responders

have a collective capacity to extend their bodily capabilities and protect their bodies through protective and transformative objects.

Finally, enacting safety is collective action. Safety hinges on the interactivity of responders with one another and BSOs. A body-body-site interplay is evidenced in buddy systems and safety officers (in the sense of the assigned organizational role and dispersed organizational practices). Every*body* prioritizes safety in action and demonstrates responsibility for one another's safety. Overall, enacting safety richly demonstrates constitutive entanglement of bodies, sites, *and* objects in joint activity to navigate risk reliably.

Performing Response

Performing response practices were examined in Chapter V in terms of scripted performing, improvising, training, searching, rescuing, and communicating. The BSO interplay of scripted performances (search and rescue practices performed based on step-by-step institutional guidelines) featured body in a body-site-tool dynamic. Scripts highlight bodily control over sites and tools. Scripted performances imbricate on one another expanding the range of scripts to draw on and adjust to site exigencies. Improvisation highlights site in a site-body-tool dynamic. When situational exigencies do not have a corresponding script, adjustments and adoptions are made. Improvisational bodies use embodied skills, a repertoire of scripts, and tools to collectively restore reliability. Training functions to position responders' bodies in situated activity to enact scripted search and rescue performances. The organization speaks through training of scripted practices exerting authority as to which script is best.

Although authentic training sites present challenges that require improvisation, training focuses on scripted performance as reliable performance.

The BSO interplay is difficult to untangle in searching practices, collapsed structure rescuing, and swift water rescuing. Hasty searches are designed for bodily senses to interact with site in order to collectively assess, label, and act quickly. Tools mediate the site-body interaction when hasty searches give way to thorough and deliberate searches. Bodily senses are accentuated through search objects (i.e. thermal imaging enhances site, hazardous materials devices enhance scent). Search objects mediate responders' bodies and sites through readings from machines and images on cameras. Canine teams introduce a different dynamic into the BSO interplay. A response dog may be thought of as another responder body in the sense that a response dog uses embodied skills to perform search and rescue. But, a response dog also functions similarly to other search objects by accentuating the responder's sense of smell and mediating site interaction. Searching sites leads to extricating the identified victims through collapsed structure or swift water practices.

The BSO interplay differs greatly between collapsed structure and swift water, indicating the influence of site on how BSOs are privileged in action. On one hand, collapsed structure exhibits a site-object-body relationship because reliability is dependent on tool use to transform the site. On the other hand, swift water exhibits a site-body relationship because reliability is dependent on body positioning to maneuver through the fluid site. Both collapsed structure and swift water practices incorporate responder-victim communication aimed at calming the victim(s). Collapsed structure

responder-victim communication situated in rescue activities is primarily verbal, whereas, swift water responder-victim communication situated in rescue activities is primarily nonverbal (exceptions include victims trapped by rushing water but stationary). Rescue swimmers use reverse and ready body positioning to calm victims and restore a sense of control over the site on behalf of the victim. A reverse and ready is body-to-body maneuvering and usually occurs prior to utterances; yet, responders and victims are able to coordinate their actions in the moment.

Lastly, resourcing communication demonstrates how communicative practices differ based on decentralization (signaling and marking) and centralization (centralizing and codifying) to respond to BSO interplay. Signaling overcomes site barriers to joint activity through communicative objects (i.e. whistle or horn). Marking overcomes communication barriers between search and rescue teams, transforming sites by marking them with a communally understood system. Centralizing overcomes information flow challenges posed by search and rescue teams dispersed over a site. The coordination center is an off-site location that is designed to map, track, and communicate. Codifying encompasses body-site-object interplay that privileges bodies in collective reflexivity in-action and of-action. Codifying reifies the reliability of scripted performances and establishes the reliability of improvisational performances, which, in turn, become scripted for future activity. Performing responses is characterized by scripted and improvisational performances whose reliability is determined by complex relationships between site and the set embodied capabilities and tools that match situational exigencies.

Ecological Coherence

The study of USAR-A's sociomaterial practices led to an impetus for a communicative model that sufficiently accounted for the plenum of agencies (Cooren, 2006b) in the enactment of safety and performance of responses. Drawing on the works of Taylor (2009a,b) and colleagues (i.e. Taylor & Van Every, 2011), the triadic model of coorientation and its constituent parts/processes has been adapted so as to extend agency to bodies, sites, *and* objects simultaneously. Thus, *ecological coherence*, like coorientation, explains *terra firma* interaction that imbricates and scales up in the constitution of organization, but provides a vocabulary through which to explain body, site, *and* object interplay (Cooren, 2006b; Taylor, 2009a; 2009b; 2011). *Ecological coherence* demonstrates how bodies are the sites where lived experiences in a social and material world cohere. Whether through language or pre-linguistic activities, this coherence is communication. To embody, which must be done to construct, understand, interact, or dialogue, is to become communicative.

Key implications of this CCO model as applied to the data follow. First, natural forces are accounted for as a part of site and seen as authoritative in relation to site and body interplay. Second, scaling up is made possible through improvisation, and improvisation is made possible because of situated needs, or site exigencies. Third, codified improvisational performances become materialized through scripts. This process shows how USAR-A scales up. Fourth, sociomaterial practices imbricate in that they become repeated in routines, shared amongst a collective of bodies, and adjusted. Data supports coorientation's view that imbrication gives way to Communities of

Response. In particular, as USAR-A's BSO interplay influences imbrications, body becomes the site of joint activity and shared practices. Fifth, the role of authority is understood with greater muscularity in BSO interplay. Finally, after extending the CCO discussion to BSO interplay, the discussion came full circle to reintroduce language. Three important claims are asserted about language and *ecological coherence.* First, language is active in coherence, although not requisite for coherence. Second, language is shaped by embodied action and reflects back on embodied action. Third, language is a sign that ecology has cohered.

Collective Body

Moreover, such a model has great applicability to the constitution of reliability in HROs. *Ecological coherence* gives attention to the risky environments that set HROs apart, demonstrates how practices are co-constituted by material arrangements, and situates reliability in-action. To make a linguistic shift from cognition to activity and from ideation to materiality, I proposed collective mind be recast as collective body. It is through a collection of bodies that situated activity accomplishes reliability. Because collective bodies embody both cognition and action through the use of the term *body,* the linguist shift does not gloss over or undervalue the weightiness of collective mind to theorizing reliability. However, it does extend and regain materiality, action-orientation, and BSO interplay. To see this shift through, anticipatory and containment processes introduced in Chapter I were recast as enacting safety and performing responses practices. Furthermore, recasting mindful processes demonstrated how reliability was talked about in terms of chaos and control. Exploring BSO interplay also explored the

space in between this binary by shifting the emphasis to navigation. Navigation becomes less about categories of chaos and control and more about maneuvering with reliable practices.

At this point, the intersections of HRO, CCO and Practice Theory have been the focus. This concluding chapter will take a step back and explore the implications of this research to communication and materiality, in general. Then, an applied section will tease out lessons learned for USAR-A. Finally, research limitations and directions will be explored.

Communication and Materiality

Implications for Communication Studies

The nagging question is, "Can a communication scholar take a constitutive entanglement approach with materiality and ideation, or in doing so, does she or he compromise the discipline which she or he represents?" To answer a question of this magnitude, legitimacy for employing ecological coherence as a metatheoretical lens in the field can be argued around 1) the plurality of communication studies and 2) the current dialogue about communication and materiality.

First, communication studies has developed in a wide array of research directions (see the divisions in the National Communication Association) and in the development of communicational perspectives (for an exemplar see the edited book by Shepherd, St. John, & Striphas, 2006). Craig's (1999) hallmark article celebrates the unifying theoretical thread in communication scholarship – communication as constitutive. The communicative constitution model encompasses a wide-range of scholarship. At its core,

the communicative constitution model asserts the centrality of communication in meaning making (Cooren, 2012). In Craig's (1999) article, he delineates between seven traditions: rhetoric, semiotics, phenomenology, cybernetics, sociopsychology, sociocultural, and critical. Each of the seven traditions is in dialogue with the constitutive metamodel. These traditions represent difference and plurality as to how the study of communication may be approached in theory building and research.

To further illustrate this constrained pluralism, Cooren (2012) proposes communication as ventriloquism (Cooren, 2008, 2010; Cooren & Bencherki, 2010; Goldblatt, 2006) and demonstrates how ventriloquism informs each of Craig's (1999) traditions. Ventriloquism is a metaphor to describe how agents animate one another. This bidirectional animation is seen in a ventriloquist who causes the dummy to speak, gesture, and act, who in turn causes the ventriloquist to respond. Ventriloquism shows how the ventriloquist, a human agent, and the dummy, a material agent, animate one another (Cooren, 2012). In terms of Craig's (1999) metamodel of communication, ventriloquism extends the meta-argument to explore a *plenum of agencies* in the construction of meaning (Cooren, 2004a). In a similar fashion, *ecological coherence* asserts that communication coheres ideation and material forces by drawing attention to a *plenum of agencies* (Cooren, 2004a; 2006b) – bodies, sites, and objects (Ashcraft, et al., 2009). The crux of *ecological coherence* is the constitutive entanglement of ideation and material relationships, thus, maintaining the centrality of communication (via coherence) in constituting meaning. *Ecological coherence* extends both Craig's (1999) and Cooren's (2012) discussion of communicative constitution by specifying types of

material agency and how they function together in communicative constitution. Using the metaphor of ventriloquism, *ecological coherence* would draw attention to the ventriloquist (a body with human agency and embodied understanding and identity), the dummy (an object with nonhuman agency), and the site. To further illustrate how ecological coherence intersects with extant communication theorizing and research, attention will shift to current theoretical dialogue about the role of materiality in communication research.

Second, in the October 2011 edition of *Communication Monographs*, Mark Aakhus, Dawna Ballard, Andrew J. Flanagin, Timothy Kuhn, Paul Leonardi, Jennifer Mease and Katherine Miller participate in a dialogue about communication and materiality that elucidates the complexities that are at play when communication studies scholars approach the subject of materiality. Outside of discussing the definitions of materiality and technology, the participants make the following relevant observations: 1) communication scholars are biased toward objects, 2) materiality and discourse are disrupted in communication, 3) materiality and Discourse constrain and enable activity, 4) communication imbricates human and nonhuman agencies, 5) constructed realities are material and discursive, and 6) agency and order are reoccurring issues in the communication and materiality debates. One point of concern this study has with Aakhus et al.'s (2011) conversation is in regard to communication scholars' bias toward objects. Leanings toward *discursive objects* (Cooren, 2006b) and technology (Leonardi, 2009a; 2009b) reify an object-centered bias. However, data in Chapters IV and V demonstrate how the body is central to reliable performance. It is through the body that

tools extend the body's capabilities and enhance skills to intervene and transform the site. It is through the body that collective action is performed, experienced, and reflected back upon. It is through the body that site is monitored, assessed, labeled, plotted, acted on, and transformed. It is through the body that scripted and improvisational performances emerge. It is the body that is trained, cross-trained, and cultivated with lived experiences to draw upon in response to site exigencies. It is in the body that emotions, trust, senses, and intuition are felt and acted upon. The body becomes the site of activity, and thus, the site of reliability. Body cannot be reduced to a material object. While bodies perform skillful activity, they are not tools. Clearly, to avoid an object bias, communication scholars are poised to examine body, site, and object interplay. In summation, *ecological coherence* provides a process by which to empirically examine multivocality across material relationships by acknowledging constitutive entanglement. Communication is the *ecological coherence* of a multitude of interrelating agencies that construct a collectively embodied reality.

Implications for Data Collection and Analysis

Leonardi and Barley (2008) claim, "that sooner or later [organization and technology research] leads one to contemplate the line between the material and the social, a line that looks less solid up close than it does from a distance" (p. 159). The process of analyzing BSO interplay is messier than is imagined at the outset. From a distance, it is simple to label saws, radios, and maps as objects, label the collapsed structure as site, or label words as language. What is not as simple is distinguishing material interplay as it unfolds in activity. In particular, a method of analysis emerged to

study the constitutive entanglement of sociomateriality – that is, identify which material arrangements are privileged through social and material interactions and to what effect. The primary contribution to the CCO and practice-based research is the focus on material interplay and its accompanying method. As such, the following section explains how researchers have methodologically approached CCO, how this work methodologically approaches CCO and materiality, and how the application of this method informs BSO interplay.

Methodologically, ethnography (Geertz, 1973) transforms how material and communal interactivity are understood in CCO. CCO research uses data collection methods that complement data analysis methods that will help get at communicative activity. Approaching CCO from the four flows model, McPhee and Iverson (2009) use a case study from literature, and Lutgen-Sandvik and McDermott (2008) also use a case study approach but from ethnographic research. Approaching CCO from the coorientation model, Taylor and Robichaud (2004) use conversational analysis to analyze transcribed talk, and Cooren, Brummans and Charrieras (2008) focus on a plenum of agencies in their ethnographic research with Doctors without Borders (i.e. incarnation of objects). More broadly, a range of methods have been used to study bodies, sites, and objects in organizational research. For example, De Saint-Georges (2004) combines traditional discourse analysis with geosemiotics to examine space and utterances simultaneously. This study about "cleaning an attic" uses video, still images from video, and transcripts. In a similar fashion, Heath and Luff (2000) use video and utterances to examine the role of technology in work (transcribed with image

sequences). Murphy (2002) uses ethnography and thick description to tease out themes related to a liminal space. Seemingly, the common thread in CCO research and organizational research is the value of a case study and ethnography.

Ethnographic methods are advanced as a means to recognize repetitive patterns in communication (Taylor & Van Every, 2011), ground interpretations in situated everyday organizational activities (Heath and Luff, 2000; Taylor et al., 2001), analyze the illocutionary force of language (Taylor and Van Every, 2011), and unpack the complexities of organizing (Mumby, 2011). How can a researcher analyze the "rhythms of nature" if she or he does not co-participate with it (Sawyer, 2004, p. 241)? In general, this study aimed to recognize communication patterns in the (re)production and transformation of sociomaterial practices by unpacking the organizational complexities through in situ research, and in particular, the research honed in on the complexities of material and ideation relationships by examining bodies, sites, and objects in the collective enactment of safety and response. Lindlof and Taylor (2011) argue that ethnographic fieldwork techniques can render material culture visible and that is precisely a need that surfaced following my collection of interview data. As the researcher, there is a significant disconnect between USAR-A interviewees describing what it was like to sift through rubble and construct shores at the World Trade Center collapse and what their bodies actually experience as they navigate through the risky site. The blending of in-depth interviews, participant observation, and organizational documents afforded me the type of embodied experiences requisite for enacting safety

and performing response and for applying the constant comparative method to fine tune coding and saturate categories.

The following example demonstrates the importance of ethnographic data in learning and understanding USAR-A's emergency response practices and interacting with bodies, sites, and objects. Feeling danger, a subset of practices in enacting safety, positions the body and site in an interdependent, or symbiotic, relationship, demonstrating the need for sensory experience in disaster sites. During my swift water training, one exercise required me and the other trainees to swim to a checkpoint to practice combat and self-rescue swimming techniques in river rapids. Instructors demonstrated and explained techniques, but then it was time for us to implement the techniques. When I entered the water and began to swim alongside other trainees, I shifted between feeling out of control and feeling as if I had mastered the swim practices. As the speed of the water increased through a set of rapids, I hit my left ring finger on a rock in the riverbed. The instantaneous swelling and pain became a physical hallmark prompting me to use the river to maneuver and position rather than to attack the river with my strokes.

Feeling danger became an embodied experience that evokes to this day the chill of the water, the soreness of my muscles from swimming, and the throbbing of my finger as I pressed on to make it to the checkpoint. My senses were heightened to the debris, rocks, and currents that influence swift water search and rescue practices, and in turn, I had a rich set of experiences that vitalized interview data and clarified organizational

documents. Being immersed in the swift water and collapse structure sites afforded closer analysis of the B_1-B_2-S_n-O_n relationships and the co-construction of meaning.

Next, the application of grounded theory in studying BSO relationships emerged in a method for analyzing the privileging of certain material manifestations over others. BSO relationships often represent themselves in ratios that privilege one material manifestation over another. Within the B_1-B_2-S_n-O_n quadric model of *ecological coherence*, body-object and site-body ratios emerge frequently, demonstrating how the material components are privileged in meaning construction. The body-object interrelationship is evidenced in practices that protect self. Self-protection through safety gear positions objects as extensions of responders' bodies. Rather than objectifying bodies, which occurs when bodies are talked about as tools, the body-object ratio embodies objects. The swim fins become extensions of the rescue swimmer's feet, enabling increased precision and decreased swim time. The facemask becomes an extension of the collapse structure technician's nose and mouth, enabling greater oxygen intake. Furthermore, tools contribute to reliability in direct relationship to the embodied know-how of the responder.

Site-body and body-site interrelationships are indicative of fluid, hazardous sites that pose risks to enacting safety. When site-body interplay challenge the agency of responders, responders react in two ways: 1) co-construct a symbiotic relationship or 2) co-construct an adversarial relationship. First, responders maneuver in and through sites to perform search and rescue and enact safety. Canine handlers move through trenches, confined spaces, debris, and such to sniff out live and dead bodies. Shore-based water

responders move around trees and other obstructions to position their bodies to throw a tow to a swift water victim. In each of these illustrations, USAR members manage site constraints by navigating through it, rather than attempting to conquer it.

The term *navigation* transcends the oppositional positioning of body and site that reduces the site to an obstacle. Navigation suggests a less combative and more cooperative relationship between body and site. Swift water rescue training manuals debunk the myth that responders "can 'beat' the river with technology" (Ray, 1997, p.34). In swift water rescue, the body uses the rapids and currents to position itself to apprehend the victim. While rescue swimmers must interact with site constraints such as debris by swimming over or around it, the overall set of in-water rescue practices depend on the harmony of the body-site relationship to navigate risk and perform response. The symbiotic relationship between site and body accentuates how responders instantaneously react to and improvise in dynamic sites to enhance reliability. Using body-site-object ratios may be helpful for other researchers, who, like me, are interested in constitutive entanglement as a way to study communication.

USAR-A: Applied Implications

Communication, as a field of study, is a practical field poised to address commonsense concerns (Craig, 1999). With this pivotal understanding, research would be remiss to not offer insights to USAR-A's reliable organizing. The following section describes lessons learned for emergency response. Thus, this section functions much like an after action report.

Lesson learned 1: Communication problems arise most often from associating communication primarily with technology problems, limited experience, and losing site of the necessity of community.

Lesson learned 2: Framing risk assessment as a part of the greater whole of risk navigation may bring greater awareness to material interplay and the importance of embodied experience within environmental elements for enhancing reliability of response practices.

Lesson learned 3: Safety is a constructed culture that requires expertise in dynamic, changing elements, both human and nonhuman.

Lessons learned 4: Experience is the best teacher. Experience warns responders of the risks that are apparent and not apparent. Experience teaches there are limits to controlling environmental elements and that risks are to be navigated with caution for one's own wellbeing and the wellbeing of fellow responders. Lastly, experience enables and constrains navigating risks based on an organizational appreciation of flexibility in implementing response practices.

Lessons learned 5: Appreciation for flexibility enables response when responders are keen on innovative attempts to accomplish tasks while remaining vigilant about safety. Current safety-first practices that establish buddy systems and reporting of errors assist in constructing this flexibility.

Lessons learned 6: While experience is a key force in safety, experience may also lead to the greatest mistakes. Relying on experience may lead to habitual performances that then lead to overlooked risks. Establishing an organizational awareness and

accountability systems assist in combatting the dark side of experience, but deep-seated, commonsensical understanding of how multiple forces are at play – and at any time can be unpredictable – is crucial. Such is borne through a community of practice that appreciate the inability to completely control elements while at the same time using communal experience to navigate chaos reliably – relatively error-free.

Research Limitations

The framing of research questions and literatures, the methodologies used for collecting and analyzing data, and the subsequent interpretive moves shape the development of an ecological model of communication in which materiality and ideation are a confluence that constitute organizing. With each decision made in the research process, other decisional possibilities were silenced. With each fore grounding in the research process, there is a back grounding. Therefore, it is important to examine the consequences of such decisions. The most pressing limitation is related to data collection and representation.

Data collection methods reflect a concern for embodied experience with emergency responders and their sociomaterial practices. However, data representation in the writing of the dissertation reduces the interpretation to a text. Ironically, constitutive entanglement highlights the constructive force of bodies, sites, and objects; yet, writing about such flattens the experience for the reader. To help with this, thick description is employed, especially in Chapters IV and V, to conjure images of flying debris while steadying a jack hammer and the feel the icy cold feel of the swift water. Dramatization is one tool that researchers can use to circumvent textualizing the body in

writing about it (Marvin, 2006). Another tool is artistic representation like photography (Ellingson, 2009).

Iedema and Carroll (2010) approach this problem through the use of video reflexivity in research practice and photography in writing. In their research with hospitals, Iedema and Carroll (2010) filmed health care teams performing their everyday care practices, held bimonthly film meetings for participants and researchers to reflect on the quality and safety of practices in the complex environment, and co-constructed improvements in the delivery of care. In their article, still images of the site transport the reader to the hospital to see the challenges to quality and safety addressed in film meetings. Not only does videography transform the process of research and documentation of BSO relationships, photography is integrated into the writing. In a similar vein as Iedema and Carroll (2010), the addition of photos, in Chapters IV and V especially, would enhance understanding of sociomaterial practices.

Future Research

Extensions

Future research may extend consideration of BSO interplay by further establishing *ecological coherence* as an explanatory tool to investigate the centrality of a material notion of communication. By investigating the interplay more directly using video ethnography (Conquergood, 1985; 1990; Iedema & Carroll, 2001), a more robust discovery might emerge from the data in relation to how certain material manifestations are privileged overs other or how discourse may impact the privileging of bodies, sites, or objects. This extension would be two fold: 1) using video ethnography and 2)

bringing discourse more into the conversation. Because this research focused on ideation and material constitutive entanglement of reliable practices, data related to power, jurisdiction and interorganizational communication was not integrated explicitly. Extending the discussion of BSO interplay into these more traditional CCO topics, for example, gender studies, might take into consideration how bodies, sites, and objects are talked about and how they are impacted by organizational structures.

New Studies

New studies examining BSO interplay might conduct participant observation of robotics or canine trainings to further elucidate the complexities of embodied experience with technologies and animals. Explicitly examining communication errors or barriers as responders engage the limitations and advances of technology using constitutive entanglement might open new avenues of research on the communicative constitution of organizing with nonhumans. Given the advances in technologies over the past few decades, such research would offer valuable insights to the evolving meaning of interaction. Furthermore, examining canine training would open an entire new area of research for communication scholars, especially when the research questions center on how canines play a role in the organizational practices associated with search. At some level, searching is dependent upon the use of these animal colleagues. What policies are associated with canine handling? How might the policies limit or harm the dogs? What is the impact on a response organization when an animal colleague is killed or severely injured in service?

REFERENCES

Aakhus, M., Ballard, D., Flanagin, A., Kuhn, T., Leonardi, P., Mease, J. & Miller, K. (2011). Communciation and materiality: A conversation from the CM Café. *Communication Monographs*, *78, 4*, pp. 557-568. doi: 10.1080/03637751.2011.618358.

Adler, P. S., & Borys, B. (1993). Materialism and idealism in organizational research. *Organization Studies, 14*, 657-679.

Alvesson, M. & Karreman, D. (2000). Varieties of discourse: On the study of organizations through discourse analysis. *Human Relations, 53*, 1125-1149. doi: 10.1177/0018726700539002.

Ashcraft, K. L. (2007). Appreciating the "work" of discourse: Occupational identity and difference as organizing mechanisms in the case of commercial airline pilots. *Discourse & Communication, 1*, 9-36. doi: 10.1177/1750481307071982.

Ashcraft, K. L., Kuhn, T. R., & Cooren, F. (2009). 1 Constitutional amendments: "Materializing" organizational communication. *The Academy of Management Annals,* 3: 1, pp. 1-64. doi: 10.1080/19416520903047186.

Ashcraft, K. L. & Mumby, D. K. (2004). *Reworking gender: A feminist communicology of organizations*. Thousand Oaks: Sage.

Axley, S. R. (1984). Managerial and organizational communication in terms of the conduit metaphor. *Academy of Management Review, 9*, 428-437.

Banks, S. P. & Riley, P. (1993). Structuration theory as an ontology for communication research. In S. Deetz (Ed.). *Communication Yearbook, 16* (pp. 167-196). Newbury Park, CA: Sage.

Barge, J. K. (2004). Reflexivity and managerial practice. *Communication Monographs, 71*, 70-96. doi: 10.1080/0363452041000169146 5.

Barge, J.K. & Fairhurst, G.T. (2008). Living leadership: A systemic constructionist approach. *Leadership, 4, 3,* 227-251. doi: 10:1177/1742715008092360.

Bencherki, N. & Cooren, F. (2011). Having to be: The possessive of organization. *Human Relations, 64,* 1579-1607. doi: 10:1177/0018726711424227.

Bea, K. (2006). Urban search and rescue task forces: Facts and issues. *CRS Report for Congress*. Retrieved from http://www.fas.org/sgp/crs/homesec/RS21073.pdf

Bender, B. (2010). Place and landscape. In C. Tilley, W. Keane, S. Kűchler, M. Rowlands & P. Spyer [Eds.]. *Handbook of material culture* (pp. 303-314). Los Angeles, CA: Sage.

Bierly, III, P. E. & Spender, J. C. (1995). Culture and high reliability organizations: The case of the nuclear submarine. *Journal of Management*, *21*, *4*, pp. 639-659.

Bigley, G.A. & Roberts, K.H. (2001). The incident command system: High reliability organizing for complex and volatile task environments. *Academy of Management Journal*, *44*, *6*, pp. 1281-1299.

Bjœkeng, K., Clegg, S., & Pitsis, T. (2009). Becoming (a) practice. *Management Learning, 40, 2,* 145-159. doi:10.1177/1350507608101226.

Blackler, F. & Regan, S. (2009). Intentionality, agency, change: Practice theory and management. *Management Learning, 40, 2,* 1350-5076. doi: 10.1177/135050760810227.

Bourdieu, P. (1976). *Outline of a theory of practice*. Translated by R. Nice. Cambridge, UK: Cambridge University Press.

Bourdieu, P. (1990). *The logic of practice* (R. Richard, Trans.). Stanford, CA: Stanford University Press.

Bourrier, M. (2005). An interview with Karlene Roberts. *European Management Journal*, 23, *1*, 93-97.

Buck, D.A., Trainor, J.E., & Aguirre, B.E. (2006). A critical evaluation of the incident command system and NIMS. *Journal of Homeland Security and Emergency Management*, 3, 3,1. Retrieved on December 1, 2006, from www.bepress.com/jhsem/vol3/iss3/1.

Burck, C. A. (2005). Comparing qualitative research methodologies for systemic research: the use of grounded theory, discourse analysis and narrative analysis. *The journal of family therapy*, *27*, *3*, pp. 237-262. doi: 10.1111/j.1467-6427.2005.00314.x.

Burrell, G., & Morgan, G. (1979). *Sociological paradigms and organisational analysis.* London: Heinemann.

Busby, J. S. (2006). Failure to mobilize in reliability-seeking organizations: Two cases from the UK Railway. *Journal of Management Studies*, *43*, *6*, pp. 1376-1393. doi: 10.1111/j.1467-6486.2006.00649.x.

Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 509-535). Thousand Oaks, CA: Sage.

Charmaz, K. (2005). Grounded theory in the 21st century: Applications for advancing social justice. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (3rd ed., pp. 507-535). Thousand Oaks, CA: Sage.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. London: Sage.

Cheney, G. & Ashcraft, K. L. (2007). Considering "The Professional" in communication studies: Implications for theory and research within and beyond the boundaries of organizational communication. *Communication Theory, 17,* 146-175. doi: 10.1111/j.1468-2885.2007.00290.x.

Cheney, G. & Cloud, D. L. (2006). Doing democracy, engaging the material. *Management Communication Quarterly, 19*, 501-540. doi: 10.1177/0893318905285485.

Cone, D. C. (2000). Rescue from the rubble: Urban search & rescue. *Case Conference*, pp. 352-357.

Conrad, C. (2004). Organizational discourse analysis: Avoiding the determinism-volunteerism trap. *Organization, 11*, 427-439. doi: 10.1177/1350508404042001.

Cooren, F. (2004a). Textual agency: How texts do things in organizational settings. *Organization, 11*, 373-393. doi: 10.1177/1350508404041998.

Cooren, F. (2004b). The communicative achievement of collective minding: An analysis of board meeting excerpts. *Management Communication Quarterly*, *17*, 4, pp. 517-551. doi:10.1111/j.1460-2466.2011.01622.x.

Cooren, F. (2006a). Arguments for the in-depth study of organizational interactions: A rejoinder to McPhee, Myers and Trethewey. *Management Communication Quarterly*, *19*, *3*, pp. 327-340. doi: 10.1177/0893318905280325.

Cooren, F. (2006b). The organizational world as a plenum of agencies. In F. Cooren, J. Taylor, & E. Van Every (Eds.). *Communication as organizing: Empirical and theoretical explorations in the dynamic of text and conversation* (pp. 81-100). Mahwah, NJ: Lawrence Erlbaum.

Cooren, F. (2008). The selection of agency as a rhetorical device: Opening up the scene of dialogue through ventriloquism. In E. Weigand (Ed.), *Dialogue and rhetoric* (pp. 23–37). Amsterdam, The Netherlands: John Benjamins.

Cooren, F. (2010). *Action and agency in dialogue: Passion, incarnation, and ventriloquism.* Amsterdam, The Netherlands: John Benjamins.

Cooren, F. (2012). Communication theory at the center: Ventriloquism and the communicative constitution of reality. *Journal of Communication, 62,* 1-20. doi: 10.1111/j.1460-2466.2011.01622.x.

Cooren, F., & Bencherki, N. (2010). How things do things with words: Ventriloquism, passion and technology. *Encyclopaideia,* XIV(28), 35–62.

Cooren, F., Brummans, B. & Charrieras, D. (2008). The coproduction of organizational presence: A study of Medecins sans Frontieres in the Democratic Republic of Congo in action. *Human Relations*, 1339-1370. doi: 10.1177/0018726708095707.

Cooren, F. & Fairhurst, G. (2004). Speech timing and spacing: The phenomenon of organizational closure. *Organization, 11*, 797-828. doi: 10.1177/1350508404047252.

Cooren, F., & Fairhurst, G.T. (2009). Dislocation and stabilization: How to scale up from interactions to organizations. In L.L. Putnam, & A.M. Nicotera (Eds.). *Building theories of organization: The constitutive role of communication* (pp. 117-152). New York, Routledge.

Cooren, F., Taylor, J., & Van Every, E. (Eds.). (2006). *Communication as organizing: Empirical and theoretical explorations in the dynamic of text and conversation*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Conquergood, D. (1982). Communication as performance: Dramaturgical dimensions of everyday life. In J. I. Sisco [Ed.]. *The Jensin lectures: Contemporary communication studies* (pp. 24-43). Tampa: University of South Florida Press.

Conquergood, D. (1985). *Between two worlds: The Hmong shaman in America* [videodocumentary]. Chicago: Siegel Productions.

Conquergood, D. (1990). *The heart broken in half* [videodocumentary]. Chicago: Siegel Productions.

Conquergood, D. (2002a). Lethal theatre: Performance, punishment, and the death of penalty. *Theatre Journal, 54,* 339-367.

Conquergood, D. (2002b). Performance studies: Interventions and radical research. *The Drama Review, 46,* 145-156.

Cox, S., Jones, B. & Collinson, D. (2006). Trust relations in high-reliability organizations. *Risk Analysis*, *26*, *5*, pp. 1123-1138. doi: 10.1111/j.1539-6924.2006.00820.x.

Craig, R. T. (1999). Communication theory as a field. *Communication Theory, 9, 2,* 119-161. doi:10.1111/j.1468-2885.1999.tb00355.x.

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches,* 2nd ed. Thousand Oaks, CA: Sage.

Cronen, V. E. (2001). Practical theory, practical art, and the pragmatic-systemic account of inquiry. *Communication Theory, 11*, 14-35.

Dale, K. (2005). Building a social materiality: Spatial and embodied politics in organizational control. *Organization, 12*, 649-678. doi: 10.1177/1350508405055940.

De Saint-Georges. (2004). Materiality in discourse: The influence of space and layout in making meaning. In P. Levine & R. Scollon [Eds.]. *Discourse & technology: Multi-modal discourse analysis* (pp. 71-88). Washington, D.C.: Georgetown University Press.

Deetz, S., & Mumby, D. K. (1990). Power, discourse, and the workplace: Reclaiming the critical tradition. In J.A. Anderson (Ed.), *Communication yearbook*, *13* (pp. 18-47). London: Sage.

Deluze, G. & Parnet, C. (1987). *Dialogues.* New York: Columbia

Derrida, J. (1976). *Of grammatology* (G. Spivak, Trans.). Baltimore: Johns Hopkins University Press.

Ellingson, L. L. (2009). Ethnography in applied communication research. In L.R. Frey & K. Cissna (Eds.), *The handbook of applied communication research*. Mahwah, NJ: Lawrence Erlbaum.

Endrikat, F. (2007). Testimony before the United States House of Representatives Subcommittee on Emergency Communications, Preparedness, and Response, Committee on Homeland Security regarding assessing the capabilities and coordination of federal emergency response teams. Retrieved on June 28, 2007, from www.hsdl.org

Fairclough, N. (1993). Critical discourse analysis and the marketization of public discourse: The universities. *Discourse & Society, 4*, 133-168.

Fairclough, N. (1995). *Critical discourse analysis: The critical study of language*. London: Longman.

Fairclough, N. (2003). *Analysing discourse: Textual analysis for social research*. London: Routledge.

Fairclough, N. (2005). Peripheral vision: Discourse analysis in organization studies: The case for critical realism. *Organization Studies, 26*, 915-939. doi: 10.1177/0170840605054610.

Fairclough, N. (2006). *Language and globalization*. New York: Routledge.

Fairclough, N. (2008). The language of critical discourse analysis: reply to Michael Billig. *Discourse & Society, 19*, 811-819.

Fairclough, N. & Thomas, P. (2004). The discourse of globalization and the globalization of discourse. In D. Grant, C. Hardy, C. Oswick, N. Phillips & L. Putnam (Eds.). *The Sage handbook of organizational discourse*. London: Sage, 379-396.

Fairhurst, G. T. (2007). *Discursive leadership: In conversation with leadership psychology*. Thousand Oaks: Sage.

Fairhurst, G. T. & Putnam, L. L. (2004). Organizations as discursive constructions. *Communication Theory, 14*, 5-26. doi: 10.1111/j.1468-2885.2004.tb00301.x.

Fairhurst, G. T. & Putnam, L. L. (in press). Organizational discourse analysis. In L. L. Putnam [Eds.]. *The Handbook of Organizational Communication* (2nd ed.). Thousand Oaks, CA: Sage.

Foucault, M. (1980). *Power/knowledge: Selected interviews and other writings 1972-1977*. New York: Pantheon.

Foucault, M. (1995). *Discipline and punish*. New York: Vintage/Random House.

Geertz, C. (1973) The Interpretation of Cultures: Selected Essays. New York: Basic Books.

Garfinkel, H. (1967). *Studies in ethnomethodology*. Englewood Cliffs, NJ: Prentice Hall.

Gherardi, S. (2009). Introduction: The critical power of the 'practice lens.' *Management Learning, 40, 2,* 115-128. doi: 10.1177/1350507608101225.

Giddens, A. (1979). *Central problems in social theory: Action, structure, and contradiction in social analysis.* Berkeley: University of California Press.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration.* Berkeley: University of California Press.

Goldblatt, D. (2006). *Art and ventriloquism: Critical voices in art, theory and culture.* London, England: Routledge.

Haddow, G.D. & Bullock, J.A. (2006). *Introduction to emergency management* (2nd ed.). Boston, MA: Elsevier.

Halford, S. (2008). Sociologies of space, work and organization: From fragments to spatial theory. *Sociology Compass, 2*, 925-943. doi: 10.1111/j.1751-9020.2008.00104.x.

Halford, S., & Leonard, P. (2006). Place, space and time: Contextualizing workplace subjectivities. *Organization Studies, 27*, 657-676. doi:10.1177/0170840605059453.

Heaphy, E. D., & Dutton, J. E. (2008). Positive social interactions and the human body at work: Linking organizations and physiology. *Academy of Management Review, 33*, *1*, 137-162.

Heath, C. & Luff, P. (2000). *Technology in action.* New York, NY: Cambridge University Press.

Hindmarsh, J., & Pilnick, A. (2007). Knowing bodies at work: Embodiment and ephemeral teamwork in anaesthesia. *Organization Studies, 28*, *9*, 1395-1416. doi: 10.1177/0170840607068258.

Iedema, R. (2007). On the multi-modality, materiality and contingency of organizational discourse. *Organization Studies, 28,* 931-946. doi: 10.1177/0170840607075264.

Iedema, R. & Carroll, K. (2010). Discourse research that intervenes in the quality and safety of care practices. *Discourse & Communication, 4,* 68-86. doi: 10:1177/1750481309351210.

Iverson, J.O. & McPhee, R.D. (2002). Knowledge management in communities of practice: Being true to the communicative character of knowledge. *Management Communication Quarterly*, *16, 2*, 259-266.

Iverson, J.O. & McPhee, R.D. (2006). Communicating Knowing through communities of practice: Exploring internal communicative processes and differences among CoPs. Paper presented at the Annual Convention of the International Communication Association in Dresden, Germany, June 19-23, 2006.

Jian, G. (2008). From the linguistic to the practice turn in organizational communication: Imagining the future of our field. Paper presented at the Organizational Communication Alta Conference, Alta, UT.

Jian, G., Schmisseur, A. & Fairhurst, G. T. (2008). Organizational discourse and communication: The progeny of Proteus. *Discourse & Communication, 2*, 299-320. doi: 10.1177/1750481308091912.

Jordan, S. (2010). Learning to be surprised: How to foster reflective practice in high-reliability context. *Management Learning, 41,* 391-413. doi: 10.1177/1350507609357388.

Klein, R. L., Bigley, G. A., & Roberts, K.H. (1995). Organizational culture in high reliability organizations: An extension. Human Relations, *48*, *7*, 771-793.

Lacan, J. (1991). *The seminar of Jacques Lacan, Book 1: Freud's papers on technique 1953-54*. New York: W.W. Norton.

Laclau, E. (1990). *New reflections on the revolution of our time*. London: Verso.

Laclau, E. & Mouffe, C. (1985). *Hegemony and socialist strategy*. London: Verso.

Larson, G. S. (2003). A "worldview" of disaster: Organizational sensemaking in a wildland firefighting tragedy. *American Communication Journal*, *6*.

Latour, B. (1994). On technical mediation: Philosophy, sociology, genealogy. *Common Knowledge, 3*, 29-64.

Latour, B. (1999). *Pandora's hope: Essays on the reality of science studies*. Cambridge, MA: Harvard University Press.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. New York: Oxford.

Leonardi, P. M. (2009a). Crossing the implementation line: The mutual constitution of technology and organizing across development and use activities. *Communication Theory, 19,* 278-310. doi: 10.1111/j.1468-2885.2009.01344.x.

Leonardi, P. M. (2009b). Why do people reject new technologies and stymie organizational changes of which they are in favor? Exploring misalignments between social interactions and materiality. *Human Communication Research, 35,* 407-441. doi: 10.1111/j.1468-2958.2009.01357.x.

Leonardi, P. M. & Barley, S. R. (2007). Materiality and change: Challenges to building better theory about technology and organizing. *Information and Organization, 18,* 159-176. doi:10.1016/j.infoandorg.2008.03.001

Leonardi, P. M. & Jackson, M. H. (2004). Technological deterministm and discursive closure in organizational mergers. *Journal of Organizational Change Management, 17*, 615-631.

Lindell, M.K., Prater, C., & Perry, R.W. (2007). *Introduction to emergency management*. Hoboken, NJ: Wiley.

Lindlof, T. R. & Taylor, B. C. (2002). *Qualitative communication research methods,* 2nd ed. Thousand Oaks, CA: Sage.

Lindlof, T. R. & Taylor, B. C. (2011). *Qualitative communication research methods,* 3rd ed. Thousand Oaks, CA: Sage.

Lutgen-Sandvik, P. & McDermott, V. (2008). The constitution of employee-abusive organizations: A communication flows theory. *Communication Theory, 18,* pp. 304-333. doi: 10.1111/j.1468-2885.2008.000324.x.

Macpherson, A. & Clark, B. (2009). Islands of practice: Conflict and a lack of 'community' in situated learning. *Management Learning, 40,* 551-568. doi: 10.1177/1350507609340810.

Madison, D.S. (2005). *Critical ethnography: Methods, ethics, and performance.* Thousand Oaks, CA: Sage.

Marafiote, T. & Plec, E. (2006). From dualisms to dialogism: Hybridity in discourse about the natural world. *Environmental Communication Yearbook, 3,* 49-75.

Marvin, C. (2006). Communication as embodiment. In G.J Shepherd, J. St. John, & T Striphas [Eds.]. *Communication as…: Perspectives on theory* (pp. 67-74). Thousand Oaks, CA: Sage.

McEntire, D. A. (2007). *Disaster response and recovery: Strategies and tactics for resilience.* Hoboken, NJ: John Wiley & Sons.

McPhee, R. D. & Iverson, J. (2009). Agents of constitution in Communidad: Constitutive processes of communication in organizations. In L. L. Putnam & A. M. Nicotera (Eds.). *Building theories of organization: The constitutive role of communication*. New York: Routledge, 49-88.

McPhee, R. D. & Zaug, P. (2000). The communicative constitution of organizations: A framework for explanation. *The Electronic Journal of Communication, 10*, 1-16.

McPhee, R. D. & Zaug, P. (2009). The communicative constitution of organizations: A framework for explanation. In L.L. Putnam, & A.M. Nicotera (Eds.). *Building theories of organization: The constitutive role of communication* (pp. 21-47). New York, Routledge. Reprinted from, *The Electronic Journal of Communication*, *10*, 1-2, 16 pages.

McPhee, R. D., Myers, K.K. & Trethewey, A. (2006). On collective mind and conversational analysis: Response to Cooren. *Management Communication Quarterly*, *19*, *3*, pp. 311-326. doi: 10.1177/0893318905280324.

Miller, K. I. (2002). The experience of emotion in the workplace: Professing in the midst of tragedy. *Management Communication Quarterly, 15,* 571-600. doi: 10.1177/0893318902154003.

Miller, K. I. (2009). *Organizational communication: Approaches and processes (5th ed.).* Boston: Wadsworth Cengage Learning.

Miller, K.I., Birkholt, M., Scott, C., & Stage, C. (1995). Empathy and burnout in human service work: An extension of a communication model. *Communication Research, 17,* 300-326. doi: 10.1177/009365095022002001.

Mumby, D. K. (1997). Modernism, postmodernism, and communication studies: A rereading of an ongoing debate. *Communication Theory*, 7, 1, pp. 1-28.

Mumby, D. (2011). What's cooking in organizational discourse studies? A response to Alvesson and Karreman. *Human Relations, 64*, 1147-1161. doi: 10.1177/0018726711408367.

Murphy, A.G. (1998). Hidden transcripts of flight attendant resistance. *Management Communication Quarterly, 11,* 499-535. doi: 10.1177/0893318998114001.

Murphy, A.G. (2002). Organizational politics of place and space: The perpetual liminoid experience of commercial flight. *Text and Performance Quarterly,* 22, 297-316.

Myers, K. K. (2005). A burning desire: Assimilation into a fire department. *Management Communication Quarterly*, *18*, 3, pp. 344-284. doi: 10.1177/0893318904270742.

Myers, K. K. & McPhee, R.D. (2006). Influences of member assimilation in workgroups in high-reliability organizations: A multi-level analysis. *Human Communication Research*, *32*, 440-468. doi: 10.1111/j.1468-2958.2006.00283.x.

Newcomb, T. (1953). An approach to the study of communicative acts. *Psychological Review, 60,* 393-404.

Orlikowski, W. (2007). Socialmaterial practices: Exploring technology at work. *Organization Studies, 28, 9,* 1435-1448. doi: 10.1177/0170840607081138.

Orlikowski, W., & Scott, S. V. (2008). Chapter 10: Sociomateriality: Challenging the separation of technology, work and organization. *The academy of management annals*, *2*, *1*, 433-474. doi:10.1080/19416520802211644.

Phillips, N. & Oswick, C. (2012). Organizational discourse: Domains, debates, and directions. *The Academy of Management Annals,* 1-47. doi: 10.1080/19416520.2012.681558.

Pierce, T. & Dougherty, D.S. (2002). The construction, enactment, and maintenance of power-as-domination through an acquisition: Case of TWA and Ozark airlines. *Management Communication Quarterly*, *16, 2*, 129-164. doi: 10.1177/089331802237232.

Poole, M. S. & McPhee, R. D. (2005). Structuration theory. In S. May and D.K. Mumby (Eds.), *Engaging organizational communication theory and research: Multiple perspectives* (pp. 171-195). Thousand Oaks, CA: Sage.

Putnam, L. L. & Fairhurst, G. T. (2001). Discourse analysis in organizations. In F. M. Jablin & L. L. Putnam (Eds.). *The new handbook of organizational communication*. Thousand Oaks, CA: Sage, 78-136.

Putnam, L. L. & McPhee, R. D. (2009). Theory buildling: Comparisons of CCO orientations. In L.L. Putnam, & A.M. Nicotera (Eds.). *Building theories of organization: The constitutive role of communication* (pp. 187-207). New York, Routledge.

Putnam, L. L. & Nicotera, A. M. (Eds.). (2009). *Building theories of organization: The constitutive role of communication.* New York, Routledge.

Putnam, L. L. & Nicotera, A. M. (2010). Communicative constitution of organization is a question: Critical Issues for addressing it. *Management Communication Quarterly, 24, 1,* 158-165. doi: 10.1177/0893318909351581.

Putnam, L. L. & Pacanowsky, M. E. (1983). *Communication and organizations: An interpretive approach*. Beverly Hills, CA: Sage.

Ray, S. (1997). *Swiftwater rescue: A manual for the rescue professional*. Ashville, NC: CFS Press.

Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European Journal of Social Theory*, *5*, 243-263. doi: 10.1177/13684310222225432.

Reed, M. (1998). Organizational Analysis as Discourse Analysis: A Critique. In D. Grant, C. Oswick and T. Keenoy [Eds.]. *Discourse and Organization.* London: Sage.

Reed, M. (2000). The Limits of Discourse Analysis in Organizational Analysis, *Organization, 7, 3,* 524–30.

Reed, M. (2004). Getting real about organizational discourse. In D. Grant, C. Hardy, C. Oswick, & L. Putnam (Eds.), *The Sage handbook of organizational discourse* (pp. 413–420). London: Sage.

Reed, M. (2005). Reflections on the 'realist turn' in organization and management studies. *Journal of Management Studies, 42*, 1621-1644. doi: 10.1111/j.1467-6486.2005.00559.x.

Roberts, K. H. & Bea, R. (2001). Must accidents happen? Lessons from high-reliability organizations. *Academy of Management Executive, 15, 3,* 70-78.

Roberts, K. H., Rousseau, D. M., & La Porte, T. R. (1994a). The culture of high reliability: Quantitative and qualitative assessment aboard nuclear powered aircraft carriers. *Journal of High Technology Management Research*, *5*, 141-161.

Roberts, K. H., Stout, S. K., & Halpern, J. J. (1994b). Decision dynamics in two high reliability military organizations. *Management Science, 40*, 5, 614-624.

Rochlin, G. I. (1989). Organizational self-design is a crisis-avoidance strategy: U.S. naval flight operations as a case study. *Naval War College Review*, *40*, 4, pp. 76-90.

Rochlin, G. I., La Porte, T., & Roberts, K. H. (1987). The self-designing high reliability organization: Aircraft carrier flight operation at sea. *Naval War College Review*, *40*, 76-90.

Rogers, R. A. (1998). Overcoming the objectification of nature in constitutive theories: Toward a transhuman, materialist theory of communication. *Western Journal of Communication, 62*, 244–272.

Ryle, G. (1949). *The concept of mind.* Chicago, IL: University of Chicago Press.

Sawyer, M. S. (2004). Nonverbal ways of communicating with nature: A cross-case study. *The environmental communication yearbook*, 241-266.

Schatzki, T. (1996). *Social practices: A Wittingsteinian approach to human activity and the social*. Cambridge, UK: Cambridge University Press.

Schatzki, T. (1997). Practices and actions a Wittgensteinian critique of Bourdieu and Giddens. *Philosophy of the social sciences, 27, 3,* 283-307.

Schatzki, T. (2001). Introduction: Practice theory. In T. Schatzki, K. Cetina & E. Savigny (Eds.), *The practice turn in contemporary theory* (pp. 1-14). London: Routledge.

Schatzki, T. (2002). *The site of the social: A philosophical account of the constitution of social life and change.* University Park, PA: The Pennsylvania State University Press.

Schatzki, T. (2005). The sites of organizations, *Organization Studies, 26,* 465-484. doi: 10.1177/0170840605050876.

Scott, C. & Myers, K. K. (2005). The socialization of emotion: Learning emotional management at the fire station. *Journal of Applied Communication Research*, *33*, 1, 67-92. doi:10.1080/0090988042000318521.

Segal, S. (2010). A Heidegerian approach to practice-based reflexivity. *Management Learning, 41,* 379-389. doi: 10.1177/1350507609346367.

Shepherd, G. J., John, J. St., & Striphas, T. [Eds.]. (2006). *Communication as…: Perspectives on theory* (pp. 67-74). Thousand Oaks, CA: Sage.

Shotter, J. (2009). Listening in a *way* that recognizes/realizes the world of 'the other.' *International Journal of Listening, 23, 1,* 21-43. doi: 10.1080/10904010802591904.

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

Stohl, C. & Stohl, M. (2011). Secret agencies: The communicative constitution of a Clandestine organization. *Organization Studies, 32,* 1197-1215. doi: 10:1177/0170840611410839.

Strauss, A. & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* Newbury Park, CA: Sage.

Styhre, A. (2004). The (re)embodied organization: Four perspectives on the body in organizations. *Human Resource Development International, 7*, *1*, 101-116. doi:10.1080/1367886032000150578.

Suchman, L. A. (2007). *Human-machine configurations: Plans and situated actions 2nd edition*. Cambridge: Cambridge University Press.

Taylor, J. R. (1993). *Rethinking the theory of organizational communication: How to read an organization.* Norwood, NJ: Ablex.

Taylor, J. R. (2006). Coorientation: A conceptual framework. In F. Cooren, J. R. Taylor, & E. J. Van Every [Eds.]. *Communication as organizing: Empirical and theoretical explorations in the dynamic of text and conversation* (pp. 141-156). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Taylor, J. R. (2009a). Organizing from the bottom up? Reflections on the Constitution of Organizing in Communication. In L.L. Putnam & A.M. Nicotera [Eds.]. *Building theories of organization: The constitutive role of communication* (pp. 153-186). New York, NY: Routledge.

Taylor, J. R. (2009b). The communicative construction of community: Authority and organizing. In A. Sannino, H. Daniels, & K. Guitérrez [Eds.]. *Learning and expanding with activity theory* (pp. 228-239). New York: Cambridge University Press.

Taylor, J. R. (2011). Organization as an (imbrication) configuring of transactions. *Organization Studies, 32, 9*, 1273-1294. doi: 10.1177/0170840611411396.

Taylor, J. R. & Robichaud, D. (2004). Finding the organization in the communication: Discourse as action and sensemaking. *Organization, 11, 3,* 395-413. doi: 10.1177/1350508404041999.

Taylor, J. R. & Van Every, E. J. (2000). *The emergent organization: Communication as its site and surface*. Mahwah, NJ: Lawrence Erlbaum.

Taylor, J. R. & Van Every, E. J. (2011). *The situated organization: Case studies in the pragmatics of communication research.* New York, NY: Routlege.

Taylor, J. R., Groleu, C., Heaton, L. & Van Every, E. (2001). *The computerization of work: A communication perspective*. Thousand Oaks, CA: Sage.

Texas Engineering Extension Service (TEEX). (2006). *Structural collapse technician 2*. College Station, TX: TAMU.

Thackaberry, J. A. (2004). "Discursive opening" and closing in organizational self-study: Culture as trap and tool in wildland firefighting safety. *Management Communication Quarterly*, *17*, 319-359.

Titscher, S., Meyer, M., Wodak, R., & Vetter, E. (2002). *Methods of text and discourse analysis*. Thousand Oaks, CA: Sage.

Trethewey, A. (1999). Disciplines bodies: Women's embodied identities at work. *Organization Studies, 20, 3*, 423-450.

Trethewey, A., Scott, C., & LeGreco, M. (2006). Constructing embodied organizational identities: Commodifying, securing, and servicing professional bodies. In B. J. Dow & J. T. Wood (Eds.), *The SAGE Handbook of Gender and Communication* (pp. 123-141). Thousand Oaks, CA: Sage.

Tyler, M. & Cohen, L. (2010). Spaces that matter: Gender performativity and organizational space. *Organization Studies, 31,* 175-198. doi: 10.1177/0170840609357381.

U.S. Army Corps of Engineers. (2006). *Shoring operations guide*.

Van Leeuwen, T. (2008). *Discourse and practice: New tools for critical discourse analysis.* New York, NY: Oxford

Weick, K. E. (1979). *The Social Psychology of Organizing.* New York: McGraw-Hill.

Weick, K. E. (1987). Organizational culture as a course of high reliability. *California Management Review*, *29*, 2, 112-127.

Weick, K.E. (1993). The collapse of sensemaking in organizations: The Mann Gulch Disaster. *Administrative Science Quarterly*, 38, 4, 628-652

Weick, K. E. (1995). *Sensemaking in organizations.* Thousand Oaks, CA: Sage.

Weick, K. E. (2001). *Making sense of the organization.* Malden, MA: Blackwell Publishing.

Weick, K. E. & Putnam, T. (2006). Organizing for mindfulness: Eastern wisdom and western knowledge. *Journal of Management Inquiry, 15, 3,* 275-287. doi: 10.1177/1056492606291202.

Weick, K. E. & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly, 38*, *3*, 357-381.

Weick, K. E. & Sutcliffe, K. M. (2001). *Managing the unexpected: Assuring high performance in an age of complexity.* San Francisco, CA: Jossey-Bass.

Weick, K. E. & Sutcliffe, K. M. (2007). *Managing the unexpected: Resilient performance in an age of uncertainty (2nd ed.).* San Francisco, CA: Jossey-Bass.

Weick, K. E., Sutcliffe, K. M. & Obstfeld, D. (1999). Organizing for high reliability: Processes of collective mindfulness. In B. Staw & R. Sutton (Eds.), *Research in Organizational Behavior* (*Vol. 21*, pp. 81-123). Greenwich, CT: JAI Press Inc.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.* Cambridge, UK: Cambridge University Press.

Wittgenstein, L. (1953). *Philosophical investigations*. Oxford, UK: Blackwell.

Wittgenstein, L. (1980). *Remarks on the philosophy of psychology (Vols. 1-2)*. Oxford, UK: Basil Blackwell.

Wittington, R. (2006). Completing the practice turn in strategy. *Organization Studies, 27,* 614-634. doi: 10.1177/0170840606064101.

Yakhlef, A. (2010). The corporeality of practice-based learning. *Organization Studies, 31*, 409-430. doi: 10.1177/0170840609357384.

Ziegler, J. A. (2007). The Story Behind an Organizational List: A Genealogy of Wildland Firefighters' 10 Standard Fire Orders. *Communication Monographs, 74*, 415-442. doi:10.1080/03637750701716594.

Zoller, H.M. (2003a). Health on the line: Identity and disciplinary control in employee occupational health and safety discourse. *Journal of Applied Communication Research, 31, 2,* 118-139. doi: 10.1080/0090988032000064588.

Zoller, H.M. (2003b). Working out: Managerialism in workplace health promotion. *Management Communication Quarterly, 17, 2,* 171-205. doi: 10.1177/089318903253003.

APPENDIX A

ENACTING SAFETY

Practice	**Definition**	**Illustration from Data**	**BSO Interplay**	**Implication**
Navigating Risk:				
Assess Risk	Through education, occupational background, training, and embodied response experience, responders better attend to situational hazards.	"If you are observant…[of] your surroundings you should be able to learn over time how those things are going to act, how fire is going to act, how dirt is going to move…" (Howard).	Body-Site Assessing is developed through repetitive body-site interaction.	Navigating risk is dependent on embodied know-how developed by placing responders bodies in risky sites. Reliability is produced in the possibility of unreliability.
Name Acceptability	Labeling the acceptability of risk is a joint activity that facilitates practice selection and/or improvisation to match risk.	"So we take calculated risks from time to time, and some people might think they're way out of bounds, but they weren't there at the time" (Cody).	Body-Site Naming acceptability requires responders to collectively judge based on their body-site interactions. Through bodies, risks are given acceptability frames.	Navigating risk pivots on how labels of acceptable, unacceptable, or calculated/manageable are negotiated *in* and *through* body-site interplay and lead to reliable practices.
Plot Strategically	This practice within navigating risk combines risk assessment and labeling to generate plans that help stop incidents before they happen.	Howard compares plotting and acting to "plate spinning" to note the ongoing nature of this practice. "If we can't say 100% of the time that they are going to be safe, then we will stay out of the path of the storm" (Hank).	Body-Site-Tool Strategically plotting a course or set of search and rescue practices aims to decrease risk by using bodies and tools to modify or avoid sites.	Navigating risks integrates assessing and naming practices to generate a course of action that either 1) safely maneuvers through the site with bodies and tools or 2) avoid the site.

Practice	Definition	Illustration from Data	BSO Interplay	Implication
Feeling Danger:				
Sensing	Hearing, seeing, tasting, smelling, and feeling are sensory ways to detect risks.	Feeling danger "really comes down to *experiencing* things you have seen, things you have heard, and things you have read about before… it is really *knowing* the environment" (Cody).	Body-Site Sensing is an embodied practice that is enabled by body-site interaction.	Responder bodies are primed to feel danger by exposing their bodies to risky, dynamic sites. Sensing improves with greater exposure to sensory stimuli over time.
Intuiting	Intuiting is a "sixth sense" response to a situation that is not easily rationalized to others.	"There is absolutely a sixth sense for people that are experienced that they know something is not right" (Howard).	Body-Site Intuition or a "sixth sense" are embodied reactions to anticipated site risks.	Responders exhibit pre-linguistic bodily reactions to perceived risks that, in turn, have implications as how they will act.
Feeling	Feelings, including fear and stress, are natural, emotive responses in search and rescue.	"When I made it out, I had a wave of fear rage over me" (Chad). "You've got to be able to talk about these things [post traumatic stress]" (Chad).	Body-Site The body feels a wide range of emotions that can heighten senses in risky sites and that can distract.	Emotions are normalized in the talk of USAR-A and cast as helpful (i.e. fear heightening senses). Responders recognize the need to communicate openly about their feelings.
Protecting Self:				
Safety Equipment	Safety gear is specified by type of response and anticipated risks (i.e. wet suit, gloves).	"Safety boots, respirator, helmet/headlamp, spare batteries, " etc…should be on the responder at all times in collapsed structure (TEEX, 2006).	Body-Tool Safety equipment is a tool to diminish risks posed by sites.	Protecting self is, in part, the responsibility of the responder to adorn his or her body with proper gear that acts as an extension of the body. Such gear protects from site.
Safety Order	The order of safety is: 1) me the responder, 2) we the team, 3) uninvolved parties, and 4) the patients or victims (Warren).	"Our primary objective when we do anything is to make sure none of our guys get hurt" (Carl).	Body Safety order is about imposing a value-system onto bodies to minimize the amount of victim bodies that need rescuing.	Protecting self prioritizes the safety practices of the individual responder over others to ensure responders do not become victims.

Practice	Definition	Illustration from Data	BSO Interplay	Implication
Protecting Self:				
Hygiene	Personal hygiene, such as hand washing and taking showers, prevent negative health outcomes.	"Being able to shower, being able to have clean hands, being able to use the restroom… " (Chad).	Body-Site-Tool Bodies are exposed to health risks in the site, but tools can enhance health and bodily capability.	Site hazards and/or lack of tools threatens personal hygiene practices. Tools, such as port-a-potties or portable showers, restore hygienic practices.
Hydration & Nutrition	Hydration and nourishment prevent negative health outcomes.	Bottled water and MRE's are normal sources of hydration and nourishment (TEEX, 2006).	Body-Tool-Site Bottled water is a tool for hydration to protect body from inattentiveness to site.	Site conditions often preclude access to clean drinking water and food, but bottled water and MRE's function similarly.
Rest	Sleep deprivation threatens responders' abilities to navigate risks reliably.	"Proper shift lengths need to be enforced and appropriate rehab facilities should be provided" (TEEX, 2006, p. PM-57).	Body-Site-Tool Body is privileged in the transformation of site for rehabilitation.	Rehab sites use presence (i.e. cots/beds) and absence (i.e. turn off phones) to carve out a site within a site – rehabilitation site within disaster site.
Protecting Responders:				
Buddy System	Responders pair up with one another and monitor risks for one another.	"You don't think 'safety first,' you think 'I don't want my buddy to get hurt'" (Carl).	Body-Body-Site Buddies protect one anther from site risks.	By taking responsibility for one another's safety, interdependence and trust emerge.
Safety Officer	The official role of a safety officer helps the team enact safety. The decentralization of the safety officer disperses risk monitoring.	"I think seeing safety for everybody is probably the biggest priority, and then there are a lot of others fall-out pieces" (Howard).	Body-Body-Site Responders' bodies protect responders' bodies from site risks.	Every*body* prioritizes safety.

APPENDIX B

PERFORMING RESPONSE

Practice	Definition	Illustration from Data	BSO Interplay	Implication
Scripted	Scripted practices are routines that follow step-by-step guidelines for expected performances.	The *Shoring Operations Guide* (2006) provides step-by-step guidelines as to how responders should enact the "expected performance" to complement the shoring practice with the appropriate tools, guidelines, and technical information about the site and victim access.	Body-Site-Tool Responders use scripted performances when their bodies are able to predict and control sites and tools.	Scripts highlight bodily control over sites and tools. Experience with different types of disaster sites, building materials, shoring techniques, water rescues, responder expertise and institutional affiliations becomes a repertoire of scripts to draw on and adapt to fit the situational demands.
Improvisational	Improvisational performances call for adjusting or adopting practices to the dynamic nature of material interplay.	An "essential concept is that swift water is different than other forms of water rescue, and that rescue techniques must be adapted accordingly" (Ray, 1997, p. 34).	Site-Body-Tool When situational exigencies exceed the scope of scripted practices, improvisational bodies use embodied skills/capabilities and tools to collectively restore reliability.	Site exigencies (i.e. rising flood waters) occur in unpredictable ways and demand bodily improvisation to adjust and adopt tools and practices that fit the situation.
Training Bodies	USAR-A requires 90 hours of yearly training that combines instruction and disaster simulations to teach responders scripted performances and the need for improvisation.	Training adopts a "show it, teach it, do it" model (Howard). "To me, I think the biggest aspect of all of this is that everybody should be cross-trained" (Larry).	Body-Site-Tool Training presents bodies with scripted practices, places bodies in fluid sites, and provides tools to perform response.	Realistic sites stimulate both scripted and improvisational performances to cultivate embodied experiences.

Practice	Definition	Illustration from Data	BSO Interplay	Implication
Searching Sites	Responders coordinate to use a repertoire of skills, abilities, and tools by which to navigate through sites to locate victims (i.e. canine searches and thermal imaging).	"There are different levels of search. We have a hasty, we have a deliberate, and then we have a thorough…" (Hank). "Our searching was literally a, I'm going to use the term 'windshield survey,' of the exterior of the building" (Hank).	Site-Body-Tool Searching practices and processes are determined based on responders' assessment of the site in a hasty search and on the responders' embodied skills, capabilities, and access to tools.	The site-body relationship is often mediated through tools to perform hasty, deliberate and thorough searches.
Rescuing Bodies:				
Collapsed Structure	Responders coordinate their experienced, trained bodies in confined spaces, flooded structures, and trenches while transporting and using technology and tools to breach and stabilize the structure.	"Structural collapse is kind of a different animal in the beginning for search and rescue, because it's really combining all the skills from water related incidents to rope related incidents to confined space…" (Cody).	Site-Tool-Body Site conditions and the rapid changes in those conditions affect how bodies maneuver through the site and how tools will be used.	The collapsed structure practices are only as reliable as the training and embodied know-how of the responder and his or her tools. The types of breaching, shoring and lifting must complement site conditions.
Swift Water	Responders coordinate their experienced, trained bodies in moving water, boats, and helicopters to intercept victims. Swimming practices are key to swift water rescue.	"You will get stuck in that drain and all the water that is forced through the drain, no one will be able to pull you out of there and you know those are the things that you learn in water rescue training" (Derrick).	Site-Body Swift water rescue practices highlight the relationship between a dynamic and dangerous site and responders' trained and experienced bodies.	Swift water practices are only as reliable as the familiarity of the responders with hydrology and the best practices for water dynamics.

Practice	Definition	Illustration from Data	BSO Interplay	Implication
Rescuing Bodies:				
Calming Victims	Calming victims requires an assessment of the victim and responder-victim interaction, verbal and/or nonverbal.	Combat and rescue swimming practices, which utilize reverse and ready strategies, enable responders to use their bodies to reposition panicked victims (Ray, 1997).	Body-Body Body to body interaction may be linguistic (i.e. communicating plan to victim) or nonverbal (i.e. using reverse and ready to control and calm panicked victim).	Responders coordinate search and rescue with one another but also with victims through body-body interplay.
Resourcing Communication:				
Signaling	Signaling is a multi-step process of using timed blasts of noise to communicate: evacuate, cease operations, and resume operations.	"Air horns, car horns, whistles, the P.A.S.S. device and clear text over the radio are all excellent methods for signaling" (TEEX, 2006, p. PM-25).	Body-Tool Signaling privileges bodily capabilities and technology as a means of overcoming site and tool barriers to communicate.	Signaling enables communal activity.
Marking	Orange markings follow a pattern to indicate hazards, search assessment, and victim location.	If a response team came upon a department store in their search grid, they would look to see if a slash marked an entry point to indicate a search in progress.	Site-Body Bodies, trained in the marking practice, mark sites to communicate with other responders.	Marking becomes an organizational text for decentralized tracking of response activity.
Centralizing	Response teams communicate with the coordination center, which, in turn, communicates with all of the response teams.	"We [coordination center] triage the information and we turn around and sent it back out. And what it does, it allows one central point for communication " (Cameron).	Site-Body-Tool Responders emphasize the role that the coordination center, as a site, plays in tracking and coordinating both bodies and tools.	As a site, the coordination center demonstrates how space arrangement, communications technologies and objects (i.e., wall-sized map) intertwine in communicative activity.

Practice	Definition	Illustration from Data	BSO Interplay	Implication
Resourcing Communication:				
Codifying: Hot Washes	Hot washes are a communication practice that reflexively examines the organizational response as it is going on.	"From a quick perspective, you know, the hot wash is just that, it is done very quickly, very spontaneously, and it is what is most permanent on your mind, so I think you would get a lot of fresh thoughts on the incident" (Derrick).	Body-Site-Objects In situ, hot washes are contextualized by and prompted by the body-site-object interplay in the activity being discussed.	Hot washes set agendas for AAR's and provide a means for talking through improvisational practices.
Codifying: After Action Reports	AAR's are a communication practice that reflexively examines the organizational response and codifies best practices for future training and deployments.	"And the only way that we improve is to learn from either mistakes or opportunities and apply those for future lessons" (Chad).	Body-Site-Objects Responders' bodies (bodily awareness, fatigue, senses, memory, etc.) enable and constrain the process and outcome of the discussion.	AAR's codify best practices by providing a communicative practice to materialize ways of doing.

APPENDIX C

SOCIOMATERIAL PRACTICES IN HROS

Sociomaterial Emergency Response Practices		**Characteristics of Anticipation**	**Characteristics of Containment**	**Implications**
Enacting Safety				
Navigating Risk	Assess Risk	Assessing risk integrates education, occupational background, training, and embodied response experience to produce attentiveness to site hazards commensurate with sensitivity to operations.		Assessing risk privileges the embodied knowledge or know-how developed through body-site interactions.
	Name/Label Risk as Acceptable or Unacceptable	Labeling the acceptability of risk is a joint activity that facilitates practice selection and/or improvisation to match practice complexity with site complexity. This labeling system partially describes how USAR-A enacts a reluctance to simplify.		The act of labeling risks is communicatively accomplished through symbolic interaction between responders about and within BSO interrelationships.
	Strategically Plot Course	Strategically plotting a course or set of search and rescue practices aims to decrease risk by using bodies and tools to modify or avoid sites. This practice within navigating risk combines risk assessment and labeling to generate plans that help stop incidents before they happen.		Strategically plotting a course integrates other anticipatory practices to accomplish one of two things: 1) construct a plan that uses bodies and tools to safely navigate through sites, or 2) construct a plan that removes bodies from the unacceptable site risks, which may mean dependence on objects to continue search and rescue or to halt operations.
Feeling Danger		Sensing and intuition are primarily associated with anticipation by prompting responders when risks threaten reliability.	Feeling danger overlaps with containment practices because feeling danger is used in-action to adopt and adjust practices to mitigate negative outcomes and contain incidents.	Sensory cues and embodied experience are privileged in both anticipation and containment, therefore, privileging the body-site relationship.
Protecting Self		Protecting self anticipates plausible risks and enacts practices to protect one's own body (i.e., hydrating with clean water, using hygienic practices, etc.).	Protecting self may also contribute to containment. For example, a rescue swimmer tethered to a victim may cut the rope if the victim or site further endangers the responder.	Protecting self privileges the responder's own body. Anticipatory and containment practices that protect self depend on embodied experience, body positioning, tacit understandings of tool use and avoiding unacceptable site risks.
Protecting Responders		Protecting responders reflects the "responder first" culture embodied in safety officer practices employed by all responders. As safety officers, responders anticipate risks.	Protecting responders is heightened when direct threats to safety emerge to contain the risks to responder safety.	Protecting responders privileges the bodies of their "buddies." Anticipatory and containment practices that protect responders depend on embodied experience, body positioning, tacit understandings of tool use and avoiding unacceptable site risks.

Sociomaterial Emergency Response Practices		Characteristics of Anticipation	Characteristics of Containment	Implications
Performing Response				
Training Bodies		Training and cross-training exhibit a "show it, teach it, do it" that facilitates experiential implementation of search and rescue practices and development of trust (Taylor). Training anticipates disaster complexities and simulates realistic sites.	Training and cross-training become learning mechanisms for skillful reactions during missions. In particularly, training and cross-training increase the availability of expertise to which to defer. The interdependency developed through training further promotes deference to expertise by building trust between responders.	Training situates responders' bodies in risky, dynamic sites and requires responders to navigate in and through the anticipated site using tools to perform search and rescue practices. Ecological coherence develops in micro-level interactions within the response team and at the organizational level in the showing, teaching and evaluating of practices.
Searching Sites		Searching sites relies on feeling danger and specified search practices and technologies to identify the location of victims. Complexity and awareness are requisite for safety and practice appropriateness.	Despite the overlay of navigating risk onto searching sites, search practices are invoked because of an unexpected event.	Searching sites privileges a site-body relationship that is mediated through tools. To anticipate reliably, searching subsumes enacting safety practices, and to contain reliably, searching practices match site complexity.
Rescuing Bodies		Collapse structure and swift water rescue demand reflexivity, complexity, and awareness to implement, adjust or adopt practices that safely access, extricate and transport victims.	Because of fluctuating sites and unpredictable victims, responders must contain risks in collapse structures and swift water.	Performing collapse structure and swift water rescue practices situates responders' bodies in ongoing incidents. Practice complexity, reflexivity in-action, and site monitoring facilitate safe performances and containing incidents.
Resourcing Communication	Signaling	Responders use a shared communication system to alert one another to risks and enact complex search and rescue practices.	Signaling is an act or countermeasure that generates increased reliability when physical threats heighten or manifest.	Signaling coheres responders and BSO interrelationships in the joint enactment of search and rescue.
	Marking	Marking buildings with symbols to indicate risks and victim locales facilitates joint navigation of risk.	Marking is a reactive practice, in that; marks are made in orange to indicate risks/threats.	Markings indicate site conditions that enable and constrain reliability and, thus, influence the navigation of risk. By marking buildings, responders employ a communicative practice that shapes performing response practices and simultaneously transforms the site.
	Centralizing	Centralizing communication through the coordination center at USAR-A headquarters accomplishes the aims of reluctance to simplify and sensitivity to operations functions of anticipation.	Tracking, mapping, recording and communicating are the primary activities conducted in and through the coordination center that influence how and where response practices are performed.	The coordination center's layout and design (space) evolved from activity and information sharing during deployments (i.e. wall-sized map hung and relocated for isolation) so that information sharing with teams on site would enhance response performance.

Sociomaterial Emergency Response Practices		Characteristics of Anticipation	Characteristics of Containment	Implications
Performing Response				
Resourcing Communication	Codifying	After action reporting is an of-action communicative practice that is affected by the physical condition of responders directly following a mission and influences future responses in the codification of best practices through reflexivity. Because AAR's are officially conducted at the culmination of operations, these practices are classified as anticipatory, in particularly preoccupation with error.	Hot washes are in-action communicative practices that are contextualized by and interpenetrated by the sociomaterial forces at the deployment site and influence the codification of best practices through reflexivity. Because hot washes are conducted in the field, these practices are both anticipatory, in the sense that they help navigate risks, and containment, in the sense that they help mitigate negative outcomes of unfolding incidents.	After action reporting and hotwashes contribute to the codification of performing response by shaping best practices. Bodies, sites and objects have agential properties that influence the communicative process and influence the outcome of best practices.