American Communication Journal
Volume 6, Issue 2, Winter 2003

A "Worldview" of Disaster: Organizational Sensemaking in a Wildland Firefighting Tragedy

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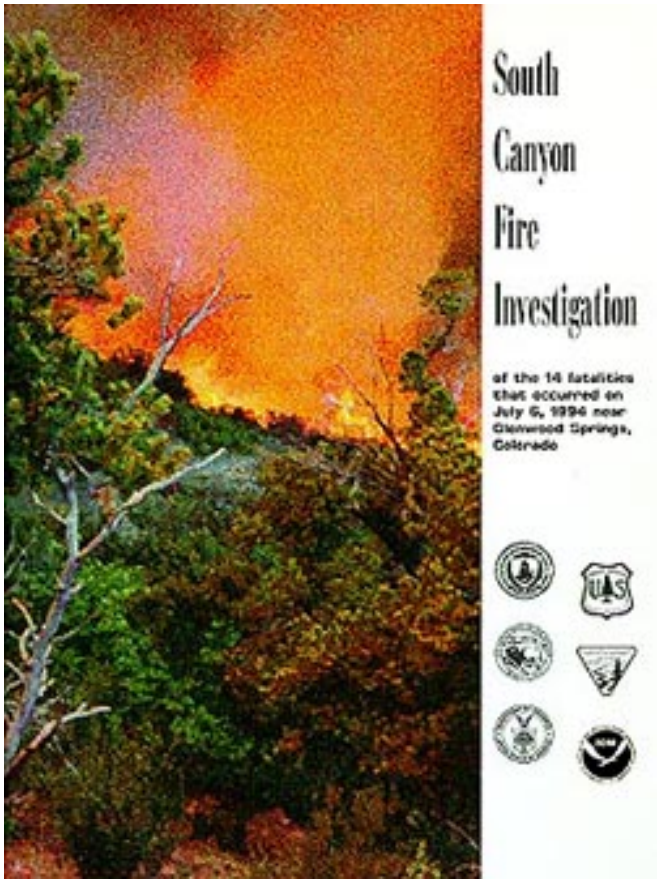
Abstract

Using the 1994, South Canyon fire in Colorado as a case study, this article suggests Taylor's (1993) concept of worldview functions as an important "frame" for organizational sensemaking (Weick, 1995a). Taylor argues that organizations use either an "activity" or "particle" orientation. An activity view focuses attention on organizational units while a particle view sees the organization from the point of view of the product or customer. Results from this study indicate that an organization's worldview functions as an overarching metaphor that influences sensemaking and decision-making processes, and that the worldview perspective in retrospective accounts may differ from that of the participants themselves.

Introduction

Every summer wildfires burn throughout much of the western United States and young men and women, many of them college students, answer the seasonal call to battle these blazes. Often these summers are marked by tragedy as the deaths of four firefighters in central Washington and two in northern California during the summer of 2001 brutally reminded us. Crisis situations, such as these firefighting disasters, provide a salient opportunity to study organizational decision making and provide lessons for organizational theory and practice (Alder, 1997; N. Maclean, 1992; Perrow, 1999; Weick, 1990, 1993, 1996). Focusing on accounts of a Colorado fire in 1994, the purpose of this analysis is to examine how Taylor's (1993) two "worldviews" function as sensemaking frames in retrospective accounts and during crisis decision making.

By arguing that "worldview" is an important, but overlooked "frame" for sensemaking (Weick, 1995a), this analysis posits that the way we "see" organizations influences the way people make sense of organizations and subsequently, the decisions people make. This study finds that worldview functions as an overarching criterion for sensemaking and that the worldview perspective applied in retrospective accounts differs from that applied in real-time crisis decision making. As a result, analyses of crises and subsequent recommendations often fail to take into account the worldview perspective of the people involved. The South Canyon Fire is used as a case study as it evidences the influence of worldview on sensemaking in one crisis situation. Organizational tragedies, such as occurred with firefighting organizations at South Canyon, are particularly valuable for analyzing decision making and sensemaking because the consequences of poor decisions, even seemingly insignificant ones, are magnified in the resulting search for answers.



(SCAIT,1994)

Literature Review

Taylor (1993) argues that examinations of organizations take the perspective of one of two "worldviews." Worldview is a systems theory concept that points to contrasting ways of thinking about and seeing problems. These orientations occur simultaneously, but according to Taylor, cannot be viewed simultaneously; taking one perspective necessarily diminishes the other. Like two different cameras looking at the same event from different angles, each perspective illuminates certain features while at the same time obscuring others. People can alternate between these two perspectives, but many get "stuck" using one worldview. Taylor takes the concept of worldview and applies it to organizational studies through two perspectives: "activity" and "particle" orientations.

> The difference between the two perspectives is this: In simulating some system and measuring its performance, one can either track the path of the entities processed by the system--the particles--or one can follow the behavior of the organizational units responsible for the processing--the activities. (Taylor, 1993, p. 33)

Particle and Activity Perspectives

The particle worldview is a metaphor, or way of thinking and seeing (Morgan, 1986), that highlights the perspective of the product or customer. This orientation provides a general understanding of the entire system, across various unit or departmental boundaries. Taylor (1993) explains, "A particle orientation is a variant of what is more usually called a product or service or customer orientation. Productivity in this sense aims at quality from the point of view of the customer" (p. 35). The particle view is particularly useful for thinking about how an organization performs interdependently to produce a product or service for a customer. From this view, the organization is seen as numerous processes that are linked together, each influencing the final end state of the product.

Organizational reality differs when seen from an activity perspective as compared to a particle perspective. An activity orientation is a metaphor that focuses attention on the point of view of the organizational units that process the product or customer (Taylor, 1993). From this point of reference, the organization is a set of individual units that perform a specific function or process. In organizational practice, we see this view represented in the specialization and division of organizational functions. Large organizations assign uniquely trained groups responsibility for such activities as sales, production, quality assurance, human resources, engineering, and accounting. In many organizations, tasks are broken down into even more specialized functions such as systems engineering, mechanical engineering, quality engineering, and optical engineering. Each of these activities, complex in their own ways apart from any other functions of the organization, requires specialized knowledge and training to successfully complete.

Communication and Worldview

Both the activity and particle perspectives have implications for communication. In the simplest terms, the particle view emphasizes communication across organizational and divisional boundaries, while the activity perspective accentuates communication within a specialized unit. The particle perspective provides a macro view of the overall communication network. Communication is highlighted from this perspective as the organization must coordinate the product as it progresses through its phases of development. From an activity perspective, on the other hand, communication within a particular organization, division, or unit is emphasized. Specialization requires rich vocabularies of knowledge. An activity perspective highlights the detailed communication necessary to complete complex and highly particular tasks.

Tendencies Toward an Activity Perspective

Both an activity and particle perspective exist simultaneously, but the activity perspective traditionally dominates most organizations (Taylor, 1993). An organizational chart is an artifact that illustrates this tendency toward an activity orientation. Companies are arranged into departments that take responsibility for specific activities such as production, sales, marketing, or accounting. As a result of establishing separate departments, many organizations fail to achieve the needed coordination among departments to fully realize their goals.

> Furthermore, worldviews, as soon as they find symbolic expression in language, tend to become collectively institutionalized, in that a given way of interpreting an event comes to be accepted by everyone (or almost everyone) within a culture as legitimated and may be seen as a self-evident truth (inscribed in custom and law). (Taylor, 1993, p. 158)

As people in organizations internalize the activity worldview, it becomes a means for interpreting and creating, through communication, organizational reality.

One problem with relying solely on the activity perspective may be that the "particles will be systematically molded to fit the needs of the activity system" (Taylor, 1993, p. 46). For example, the so called South Canyon Fire actually burned on Storm King Mountain--on the other side of Interstate 70 and across the Colorado River from South Canyon. A man had called from South Canyon to report the fire across the river. The dispatcher, Flint Cheney, who took the report, followed procedures and assigned a name to the fire but erroneously gave the wrong name to the fire. "When asked why he didn't change it to the Storm King fire once he learned the true location, minutes later, Cheney's shoulders drooped. 'It would have been more of a hassle to back out,' he said" (J. N. Maclean, 1999, p. 10). In this case, the activity procedures themselves framed the naming of the fire and then proved rigid as the procedures did not allow Cheney to easily adapt to changes when the true location of the fire was found. Although only a small mistake, this example evidences a larger problem among the firefighting agencies during the South Canyon fire of shaping the events of the fire according to an activity perspective. When the particles are communicatively molded to fit the activity system, the possibilities for miscommunication, inefficiencies, and poor decision making increase.

Sensemaking and Worldview

Sensemaking offers a unique understanding of the way that decision making occurs in organizations (Bantz, 1989; Morgan, Frost, & Pondy, 1983; Sias, 1996; Weick, 1979, 1995a). "The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs" (Weick, 1993, Sensemaking in Mann Gulch section, para. 4). Weick argues that we make sense of life around us, particularly new experiences, after the fact, that is, after we have participated in activities. Then, through discussion with others and subsequent explanations, we construct the meanings for our experiences. Sensemaking, though, is not synonymous with interpretation because sensemaking also implies creation (Weick, 1995a). Action taken in a particular situation, what Weick terms "enactment" (Weick, 1979), serves to create much of the "reality" that is subsequently attributed to that incident.

Weick (1995a) argues that the "content of sensemaking can be embodied in frames" (p. 18) such as: ideology, decision premises, paradigms, theories of action, tradition, and narratives. People draw on these frames as resources for sensemaking--creating links between what they currently see and beliefs cultivated from past experiences. Ideologies, for instance, serve as filters that influence how one makes sense of a particular situation. Bullis (1993) showed how unique professional groups within the U.S. Forest Service differed substantially in the ways they made sense of particular situations. Biologists, for example, who valued "managing ecosystems" often protested decisions that supported the timber industry. Their ideologies filtered the information they choose to focus on, shaped their sensemaking, and influenced how they responded to a particular decision. While most scholars focus on the process of sensemaking, Weick (1995a) cautions that we must be careful not to neglect the words and meanings associated with those words that are being processed. These words and meanings are embodied in frames.

This article argues that worldview functions as a sensemaking frame or mechanism in organizations that can be added to Weick's (1995a) list of frames. All of the frames have in common that they "describe either past moments, present moments, or connections" (p. 111). A worldview perspective helps people make a connection between present moments and past ways of seeing the organization--either activity or particle. An activity perspective, for instance, will serve as a filter that focuses one's attention on words and meanings associated with a particular unit or team. What worldview adds to the substance of sensemaking that is not captured in the other frames noted by Weick is the specific notion that people adopt contrasting orientations to problems. When one takes a particular worldview perspective, he/she is required to temporarily suppress the other (Taylor, 1993). As people become accustomed to taking one perspective, the tendency remains to define all problems from within the frame of that worldview. The perspective a person takes when viewing a problem influences the reality that emerges. The other frames also address the emergence of situated realities, but do not capture these contrasting ways of viewing a problem as does worldview. By combining worldview and sensemaking, we get an idea of why organization members make sense of their organizations in particular ways and why certain problems, such as productivity related to coordination, are so prevalent in many organizations today.

Methods

On July 6, 1994, fourteen firefighters were killed while combating a fire on Storm King Mountain, near Glenwood Springs, Colorado. The South Canyon Fire, as it is officially known, was visible as a plume of smoke from nearby Interstate 70 for several days before any firefighters were sent to fight the blaze. When firefighters did arrive, they found a fire burning in steep, loose terrain amongst vegetation that had been baked by the worst Colorado drought in a decade. The steep terrain made access to the fire difficult and delayed the deployment of elite firefighters to the top of a strategic ridge. Many firefighters later recalled fear and apprehension as they observed the fire conditions and the lack of a readily visible escape route (J. N. Maclean, 1999). As they began to dig a fireline to contain the fire, weather conditions changed and the fire unexpectedly blew-up. Flames climbed 300 feet into the air. Men and women raced for their lives. At this point, seemingly insignificant decisions, such as the moment one started to run or whether or not people dropped their tools (Weick, 1996), made the difference between life and death.

To view images of the fire:

Fire Location	Storm King Mountain	Firefighter Near the Flames	Firefighter Eyes the Blow-Up
Site Overview	Aerial Overhead View	Firefighters Digging on Fatal Fireline	Blow-Up from a Distance

In the aftermath of this tragedy, many questions arose. Why wasn't the fire attacked earlier? Who was really in charge of fighting this fire? Were leaders properly prepared? Why did firefighters seemingly ignore their normal safety guidelines? Why wasn't important information, such as weather warnings, communicated to firefighters on the front lines? Firefighters perished because of a combination of natural and human factors. As with most tragedies, hundreds of seemingly insignificant decisions combined to produce the conditions in Colorado that led to the deaths of four women and ten men. Explanations and alternatives are needed to prevent mistakes from being repeated.

Research Questions

To explore the connections between sensemaking, worldview and decision making at South Canyon, two research questions were asked. As the data for analysis were based on retrospective accounts, the first question asked, "How do particle and activity worldviews affect the retrospective sensemaking of individuals reporting/critiquing past decision-making events?" The second question explored the worldview of the participants themselves, "How do particle and activity worldviews affect decision makers as they make sense of crisis situations and decide how to respond?" Compared, these questions allow for an examination of how worldview may be affected by time and context.

Method

This case study is based on analysis of documents related to the South Canyon Fire. These documents, produced by government agencies, firefighters, academics, and journalists, represent knowledgeable interpretations of the events that occurred at South Canyon. The documents reveal clues as to the way we make sense of disasters and provide insight, though mediated, into the actions of participants themselves. One key document was the *Report of the South Canyon Fire Accident Investigation Team* (SCAIT, 1994), dated August 17, 1994 (click to view the Executive Summary). The accident investigation team included managers and experts from the Bureau of Land Management (BLM), U.S. Forest Service and National Weather Service. The team, formed within hours of the accident, investigated the fire and the fatality sites and interviewed 70 witnesses. The report reconstructs the timeline for the fire and suggests "direct causes" and "contributory causes" in the deaths of the 14 firefighters. An appendix to the report includes hand-written statements from witnesses. In addition to the accident investigation report, I also examined other government reports including the *Final Report of the Interagency Management Review Team* (IMRT, 1995) .dated June 26, 1995. This report proposes safety initiatives in the aftermath of the South Canyon fire and documents the implementation and initial results of those initiatives. I also utilized an Occupational Health and Safety Administration (OSHA) accident report citing management violations in the Forest Service and BLM at South Canyon (click to view summary of OSHA report.)

From the academic literature, I relied on several articles by Weick (1995b, 1996) that deal specifically with analysis of the South Canyon fire as well as one by Alder (1997). Weick's work was especially useful in this analysis as he directly addresses sensemaking processes among firefighters and administrators. I also examined Weick's account to see if he treated the fire as an activity or a particle process.

Finally, I relied on one other significant piece of text to detail the events at South Canyon--a book by John Maclean (1999) entitled *Fire on the Mountain: The True Story of the South Canyon Fire*. To research the book, Maclean interviewed all 35 survivors as well as many others associated with the accident or the investigation, collected thousands of pages of documents from government agencies, newspapers, libraries and other sources, and visited the South Canyon accident site more than a dozen times. Maclean notes that

the research and writing of the book took nearly five years and that he logged almost 50,000 miles by car traveling to gather data in various locations. The book provides the most complete account of the South Canyon Fire to date.

The documents collected for this analysis, like any texts, are mediated representations of events at South Canyon. Ideally, data for such a study of crisis decision making could come from firsthand experience or direct observation. On the other hand, the view of events represented in these accounts merits critique and does offer clues as to the sensemaking of participants. In addition, the exceptional nature of such events makes direct observation by scholars virtually impossible (Turner, 1976). In order to learn from these events, organizational scholars have relied heavily in the past on similar archival accounts to analyze decision making of participants in crisis situations (Alder, 1997; Perrow, 1999; Shrivastava, 1987, Shrivastava, Mitroff, Miller, & Miglani, 1988; Turner, 1976; Weick, 1990, 1993, 1996). As Gephart (1993) rationalized, "Infrequent organizational events, like accidents and disasters, illustrate the importance of using rather than neglecting documentary data. These events need to be investigated because they have significant impacts on organizations and society" (p. 1467). Also contributing to the strength of this data set, all of these documents are available for public review and scrutiny (Tompkins, 1994).

In analyzing the data, I utilized a version of the constant comparison method (Glaser & Strauss, 1967; Lindlof, 1995; Strauss & Corbin, 1990). This method calls for the creation and refinement of data categories through the continual comparison of each new incident with previous incidents. Overall, I started with the decision as the unit of analysis. Although some decisions certainly overlap, the decision, as a unit of analysis, provided an instrumental way to breakup large amounts of data. Decisions were selected if they were discussed in multiple texts and if they were seemingly connected to the deaths of the firefighters. For example, decisions of supervisors and firefighters in the hours before the blow-up to build the fireline downhill was treated in almost every account of the fire and was considered a "direct cause" of the entrapment of the firefighters (SCAIT, 1994). After identifying several dozen key decisions, each was then compared across accounts and across other decisions to draw out the characteristics of the decision. For example, when considering the deployment of fire shelters, firefighter Brad Haugh's decision not to deploy and to run for the top of the ridge must be compared with a claim by investigators that "firefighters on the ridgetop failed to recognize areas where fire shelters could have been successfully deployed" (SCAIT, 1994, p. 30) In instances such as this, I looked to the accounts for reasons as to the sensemaking of the participants as well as the authors of the account in that particular instance. Haugh's witness statement, for instance, emphasized the primacy of 100-foot flames and his confidence in his legs to get him over the ridge. The accident investigators, noting that others following Haugh perished, saw opportunities where fire shelters would have saved lives. For each decision, I made a list of characteristics that seemed to describe the decision. I then compared each decision with the characteristics of the activity and particle worldviews as described above.

One challenge with this study was deciphering worldview at two different levels of analysis: the participants and those writing retrospective accounts. To do so rigorously, I consciously compared each decision at these two related levels of analysis as reflected in the research questions. For example, the failure to communicate weather warnings provided insights into both the sensemaking of those making retrospective accounts and the participants involved. When looking at the treatment of the weather warning in accounts, I noted that they were linked explicitly to discussions of fire behavior, fuels, firefighting tactics, guidelines, and communications in the *Report of the South Canyon Accident Investigation Team*--evidence of a particle perspective in that account. On the other hand when trying to understand the sensemaking of the firefighters, I kept asking myself, why firefighters, especially the supervisors, did not request updated weather reports before they started fighting the fire? Their decision making just did not make sense from the particle perspective that considers the fire as a whole. As I looked at the actions of the firefighters, I noted repeated instances where they seemed to be thinking about that which they could immediately control-evidence of an activity perspective. For instance, one supervisor offered to help fix a saw in the minutes just prior to the blow-up instead of requesting weather reports or otherwise taking the broader, particle perspective of the fire. As I compared each subsequent decision to previous decisions, distinct patterns emerged regarding the demonstrated worldview of those writing accounts and the participants.

As part of the analytic process, I wrote exemplars (Lindlof, 1995) that summarized the data into more precise themes. These exemplars were then compared to test the findings. In addition, I took several of the

exemplars and tried to prove them wrong--a form of negative case analysis (Taylor & Trujillo, 2001). Specifically, I tried to prove the opposite of what I believed were the emerging themes. For example, I tried to find evidence that the firefighters took a particle perspective while trying to build the fireline. Although I was able to find some evidence of a limited particle perspective, this analysis reinforced the conclusion that the digging of the fireline was overall guided by the activity perspective.

Case Analysis

To examine the first research question, I report on three accounts of three different instances from the case timeline. These examples serve as exemplars representative of similar patterns found in the larger data set. These accounts pieced together many elements to provide narratives concerning causes and explanations for the events at South Canyon. Although there were clearly some examples of an activity perspective, the overall theme of these accounts is to piece together all of the details to gain a holistic picture of the event.

The first example demonstrating a particle perspective in retrospective accounts is J. N. Maclean's (1999) discussion of why air tankers and other resources were not sent to the fire earlier than they were. Several days elapsed from the time the fire started until air tankers or firefighters were actually sent to fight the blaze. According to J. N. Maclean (1999), many factors combined to cause the delay, such as: federal, state, and local agencies fought over who was responsible for fighting the fire; drought conditions caused an unusually high number of fires in the area; a long-standing dispute between two federal fire centers, both located in Grand Junction, Colorado, led to air tankers sitting unused on the ground in the days before the tragedy; local officials failed to secure additional assistance from national officials because the fire did not appear as an immediate threat to any homes or other structures; the presence locally of Colorado's governor and accompanying media diverted attention to other fires; and initial scouting reports of the fire mistakenly characterized it as "inaccessible" by foot. Maclean weaves together these and dozens of other instances, people, agencies, and historical context to present a holistic account of the fire. In his narrative, Maclean moves from one context to the next and points to how these various instances interrelated to set-up the conditions that led to the tragedy. Maclean's account clearly represents a particle orientation to the fire.

A second example of the particle perspective in writing about the fires is seen in Weick's discussion of the South Canyon fire. Weick (1995b) points to the importance of tools in the tragedy at South Canyon and makes a comparison to what happened in a similar firefighting circumstance at Mann Gulch[1]. At both of these fires, firefighters ran uphill carrying their packs while trying to outrun the fire. By carrying their packs, the firefighters reduced their chances of survival. Weick's discussion of these packs and tools is from a particle perspective. He begins by tying the firefighters' actions to research on fire behavior that indicates that firefighters move 15-20% faster if they put down their packs. His next move ties the firefighters' refusal to remove their packs with naval seamen who will not remove their steel-toed shoes when they are abandoning ship and with pilots who do not wish to eject out of the cockpit when their plane crashes. Weick uses these comparisons to show symbolic significance in holding onto one's tools; in fact, he argues the tools may be linked to the smokejumper's identity. "To discard one's tools may signify more than giving up control, it may also be an admission of failure which, in a 'can do' culture, is a devastating thing to admit" (Weick, 1995b, p. 6). Weick's treatment of this subject is significant because it represents a particle view of the use of tools. An activitiy orientation would focus on what functions the tools might perform, development and testing of tools, and costs associated with the tools. Instead, Weick builds a particle picture of the process that combines tools with identity, culture, economics, habits, avoidance of failure, predictions of fire behavior, and social dynamics.

A third example of a retrospective account of the fire involves the official *Report of the South Canyon Accident Investigation Team* (SCAIT, 1994). The Report, although mainly demonstrating the particle perspective, did also exhibit an activity perspective in some of the analysis. The "Findings" section of the report lists 18 factors that "significantly contributed" to the deaths of the firefighters including fuels, weather, predicted versus observed fire behavior, strategy, tactics, instructions given, safety briefings, attitudes, and leadership (SCAIT, 1994, pp. 21-34). The Report, like the previous accounts, lists all of these elements in brief and in succession, and by doing so presents a particle understanding of the fire. On the other hand, the Report also provides a negative case in that there are several good examples of an activity perspective in this account. Appendix 1 examines weather from an activity perspective. This section focuses exclusively on understanding weather as a detailed complex activity. For example, the authors discuss the

"Haines Index," which is a weather tool designed to predict the growth potential for existing wildfires. The Haines Index combines the measurement of moisture and atmospheric stability to offer firefighters a gauge of a fire's potential for rapid and large growth. The Report concludes that a high Haines Index on July 6, 1994 contributed to the blow-up of the South Canyon fire (SCAIT, 1994). The detailed discussion of the Haines Index and related weather phenomena indicates an activity perspective. The authors of Appendix 1 were concerned with describing weather as a single, important activity, rather than discussing how weather related to other factors such as leadership or communication. Although overall the Report provides a particle understanding of the fire, the report does also give a glimpse of what an activity perspective might look like in a retrospective account.

As one might expect, the three examples above strongly indicate that a particle understanding of the fire was most prevalent in retrospective accounts. What makes this finding important is that it provides a baseline with which to compare the worldview perspectives of those involved in fighting the fire to these retrospective accounts. I now focus on analysis of the worldview understanding of the participants. A second research question asked, "How does worldview affect decision makers as they make sense of crisis situations and decide how to respond?"

Descriptions of events at South Canyon in July of 1994 indicate that an activity worldview permeated firefighting organizations. As Taylor (1993) suggests happens frequently, the activity worldview rather than the particle, framed organizational consciousness and sensemaking. This section offers evidence of a tendency toward an activity perspective among firefighting organizations within the U.S. Forest Service, BLM, and National Weather Service as well as state and local agencies. Three examples, each discussed in multiple texts, are presented as exemplars of the activity orientation prevalent among participants.

The first example discusses an activity perspective during the early hours when firefighting agencies argued over who had responsibility for the fires. In the early hours after the fire ignited, as concerned residents viewed the flames on Storm King Mountain and called for assistance, local, state, and federal agencies failed to effectively coordinate suppression responsibilities (Interagency Management Review Team [IMRT], 1995). The Garfield County Sheriff's Office contacted the Glenwood Springs Fire Department that refused to respond, indicating that the fire was too remote, was not endangering property, and was burning on BLM land (J. N. Maclean, 1999). Similarly, the New Castle Volunteer Fire Department, just down from Glenwood Springs, received so many calls that the chief drove to the fire, observed that it was a mile above his jurisdiction, and went home (J. N. Maclean, 1999). Firefighters from these local departments had not taken the basic skills course and therefore had not passed the physical requirements test to fight fires on federal lands[2]. The early actions of these firefighting agencies demonstrate that they were viewing the fire from the perspective of their own units and keeping boundaries intact. Decision alternatives for processing the fire, such as offering assistance in the early hours while the fire was still very small, were not acted upon.

The second example demonstrates an activity perspective during the organizing of resources to fight the fire. Once the fire was passed on to BLM and Forest Service agencies, those ultimately responsible for the fire, further evidence emerges of an activity worldview focused on individual units and activities. Ted Putnam, a member of the federal accident investigation team, alleged that a feud existed for years between individuals at the Western Slope Coordination Center, a federal fire office, and the BLM's Grand Junction District, both located in Grand Junction, Colorado (Keller, 2001). Airplanes that could have dropped fire retardant on the South Canyon Fire remained on the ground at the Western Slope Coordination Center during the mornings of July 3, 4, and 5 because requests were not forwarded through the proper channels. The center manager, Paul Hefner, later explained:

> If they [the BLM's Grand Junction District] don't order the air tanker, the air tanker doesn't go. They would wait until the smoke started and then the air tankers would go nuts. We would send air tankers if they were ordered, but they weren't. (J. N. Maclean, 1999, p. 36)

Instead of taking the initiative to offer idle air tankers for support, the Western Slope Center focused more on unit activities, particularly bureaucratic procedures, while ignoring the overall processing of the fire.

The experience of the Prineville Hotshots from the National Interagency Fire Center (NIFC), one of the elite firefighting groups, also demonstrates an activity perspective at South Canyon during the time when resources were being mobilized. After being dispatched to fight the South Canyon Fire, the Prineville Hotshots arrived at the BLM's West Glenwood office around noon on July 6th to pick up equipment such as shovels, chain saws, and gasoline. Later, in a group statement made to fire investigators, the hotshots testified that no one at the West Glenwood office was prepared for their arrival (SCAIT, 1994). The hotshots encountered a clerical worker who refused to open any of the equipment lockers without permission from the BLM office in Grand Junction. After some scrounging around on their own behind the office, the hotshots were able to locate most of the materials they needed except gasoline that remained locked away. As the hotshots then attempted to get some lunch before fighting the fire, they were directed to report immediately to the fire by the Incident Commander (IC) from the BLM, Butch Blanco (J. N. Maclean, 1999).

The experience of the hotshots and the failure by supervisors to request air tankers demonstrates the inability of the BLM Grand Junction District Office to coordinate the key available resources at South Canyon. The unusual number of wildfires in the summer of 1994 combined with the activity focus of the District Office to exacerbate their difficulties in dealing with the process of these fires. The evidence suggests that managers and employees made sense of the fire from an activity perspective and were therefore more focused on protecting bureaucratic territorialities and ownership of resources than on processing the South Canyon fire.

As a third example, an activity focus also shaped the digging of the fireline at South Canyon. The building of the fireline at the South Canyon fire came under close scrutiny in the aftermath of the tragedy (SCAIT, 1994). Because of steep terrain, available resources, and position of the fire, leaders faced a difficult decision as to where to build the fireline. On July 6th, after a helicopter reconnaissance flight to scout the fire, three supervisors, Blanco (the IC), Don Mackey (the smoke jumper in charge), and Rich Tyler (the helicopter foreman) discussed the possibilities for fighting the fire. They had 27 firefighters on the top of the ridge and expected the 20 Prineville Hotshots to show up at any time. The supervisors considered two plans, both starting from the top of Hell's Gate Ridge. As J. N. Maclean (1999) explained:

> Having everyone hike or take the helicopter down the mountain and start from below, at the bottom of the western drainage, ran so contrary to their actual situation that they gave it scant, if any, attention, though after the fire many touted this as a safer and more sensible alternative. On July 6, after a strenuous effort to put twenty-seven people on the top of Hell's Gate Ridge, none of the supervisors argued for starting over again from a different place. (pp. 74-75)

Starting from the top of the ridge required that the firefighters build the fireline downhill, a potential safety hazard (SCAIT, 1994).

At South Canyon, witness accounts demonstrate that the firefighters were nervous about digging the fireline downhill. Building a fireline downhill is one of the "18 Watch Out Situations" taught to all wildland firefighters because fire travels much more quickly uphill than downhill (SCAIT, 1994). When Mackey radioed the smokejumpers and told them to start building the fireline downhill, they responded that they were going to wait for him to come to explain some things more clearly (J. N. Maclean, 1999). Kevin Erickson, a smokejumper squad leader, scouted the area and returned with questions about potential escape routes. Mackey, from his helicopter surveillance, reported that a safe zone existed at the bottom of the drainage, but the vegetation looked thick from Erickson's perspective. Mackey and Erickson soon met and, after some discussion, agreed to build the fireline downhill, but many others continued to question the approach. Michelle Ryerson, a squad leader with a BLM crew, refused to take her crew down to support the smokejumpers. "I'm too tired and I think my crew's too tired to go down there" she said (J. N. Maclean, 1999, p. 78). Other firefighters later expressed reservations, which many kept to themselves at the time, of building the fireline downhill.

The digging of the fireline downhill evidences an activity perspective amongst leaders at South Canyon.

Some leaders at times viewed the fire from a limited particle perspective, such as when the crew requested a face-to-face meeting with Mackey before digging the line downhill, when Mackey and Erickson considered escape routes and current fire behavior before deciding to build the fireline downhill, and when Ryerson refused to take her crew down the line to support the smokejumpers. At those times, the actions and testimonies of leaders show a consideration of not just the immediate task of putting out the fire, but also other environmental and crew related concerns. On the other hand, this was a limited particle perspective. Leaders on the mountain did not have enough information to make important decisions. For example, supervisors failed to communicate weather reports to firefighters even though the information was available (SCAIT). Chris Cucco, from the National Weather Service, had issued a "Red Flag Warning" weather report on the morning of July 6th. A "Red Flag Warning" alerts firefighters to weather conditions that are potentially dangerous. Firefighters never received this critical update as it got lost in the overload of information at the BLM Grand Junction District Headquarters (OSHA, 1995). In addition, there is scant evidence that suggests that firefighters requested a weather update before making crucial decisions. The firefighters in charge concerned themselves with what they could see and hear. To further illustrate this point, the predicting of fire behavior for certain fuel types (an important activity in itself) had been completed for the fuels located at South Canyon. At the time of the fire "Fuels were extremely dry and susceptible to rapid and explosive spread" (SCAIT, 1994, p. 35). Again, while information describing the types of fuels at South Canyon and the burning behaviors of those fuels was available, this information did not reach firefighters (OSHA, 1995).

To an outsider looking in at this incident from a particle perspective, several questions come to mind: Why didn't administrators make sure that firefighters had all of this information? Why didn't firefighters demand to have all of this information before they went into the fire? A decision that is logical from one perspective may appear irrational from another perspective. Organizations and individuals, accustomed to operating from an activity perspective, did not consider the entire particle process of the fire when key decisions were made.

Discussion

Theoretical Implications

The South Canyon case provides evidence of a theoretical link between worldview and sensemaking. What worldview contributes to our understanding of sensemaking is two specific orientations to problems that influence which decision alternatives people consider and, ultimately, which decisions are made. Without considering worldview, understanding of sensemaking is necessarily incomplete. In the case of South Canyon, the activity worldview framed the way people made sense of the fire. For example, when agencies initially passed responsibility of the fire to other agencies they made sense of the fire not from the perspective of the fire, but from bounded organizational units. Although several different agencies could have attacked the fire, they instead chose to define the fire as someone else's problem (e.g., when the Glenwood Springs Fire Department ignored the fire because it was not part of their jurisdiction). As this example shows, worldview provides an important frame for understanding organizational sensemaking. Current sensemaking research describes cultural and experiential frames that guide the way members make sense of organizational experiences (Sackmann, 1991). As discussed previously, Weick (1993, 1996) suggests that firefighters held onto their tools when running from the Mann Gulch Fire in 1949 and the South Canyon Fire in 1994 because the tools provided a sensemaking resource. If smokejumpers abandoned their tools, who were they? Without the tools needed to do their jobs, the smokejumpers were simply people running for their lives. Similarly, worldview provides a perceptual resource for understanding why sense is constructed in particular ways. At South Canyon, worldview seems to function as a resource for sensemaking--one that guides the way people construct meanings and ultimately, make decisions.

In the same way, sensemaking also adds to our understanding of worldview. Worldview cannot be thought of as only a frame for interpreting organizational events. Rather, taking a particular worldview perspective also creates sense. At South Canyon each failure to communicate across organizational boundaries, a relic of activity orientations, increased the isolation of firefighting units on Storm King Mountain. For example, the unfortunate reception provided the hotshots in Grand Junction may have led to subsequent decisions by the firefighters that increased the lack of communication. After having to search for their own equipment, purchase their own gasoline, and report to the fire after being first told to go get lunch, the hotshots likely

thought that they could only depend on themselves. In such circumstances, their failure to request weather, fuel, and terrain reports seems more understandable. Theoretically, this implies a structuration approach (Giddens, 1984) to understanding worldview in that each perspective not only serves as structure that guides sensemaking routines, but also creates new meanings or reinforces existing ones at the same time. In other words, a structuration approach to worldview highlights both the micro, communicative processes that form a particular worldview perspective and the ways that worldview serves as a structure that influences communicative processes, including decision making. A structuration approach also implies that we can change the structure (worldview) by changing the micro-practices. For example, had the hotshots been treated as part of the overall team when they reached Grand Junction, this treatment could have started a chain of sensemaking practice that might have led them to alter their worldview orientation to take into account the larger, particle picture. Although not inconsistent with worldview as portrayed theoretically by Taylor (1993), this dual function of worldview needs detailed empirical study to tease out the subtleties and inconsistencies between the process and agency dimensions of worldview in practice.

Another theoretical implication of this study suggests that one perspective may be favored in certain discourse situations. Although an activity worldview seemingly permeated firefighting organizations at the time of the blow-up, analyses of the fire, such as the OSHA report, J. N. Maclean's book, or the report of the accident investigation team, usually take the particle worldview. A retrospective analysis of events may lend itself toward a particle worldview. Noting that retrospective accounts draw together many pieces of information and frame events in broad ways is not surprising news in itself. On the other hand, noting the differences between worldview perspectives in various discourse situations is important to understanding why sensemaking and decision making failed during this crisis. Given the benefit of hindsight and time to reflect, a particle orientation is likely, but an activity orientation is likely during the time of crisis. It is critical to point out this disconnect between the way people are likely to see the world in practice and the way they are likely to make sense of it after the fact. Unless attention is paid to these differences, it remains likely that prescriptions made in retrospect will not adequately address reality as seen from the perspective of those on the front lines. Future research should examine subtle differences in discourse situations and worldview. For instance, the worldview presented in training seminars could be compared to that of in-the-field briefings. Such research might be able to determine which discourse situations are likely to produce a particular worldview and when such worldview perspectives are likely to change.

In addition, worldview might also offer a reasonable explanation for why coordination problems predominate in so many large organizations. The tendency of workers to identify strongly with work teams (Barker & Tompkins, 1994) or with professions (Bullis, 1993) suggests one reason that workers may have difficulty acting in ways that benefit the larger, overall organization. Worldview suggests another reason--that the very way that people organize and make sense of problems associated with work encourages isolation in activity specializations. A lesson from South Canyon may be that organization members "satisfice" (Simon, 1976) too much. In decision-making situations with the potential for crisis, a broader understanding of events is important before key decisions need to be made.

Practical Implications

This analysis highlights the dangers of relying primarily on one worldview during sensemaking and decision-making situations. Both perspectives are important and necessary for the successful functioning of organizations. Over-reliance on a particle perspective neglects the specialized activities vital to organizations. In wildland firefighting, such activities as the detailed study of weather, topography, and fuels have greatly increased the safety of firefighters. On the other hand, this detailed knowledge, developed through the activity orientation, is useless unless the information is communicated effectively. Over-reliance on an activity perspective provides a limited view of the entire process of events necessary to make effective decisions in crisis situations. A particle orientation by managers at South Canyon might have led to increased communication of weather, topography, and fuel reports to firefighters on the mountain. The experience of South Canyon suggests that a particle view is needed to complement the activity orientation of many organizations. The following recommendations focus on ways to foster a particle orientation in organizations conditioned to an activity perspective. Although many of these suggestions have been offered in other forums, they represent prescriptions that most organizations do not practice consistently and, combined, they offer a comprehensive approach for increasing overall organizational coordination.

First, employees and managers need regular communication relationships with those people they might

need to depend on in a crisis. The firefighter digging a fireline on a mountain in Colorado depends on the scientist studying the burning patterns of fuels in Montana or the weather forecaster predicting a cold front moving through California. The discipline of regular communication forces individuals to consider other perspectives. When employees regularly communicate only with people in their activity specialties, the odds of seeing the world only in terms of that specialized activity increase. Obviously, it is not practical for every wildland firefighter to have a daily conversation with the weather forecaster. On the other hand, more can be done to help both parties understand their interconnectedness in the process of fighting a fire. Other organizations have found ways to foster a wider, particle orientation. Tompkins (1992) found that the routine of the "Monday Notes" at NASA during the Apollo missions established a system of organizational communication. These notes, created by managers and given to NASA Administrator, Werner VonBraun, every Monday morning, focused on the status of various jobs throughout the organization. The notes were then reproduced and distributed to all managers. As a result, managers throughout the organization were aware of their interdependence with others and better prepared to anticipate future difficulties. Another example of a way to foster a particle orientation can be found in Weick's (1993) discussion of excellent airline pilot captains.

> Typically, this meant that excellent captains did not spend much time on routinized tasks, but less-excellent captains did. Crew boundaries were enlarged and made more permeable by excellent captains when, for example, they regarded the flight attendants, gate personnel, and air traffic controllers as members of the total flight crew. This contrasts with less-excellent captains, who drew a boundary around the people in the cockpit and separated them from everyone else. (Structures for Resilience, para. 20)

By noting the interdependence of jobs and responsibilities, excellent captains were demonstrating a particle understanding of flying an airplane.

A second recommendation to foster a particle worldview relates to the training of managers. As both perspectives are necessary to ensure the protection of firefighters and the quick, efficient suppression of fires, training should include instruction on how to "see" the world from each perspective. Managers, in particular, must take responsibility for incorporating a particle worldview when making decisions in crisis situations. The particle understanding of managers can be increased by making them aware of the worldview concept, encouraging communication dependency with interrelated departments, cross training in other activity specialties, moving managers periodically to new units, and increasing the accountability for the particle view in the formal review process. One novel approach might be to teach managers to think like journalists covering their own stories. Asking "If I were writing an account of this fire, what would I want to know?" would force decision makers to consider a retrospective view of the present and potentially assist with providing a particle perspective of events transpiring.

Third, organizations should reward individuals and teams for demonstrating a particle perspective in decision making. Too often, organizations disperse rewards based upon activity performance regardless of the overall particle influence of those activities. Activity success does not necessarily lead to organizational success. Individuals and teams should be encouraged to communicate lessons learned across departmental and organizational boundaries and coordinate activities for the overall benefit of the organization. This practice would mark a radical change to the reward structures of most organizations, but such efforts may be critical to fostering a particle perspective and increasing overall coordination.

Fourth, related specifically to high-risk or crisis decision making, organizations should designate responsibility for the particle perspective to particular individuals. The events at South Canyon demonstrate a tendency in individuals to fall back on familiar behaviors during crisis situations. Mackey, the smokejumper in charge, helped with the task of creating the fireline rather than focusing on his role as the leader when the pressure started to mount. Weick (1995b) states,

> Still later, when the saw Rhoades is using breaks down, Mackey offered to sharpen it and help him cut line. This looks like a clear instance of a person falling back on over learned behavior when that person is under pressure. Mackey disregards the less familiar activity of keeping your head up and supervising for the more familiar activity

> of keeping your head down and cutting line. (p. 16)

Individuals accustomed to taking the particle perspective are more likely to "fall back" on this perspective during a crisis. This suggestion is not intended to put total responsibility for the particle perspective in the hands of a few individuals, but rather to ensure that individuals competent in a particle understanding of the firefighting process (or any process) are on-hand to assist with important decisions during times of increased pressure and risk.

Actions of firefighting officials since the South Canyon tragedy indicate a growing awareness of the need for understanding the overall process of fighting fires. The *Final Report of the Interagency Management Review Team* (IMRT, 1995) describes changes made in fire management practices as a result of lessons learned at South Canyon. The accomplishments cited by the Interagency Management Review Team (IMRT) include: a joint investigation of the causes of the accident, interagency workshops designed to examine fire management and safety, efforts to hold administrators accountable for system performance, coordinated messages about "Safety is Job #1" from all federal wildland firefighting organizations, changes in reporting weather conditions, increasing the transfer of fire danger and fire behavior technology, increased training related to fire behavior and weather for fire managers, and incorporating the lessons from South Canyon in several wildland training courses. While these accomplishments indicate a particle perspective from administrators in response to the fire, sustained effort is needed to keep firefighting organizations from settling back on the more traditional activity orientation. One disturbing sign of such a trend is evidenced in the IMRT report itself.

> [W]ith the publication of this report, the IMRT has turned the responsibility of each item over to the appropriate management group. Those groups are accountable from this point on. The IMRT will no longer track the status and the results of ongoing efforts and activities. (IMRT, 1995)

Turning over responsibility of action items to specialized groups may lessen the system wide implications of those efforts.

Future Directions and Conclusions

One of the most important contributions of this case study is that it provides a framework for (re)examining cases in other settings. Worldview analysis provides a way of interpreting and predicting sensemaking and decision making in organizational contexts. For example, worldview might help to explain both failures of intelligence agencies prior to September 11, 2001 and prescriptions in the aftermath of the terrorist attacks. Intelligence agencies, prior to September 11th, seemed to have treated terrorism as an activity with each unit chiefly concerned with its own specialties. As Sen. Bob Graham, a Florida democat and chair of the Senate Intelligence Committee, put it, "There were many sources within the federal government collecting information. There was no single source that was looking at all that information to try to see if there was a pattern, a picture, a plot, that began to emerge" (CNN, 2002). Without an overall particle picture, preventing the attacks of September 11 proved tragically ineffective.

In addition, worldview analysis may inform practice in response to the terrorist attacks of September 11, 2001. In an executive order dated October 8, 2001 the President created the Office of Homeland Security:

> The Office will work with executive departments and agencies, state and local governments, and private entities to ensure the adequacy of the national strategy for detecting, preparing for, preventing, protecting against, responding to, and recovering from terrorist threats or attacks within the United States and will periodically review and coordinate revisions to that strategy as necessary. (Bush, 2001)

Given the tradition of isolation and distrust among government agencies, the task of coordinating efforts

amongst these agencies is monumental. In addition, as key intelligence agencies (CIA and FBI) are not included in this new office, significant activity divisions will predictably remain. One of the key challenges for director, Tom Ridge, will be convincing and training agencies, both those inside his new office and those outside, to view homeland security as a particle process rather than an isolated activity.

Similar analyses of other cases might better help us understand crisis decision making in organizational contexts. A worldview analysis might help explain failures related to well known tragedies such as the Challenger disaster or the sinking of the Titanic as well as lesser-known crisis situations that arise everyday in organizational practice. In addition, through examination of these cases we may learn more about how to encourage and train decision makers to adopt a particle orientation at key moments. There is evidence, for instance, that President John F. Kennedy was aware of Barbara Tuchman's thesis related to World War I that seemingly isolated and unrelated events lead to war (Tuchman, 1962). This particle level awareness influenced Kennedy's successful management of the Cuban Missle Crisis (Kagan, 1995).

By combining sensemaking and worldview this study offers a distinct explanation for decision making in organizational contexts. This case suggests that worldview provides a compelling explanation for why organizations struggle with overall coordination. Tendencies in organizations to adopt the activity perspective condition these organizations to act in ways that impede cooperation. In most organizations coordination failures lead to inefficiencies. As the events at South Canyon showed, for firefighters, coordination failures can lead to organizational tragedy.

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Endnotes

1 The Mann Gulch Fire in 1949 killed 13 elite firefighters in Montana. South Canyon marked the first time since Mann Gulch that smokejumpers had been killed by fire. Similarities between these fires have been noted in several analyses (Alder, 1997; Putnam, 1995; Weick, 1996).

2 The BLM had not encouraged much cooperation with local firefighting units prior to South Canyon. In a 1992 management plan, BLM officials expressed distrust of the dependability and training of local and volunteer crews nationwide (J. N. Maclean, 1999).

Sensemaking or sense-making is the process by which people give meaning to their collective experiences. It has been defined as "the ongoing retrospective development of plausible images that rationalize what people are doing" (Weick, Sutcliffe, & Obstfeld, 2005, p. 409). The concept was introduced to organizational studies by Karl E. Weick in the 1970s and has affected both theory and practice. Weick intended to encourage a shift away from the traditional focus of organization theorists on decision Pervomaisky is located between Snizhne [Snezhnoye] and the Savur-Mogila hill," the judge added. In her words, three out of those nine eyewitnesses said they were near the presumed launch site in a field near Pervomaisky. Malaysian Airlines flight MH17 from Amsterdam to Kuala-Lumpur crashed in the Donetsk Region of Ukraine on July 17, 2014, killing 298 people from ten countries. The Joint Investigative Team (JIT) was established in order to carry out a criminal investigation of the tragedy. In June 2019, the JIT announced that it had identified a group of four people, suspected of being involve Wildland Firefighters - Free download as PDF File (.pdf), Text File (.txt) or read online for free. Wildland Firefighters.Â Decision Making Under Stress: Wildland Firefighters in the South Canyon Fire and Its Aftermath MICHAEL USEEM Wharton School, University of Pennsylvania JAMES COOK U.S. Forest Service and National Interagency Fire Center LARRY SUTTON U.S. Bureau of Land Management and National Interagency Fire Center To identify the sources of ineffective leadership decisions, we focus on ten decisions made by a leader of.Â In the wake of this firefighting disaster14 men and women lost their lives the fire service created a development program using both classroom and experiential methods for preparing its leaders to make good and timely decisions. In 2019, 396 natural disasters were recorded in EM-DAT with 11,755 deaths, 95 million people affected and 103 billion US$1 in economic losses across the world. The burden was not shared equally as Asia suffered the highest impact and accounted for 40% of disaster events, 45% of deaths and 74% of the total affected. India was hit hardest and recorded nearly 20% of the total deaths and 24.5% of the total number of people affected.Â Nevertheless, the cyclone left nearly 400,000 people in need of humanitarian assistance in a country still struggling from the previous disaster. The deadliest geophysical event was the earthquake that hit Albania in November, and which killed 51 people.