THE COGNITIVE EFFECT OF TAILORED SAFETY COMMUNICATION ON SMOKEJUMPERS: AN ELABORATION LIKELIHOOD MODEL PERSPECTIVE

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Abstract

The present study was grounded in Nilsen’s (1960) philosophy of significant choice and enlisted Petty and Cacioppo’s (1986) Elaboration Likelihood Model of Persuasion to determine if tailored safety communication among smokejumpers activated central route processing better than agency delivered safety communication. Analysis of the results confirmed that tailored safety communication encouraged smokejumpers to think more deeply about safety than they would if the message was delivered by the agency for which they work. A smokejumper focus group was utilized to determine what information would comprise a tailored safety message. Data obtained from this group was used to build a tailored message that was subsequently placed into a questionnaire alongside an agency derived safety message. The study participants were asked to choose one of the messages and explain why they chose it. There were 30 participants that completed the study and 24 participants chose the tailored message. Ultimately, the tailored message was chosen because it was described as a streamlined version of what the smokejumpers already know and also because there was a visual stimulus enlisted that helped them identify with the message. Information garnered from this study may transfer over to other firefighting groups as well as high-risk organizations such as police and military.
We the undersigned, certify that we read this thesis and approve it as adequate in scope and quality for the degree Master of Arts.

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Chapter 1: Introduction

Problem and Study Goal

Safety communication is ubiquitous in the organizational setting. “Be safe” and “have a safe day” seem to be used generically in day-to-day communication rituals similar to “hello” and “how are you?” It may have come to the point where we speak about safety without thinking about it at all. It is not that people do not want to be safe; it really comes down to “the amount and nature of issue relevant elaboration in which people are willing or able to engage to evaluate a message” (Petty & Cacioppo, 1986, p.128). This is especially true in government organizations where safety policies, procedures and programs are rolled out by the dozen and can have an overwhelming effect on the employee. Such information overload has been associated with decreased performance in the organization and “careful dissemination of information” is needed to get performance back on track (O’Reilly, 1980, p.693).

The following thesis studies safety communication among United States Forest Service (U.S.F.S) Smokejumpers. This unit is comprised of approximately 467 wildland firefighters who parachute to forest fires throughout the Western United States. Smokejumpers are a very small sub-unit of the U.S.F.S., an agency employing thousands of wildland firefighters all across the nation. The U.S.F.S. is unyielding in its effort to make wildland firefighting as safe as possible and has designed safety programs that all firefighters must utilize, regardless of their experience level or where they are in their safety development. Subsequently, this has created something similar to what Perrow (1999) describes as an “organizational contradiction” in that high risk operators, such as
smokejumpers, need to be able to independently act upon the realities of their environment, yet “control of the operators is centralized,” which prevents independent action from happening (p.10).

The objective of this study is to determine if organizational controls of safety communication processes have an impact on the motivation and ability of smokejumpers to think about them. Ultimately, the goal of this study is to find out the extent of this influence and to provide perspective on the most effective way to communicate safety to smokejumpers. If it is possible to consistently activate high cognition of safety information among such groups, it may be possible to move beyond generic safety rituals and move toward personally relevant and elaborative discussions.

**Importance of the Study**

Stewart (n.d.) states that, “theory is practice made articulate” and that the application of theory is useful because “it helps one understand practices that we deem consequential.” Petty and Cacioppo’s (1986) Elaboration Likelihood Model of Persuasion (ELM) fundamentally guides this thesis to provide a deeper understanding of how smokejumpers process safety communication. Under the ELM, there are two routes to persuasion: the central route and the peripheral route (Petty & Cacioppo, 1986). The peripheral route activates short term message processing with very little thought, whereas the central route activates long term message processing with extensive thought and reflection. Ideally, safety communication would be activated through the central route, because safety information is often only relevant well after the initial reading of the message. For example, one may read about chainsaw safety, but it may be several weeks
before that same person handles a chainsaw; therefore it is important to have information that provides a long-lasting cognitive effect on the operator.

It is essential to find out how to tailor safety communication so that smokejumpers prioritize this information and operationalize the principles that contribute to a safe and productive work environment. A theory of persuasion is used in this thesis because safety communication is only one type of communication that smokejumpers are exposed to. For example, smokejumpers receive daily communication regarding computer security, cultural transformation, budget, policy, interim directives and more. Ultimately, smokejumpers would move beyond reading safety information solely because they are required to. Smokejumpers should move toward a day when safety information is sought after instinctually, so that they don’t actually think about safety communication as a process, rather, they see it as means of increasing awareness about something intrinsic to their well being. Additionally, information garnered from this study may transfer over to other firefighting groups as well as high-risk organizations such as police and military. Such groups are characteristically very similar to smokejumpers in that they operate in a high-risk environment and their baseline knowledge of job related safety lends itself well to producing customized safety communication.

Definitions of Terms Used

Key terms used in this work include smokejumper, elaboration, and tailored communication. Following are brief definitions of these terms:

1. Smokejumper- a smokejumper is a wildland firefighter who parachutes into wildland fires for the purpose of suppressing such fires before they become large
and catastrophic. Smokejumpers engage fires throughout the western United States, and use high speed, fixed wing aircraft to be delivered as rapidly as possible to any incident with the potential to become problematic. In general, smokejumpers are the most highly experienced initial attack wildland firefighters in the United States and are used on the most difficult and least accessible wildland fires in the nation.

2. *Elaboration*—“the extent to which a person thinks about the issue-relevant arguments contained in a message” (Petty & Cacioppo, 1986, p. 128). Specifically, this study is interested in how much thinking a person devotes to a message.

3. *Tailored Communication*—“refers to the customized, personally relevant information that is designed to target recipients’ needs, interests, and considerations” (Wan, 2008, p. 472). Specifically, this study is interested in how well a person identifies with a safety message.

**Organization of Remaining Chapters**

The remaining chapters in this study extend the knowledge about safety information processing and the ELM. Chapter two, the literature review, will utilize communication philosophy and theory to establish a baseline of knowledge about how and why people are motivated to process some messages and not others. From this foundation, a call for more research is proposed and a new research question is offered. Chapter three describes the method for carrying out the study that was used to answer the research question proposed in chapter two. Chapter four presents the results of this study and
provides analysis of the findings. Finally, chapter five discusses the limitations of the study, suggests further areas of inquiry, and provides summary conclusions.
Chapter 2: Review of the Literature

The purpose of this review is to present current academic literature on safety communication processing by members of groups. An explanation for additional research will be presented from this review. The first part of this chapter covers Nilsen’s (1960) ethical philosophy of significant choice. A theoretical foundation is then presented, and the Elaboration Likelihood Model of Persuasion (ELM) (Petty & Cacioppo, 1986) is used to help facilitate inquiry into how safety communication processing by members of a group can be understood and enhanced. The second part of this chapter examines literature describing how individuals process information, including (a) information overload and the organization, (b) motivation and ability to process a message, (c) organizational factors and safety communication, (d) personal relevance and safety communication, and (e) tailored communication. The third part of this chapter gives a rationale for why additional research is needed.

Philosophical Assumptions

In many ways, a discussion of information processing by members of groups is a discussion about values. Organizational values concerning safety are predictable. One would be hard pressed to find an organization that does not value safety of its members over everything else. But how is the organizational member valued when it comes to the safety communication process? Are organizational members engaged and empowered by the process or are organizational ideas about safety used “as pushbuttons to trigger off pre-selected responses” (Nilsen, 1957, p. 74). Nilsen (1960) believes that in a “persuasive situation there is an ethical obligation to provide listeners” with the “right to
the information necessary” to “make appropriate and significant choices” (p. 201). This provides the communication recipient with what Nilsen (1960) calls “significant choice” (P. 204).

Significant choice is not so much about a right or wrong way of communicating a persuasive message; it is more about the value a speaker places on a listener as a participant in the process of persuasion. Nilsen (1957) explains:

The speaker’s concept of man is reflected in the manner in which he speaks, the language he employs, the information he presents or fails to present, the issues he chooses, the questions he raises, the faiths he generates, the doubts he implies, the feelings he appeals to, the process of choice he inspires (p. 74).

This study assumes that the organizational member is the organization’s greatest resource, and in so being, needs to be an integral part in determining the type and kind of safety information that they receive. When this is the case, the organizational member is thoughtfully engaged because their “acts are self determined, based on rational informed choice, with adequate consideration for other men” (Nilsen, 1957, p. 73). This “freedom to think, to choose, to act” is a result of shared values and the “correlative” relationship between the speaker and the listener (Nilsen, 1960, p. 205).

**Theoretical Basis**

**The Elaboration Likelihood Model of Persuasion**

Petty and Cacioppo (1986) found that people generally want to hold correct attitudes, but are limited in their ability to do so because there is only so much cognitive effort that
they are willing to expend and this varies “based on individual and situational factors” (p. 128). Harvey et al. (2002) found that a person’s decision as to whether or not they will process a message “really comes down to motivational factors to do so” (p. 33). Because motivational and situational factors play such an important role in message elaboration, it is necessary to find a way to explain this process. This is where the practical application of communication theory is helpful in discovering why people choose to process some messages and not others. Petty and Cacioppo (1986) developed a general theory of attitude change called the Elaboration Likelihood Model of Persuasion (ELM). The ELM brings together a vast amount of scholarly knowledge involving persuasive communication into one common theory of persuasion. Fundamental to the ELM is the idea that “people are neither universally thoughtful in evaluating persuasive messages or universally mindless” (Petty & Cacioppo, 1984, p. 668). ELM is not concerned with the “total amount of thinking per se a person engages;” rather, ELM is concerned with the “likelihood that one engages in issue relevant thinking” (Petty & Cacioppo, 1984, p. 669).

ELM states that there are two distinct routes to persuasion: the central route and the peripheral route. The central route “occurs when motivation and ability to scrutinize issue-relevant arguments are relatively high” (Petty & Cacioppo, 1986, p. 131). The central route is the preferred route when long-term attitude change is desired, as is the case with safety communication. The peripheral route, as stated by Petty and Cacioppo (1986):
Occurs when motivation and/or ability are relatively low and attitudes are determined by positive or negative cues in the persuasion context which either become directly associated with the message position or permit a simple inference as to the validity of the message (pp. 131-132).

Rucker and Petty (2006) state that it is important to understand central and peripheral routes to persuasion so that one can determine how a given variable will influence attitudes. This, as stated in ELM, relies on a “person’s motivation and ability to evaluate the communication presented” (Petty & Cacioppo, 1986, p. 129). According to Petty and Cacioppo (1984), there are several factors that may reduce one’s motivation or ability to process a message and include the following: one’s nature leads them to “avoid effortful thinking”, one views the “appeal as being personally inconsequential,” the individual is “engaged in a distracting task” during their exposure to the message, or they have “little prior knowledge on the issue” (p. 673). The peripheral route is not as “enduring” as the central route in its ability to promote long-term attitudinal change (Petty and Cacioppo, 1984, p. 673).

Priester, Wegener, Petty and Fabriger (1999) refer to the enduring effects of a message as the sleeper effect, which is the “increase in persuasive impact over time” (p. 29). Two conditions influence whether or not the sleeper effect will occur. First, the message needs to have been “thoughtfully elaborated” (Priester et al., 1999, p. 36). Second, a discounting cue needs to come after the recipient has heard the message. A discounting cue is a temporary influence in message processing (Priester, et al., 1999). The key point here is that as long as a message has been thoughtfully elaborated upon as prescribed
through central route processing in the ELM, then it is unlikely that the attitude toward this message will change over time even if the individual is temporarily influenced to the contrary (Priester, et al., 1999).

Central and peripheral message processing has been measured in a variety of ways and it is important to note some of these here. One method for determining which route of persuasion is being utilized is to introduce peripheral cues into the message. Petty and Cacioppo (1986) offer a simple way to test this by “merely describing various potential cues to subjects (e.g., a message from an attractive vs. unattractive source) and asking them which would more likely be acceptable and/or persuasive” (p. 134). Another test that measures the “extent of thinking” offered by Petty and Cacioppo (1986) is to directly ask people “how much effort they expended in processing the message, or how much thinking they were doing about the advocacy” (p. 136).

In a study involving opinion change through face-to-face communication versus computer mediated communication (CMC), Blasio and Milani (2007) find that CMC is more adept at allowing central route processing of a message to occur, even when a peripheral cue was introduced. According to Blasio and Milani (2007), even “with motivation and interest” in the subject being equal opinion change was most likely caused because of the following:

It is probable that interaction via a chat line, because of its particular characteristics, i.e. the absence of social and relational distracters and non-verbal stimuli, has allowed the employment of more careful processes of reasoning and types of central route, which helped the subjects to reflect and to reject the conditioning message. On the
contrary, these are mechanisms that face-to-face discussion, which is rich in contextual and relational stimuli, discouraged, encouraging the subjects to pay less attention to the content and meaning of the message. (p. 809)

This study is significant because of its utilization of CMC and its ability to influence central versus peripheral route processing as stated in ELM. However, Blasio and Milani (2007) qualify their conclusion based upon the fact that they did not “consider opinion change time stability” (p. 811). If central route processing really did occur, then the participants will need to maintain this attitude through time, which was not measured in the study. Time stability is significant because it has been demonstrated to be an outcome of central route processing of a message (Priester, et al., 1999).

Measuring attitude certainty is an important factor to be considered when an individual’s motivation to process a message is high and it has been determined that attitude change has occurred. Attitude certainty toward a persuasive message can be associated with long-term attitudinal change. Rucker and Petty (2006) found that “people held their attitudes with greater certainty when they thought that they were aware of both the potential benefits and the potential risks” associated with a particular message (p. 49). Attitude certainty will help predict “when attitudes will be persistent and resistant and when they will guide behavior” (Rucker & Petty, 2006, p. 49). Rucker and Petty (2006) believe that, “coupled with work on the ELM, a further understanding of attitude certainty will help in the design of even more effective risk communications” (p. 49).
The Literature

Information Overload and the Organization

There is not a day that goes by where smokejumpers are not involved with some form of safety communication and one has to wonder how much of this communication has become ritual (Rothenbuhler, 2006), especially when safety information is coupled with all of the other information that they are faced with. Safety communication is “the collective means by which safety information is disseminated to employees, including the classroom, departmental safety meetings and written communications” (“Work safely glossary”, n.d.). Safety communication is associated with risk communication, and both terms are used interchangeably throughout this paper (Zhu, Xie & Gan, 2011; Wan, 2008). As Zhu et al. (2011) note, “the purpose of risk communication is to change the individuals’ awareness by exchange and transmission of risk information” (p. 130). The utility of such information should be measured by the “visible usefulness or impact” of specific communication practices on a member’s “awareness or behavior” (Lingard, et al., 2006). This finding is significant because it shows that there needs to be a measurable effect for which to gauge the utility of any given safety communication program.

One type of safety communication used by smokejumpers is the Job Hazard Analysis (JHA). The JHA is a tool that can be utilized to identify risks associated with tasks or activities and offers mitigation measures to lessen those risks. The JHA is to be read and signed before a task or activity begins and “provides the format for building safety into every project” (“Job Hazard Analysis”, n.d.). When “misunderstood or not properly
implemented”, the *Job Hazard Analysis Guidelines* (n.d.) states, “it is often treated as a meaningless bureaucratic requirement.”

Safety communication is only relevant when people see the value in it, and it is hard to find the value when one is swimming through a sea of information. Organizational members are susceptible to information overload and have developed coping mechanisms to filter out relevant messages from irrelevant ones (Grates, 2005; O’Reilly, 1980). Research on the effects of information overload has shown that there comes a point where too much information among organizational members becomes counterproductive, and leads to decreased decision making performance (O’Reilly, 1980). In two studies involving organizational members, O’Reilly (1980) found that it is not the amount of information that organizational members face that leads to a decrease in performance, it is their “inability to carefully disseminate” the information that is available to them. (p. 693).

To further complicate the problem of information overload, many of the safety communication programs that smokejumpers are required to engage, adopt a *one-size fits all approach* to communicating safety. Grates (2005) points out that an organization is essentially made up of “communities of interest” and these diverse groups respond to information differently “depending on their role, assignment and location within the organization” (p. 24). It has also been shown that the safety concerns of management are not necessarily the same as those of employees (Clark, 2006: Cunningham, 2010). An important safety topic for those in the field may not share the same relevance for the administrators in the office because they do not have a shared sense of reality.
Motivation and Ability in Message Processing

Argument quality is a factor that affects an individual’s ability to process a message. In the ELM, “arguments are viewed as bits of information contained in a communication that are relevant to a person’s subjective determination of the true merits of an advocated position” (Petty & Cacioppo, 1986, p. 133). To test the ELM Petty and Cacioppo (1986) believe it is important to “specify arguments that the vast majority of a specifiable population finds compelling rather than specious” (p. 133). Some critics of ELM find that the theory does not define what a strong or weak argument is (Griffin, 2009, p. 203). Petty and Cacioppo (1986) deal with this objectively by prompting the “specifiable population” to determine what a strong or weak argument is by measuring the following characteristics: first, several arguments are evaluated by the target population and determined to be strong or weak; second, a “thought listing measure” is used to determine how a person feels about the message; finally, “messages are rated for overall believability” (p. 133). At this point, argument quality can be tested because those same members who will be a part of the study have validated it.

Petty and Cacioppo (1986) found that distraction is a significant “disruptor” to an individual’s ability to process a message (p. 141). For people that are highly motivated to process a message (e.g. smokejumpers and safety communication) distraction is especially significant, whereas people with low motivation will not be as influenced by distraction because they are not trying to process the message as deeply.

According to ELM, an individual’s motivation to process a message is a significant factor in the persuasion process (Heesacker, Petty & Cacioppo 1983; Petty & Cacioppo,
1984; Zhu, Xie, & Gan, 2010). Credibility has been perceived as having an effect on a person’s motivation to process a message since the time of Aristotle. In The Rhetoric, “Aristotle used the term ethical proof (ethos) to describe the credibility of the speaker that increases the probability that the speech will be persuasive” (Griffin, 2009, p. 475).

Heesacker and Petty (1983) were able to show that source credibility was important in affecting attitudes about a high involvement issue when subjects “were unmotivated to articulate and differentiate external stimuli” (p. 664). What is significant about this study, according to Petty and Cacioppo (1984), is that source credibility did not “increase persuasion uniformly, as is the case typically with low involvement issues; rather the effect was to increase message scrutiny,” which fosters central route processing (p. 664).

In another study, looking at credibility associated with message processing, Petty and Cacioppo (1984), utilized source factors as a variable to influence message processing. Petty and Cacioppo (1984) found that source factors tend to have an effect on whether a person agrees with a message when elaboration likelihood is low by serving as “simple acceptance or rejection cues,” but “do not serve as simple cues when elaboration likelihood is high” (p. 669). This study is significant because it shows that source factors influence peripheral route processing of a message and this, according to Petty and Cacioppo (1986), only promotes short-term attitudinal change.

Zhu et al. (2010) gauged public perception about risk information after being involved in an earthquake and uses information credibility as a key construct for measuring how the public evaluates risk information. Zhu et al. (2010) found that “information credibility affects risk perception significantly,” and that credible
information, even though hard to come by in the aftermath of an earthquake, may activate central route processing because people will have “high subjective motivation” (p. 134).

Another way to try to influence message processing is through moral and fear appeals. Hockett and Hall (2007) conducted a study involving National Park visitors who were presented with two different messages regarding the feeding of deer: one to communicate the hazards (fear appeal) and the other to communicate the impact (moral appeal) of feeding deer by the public. The fear appeal was directly related to the threat faced by visitors from feeding deer and shown to “enhance elaboration” because it was “directed at respondents personally” (Hockett & Hall, 2007, p. 19). The moral appeal was ineffective at changing attitudes about feeding deer. Hockett and Hall (2007) feel that this could be due to the fact that the moral appeal message “was insufficiently arousing to provoke central route processing or elaboration” (p. 20).

Organizational Factors and Safety Communication

It is apparent that leaders of an organization have some effect on an employee’s ability to process safety information, but it is not clear to what degree. There has been scholarly inquiry into the role of leadership’s influence on safety (Clarke, 2006; Zacharatos & Barling, 2005; Zohar, 2002). For example, Zohar (2002) explored leadership and its effect on safety when he studied the relationship between an organization’s safety climate and leadership. In this study, Zohar used the principles of transformational leadership. As Zohar (2002) notes, “transformational leadership is characterized by value-based and individualized interaction, resulting in better exchange quality and greater concern for welfare” (p. 77). In the Zohar (2002) study, transformational leadership did play an
important role in occupational safety and this was primarily because of the “leader-member” exchanges of quality information and their influence on “group composition and individual development” (p. 89).

Harvey et al. (2002) found that an organization’s safety culture was dependant upon an employee’s position in the organization, and also that “one measure of culture may be inappropriate for all employees” (p. 30). Clarke (2006) found that there was a “significant difference in the way managers, supervisors and workers conceptualize safety issues” (p. 416). Just because management thinks everything is going great does not mean that the employees feel the same way, and when this is the case, “problems may arise and misunderstandings are highly probable” (Harvey et al., 2002, p. 32). Clarke (2006) found that it was workers’ “response” to safety that had the “greatest impact on safety behavior, rather than managers’ concern for safety” (p. 425). The Harvey et al. (2002) and the Clarke (2006) research is significant because it shows a possible disconnect between the way management and employees view safety.

Simard and Marchand (1997) studied an organization’s safety culture when they addressed how organizational factors in manufacturing plants affected workgroup’s ability to comply with safety rules. Simard and Marchand (1997) determined that the two most important factors influencing a worker’s ability to comply with rules is the “degree of cooperative relationships between workers and their first line supervisors and the latters’ propensity to a participative management of safety” (p. 185). The Simard and Marchand (1997) study offers the following:
A good safety culture is one that motivates workers to conform to safety rules by leading them to participate in the safety regulation process, rather than by management imposing safety rules and norms in an authoritarian and punitive manner on the workforce (p. 185).

High performance work systems are shown to have characteristics that contribute to a positive safety culture. Zacharatos and Barling (2005) used ten practices that have been positively associated with occupational safety and summated these into a “single underlying construct- a high performance work system” (p. 83). One of these ten practices has to do with self-managed teams and decentralized decision-making. According to Zacharatos and Barling (2005) this practice “should enhance occupational safety because it provides those people who are more familiar with the situation greater opportunities for control” (p. 79). Although self-managed teams and decentralized decision-making was not studied exclusively, the Zacharatos and Barling (2005) study shows that “high performance work systems do affect occupational safety and this relationship is mediated by trust in management and perceived safety climate” (p. 89).

Personal Relevance and Safety Communication

Personally relevant messages affect message processing and research has used this construct in measuring attitude change (Cunningham, et al., 2010; Langille et al., 2011; Simard & Marchand 1997; Tarrant & Overdest, n.d.). With personally relevant messages, “information processing increases in intensity and/or complexity” (Petty and Cacioppo, 1986, p. 148). Cunningham et al. (2010) studied communication practices that were aimed at reducing medical sharps injuries. Concluding remarks from this study
stated that it was important to “empower departments to think for themselves about safety” (Cunningham et al., 2010, p. 181).

Langille et al. (2011) utilize the ELM to determine how best to communicate feedback to participants in a company wellness program. The feedback was either personally relevant or general in nature. Langille et al. (2011) found that personally relevant feedback is “more likely to engage the participants in central processing,” and that feedback that was general in nature, “contributed to the weak nature of the persuasion and resulted in disinterest or counterargument” (p. 310). Interestingly, this study showed that those members in the wellness program who had a high fitness level were somewhat offended at the general nature of feedback and were prone to completely dismissing this feedback based on its general nature alone.

Tarrant and Overdest (n.d.) found that personal relevance may not be enough to create central route processing of a message, and that there may need to be a three-way interaction between personal relevance, knowledge of issue and strength of argument. Tarrant and Overdest (n.d.) found that “strong arguments may be more important than ensuring the message is personally relevant” (p. 8). Tarrant and Overdest (n.d.) believe that this may be caused by an “individual’s need for cognition” which “may have mediated the roles of personal relevance” (p. 9). The authors did not test a person’s need for cognition in their study therefore this question remains unresolved as to its significance. If Tarrant and Overdest had measured cognition, they would have validated the research from Petty and Cacioppo (1986) showing that “argument quality becomes a
more important determinant of persuasion for individuals high rather than low in need for cognition” (p. 162).

**Tailored Communication**

*Tailoring* safety communication can be a positive way to increase safety message processing by individuals (Blasio & Milani, 2008; Etter, 2009; Wan, 2008). Wan (2008) defines tailored communication as, “customized, personally relevant information that is designed to target recipients’ needs, interests, and considerations” (p. 472). Wan (2008) studied tourist perceptions of risk information before traveling abroad and used tailored communication to show that *resonance* “is a strong factor in influencing attitude and behavioral disposition” (p. 472). Wan (2008) defines resonance “as the achievement of a harmonious state of mind in an individual due to accordance between an external stimulus and relevant nodes stored in the long-term memory” (p. 475). Wan (2008) utilized resonance as a construct partially because he felt it was important to “investigate the interaction between messages and receivers’ psychological state after being exposed to certain messages,” something that the ELM does not measure (p. 473). Although Wan (2008) does show that emotion plays a factor in a person’s ability to think about a message, the study utilizes tourism as a frame of reference. In this context, emotion may play a bigger role than it would in an organization, where members face somewhat of a daily routine.

Etter (2009) investigates message tailoring by testing if computer tailored smoking cessation counseling reports were more effective than untailored reports. Study recipients of the untailored reports were given general information that may or may not
have applied to them whereas the tailored reports had information that was personally relevant. Both types of reports were tailored to some extent in that the recipient’s name was at the top, but the information in the report is where the tailoring occurred. The Etter (2009) study found that tailoring in of itself was not solely responsible for attitude change and concluded that there were many factors involved with the way the study was conducted that could have contributed to this. Notably, “the content of the tailored report was probably too similar to the content of the generic, untailored report to produce any detectable effect” (Etter, 2009, p. 654). Any future study measuring the effectiveness of tailored and untailored communication would need to make these messages noticeably different (Etter, 2009, p. 654). It is also worth noting that Etter (2009) does not measure an individual’s cognitive processing of a message, only whether or not tailored or untailored smoking cessation reports were more effective.

Rationale for Study

The literature reviewed provides a significant base from which to extend the knowledge on the topic of safety communication processing by organizational members. The ELM provides a theory that describes message processing and Petty and Cacioppo (1986) and Rucker and Petty (2006) provide direction on how to measure message processing and attitude certainty. There are, however, gaps in the literature that need to be filled and a discussion of these follows.

When safety information loses its impact because it does not meet the needs of the various sub-cultures in the organization and gets lost in between all of the other organizational messages that one has to sift through, it becomes, as Petty and Cacioppo
(1984) describe, “personally inconsequential” (p.673). This study is interested in making the safety communication process more personal by placing high value on the contributions from the rank and file members of the organization. Furthermore, this study assumes that the organization has an ethical responsibility to do so. Utilizing Nilsen’s (1960) ethical philosophy of significant choice to inform the relationship between Fire Management and the smokejumpers, this study offers that safety communication should be developed, synthesized, and delivered by employees from the bottom up and should be considered by fire management as an important feature of any comprehensive safety program of the future.

The fact that smokejumpers operate under a classical management paradigm may be one of the biggest influences affecting their ability to think deeply about safety. Theorists, including Deetz, and Weick, offer alternative ways of “organizing people” that reject the “mechanistic analogies on which bureaucratic organizations are based” (Griffin, 2009, p. 248). For example, Deetz offers a critical theory of communication that promotes a “democratic approach to corporate decision making” (Griffin, 2009, p. 249). This approach is valuable for empowering employees with the ability to participate in the decision making process, but it does little to empower them to think. Safety communication is more than a catchy slogan or twelve-step procedure; safety communication is a discussion about things of potential consequence. When there is no discussion, it becomes too easy to get lulled into a sense of complacency about something that is unlikely to ever happen. Therefore, it is not enough to have an organization that values participation, it is more important to have an organization that values thinking.
To enhance a thinking culture, it is important to understand why certain messages and not others influence people. Smokejumpers, by nature, are highly involved with safety, so it is not so much that they are not thinking about safety, as it is that the information they receive may not be meeting their cognitive needs. The ELM suggests two routes of persuasion to meet this end, and central route processing of a message would be the most desirable route of persuasion since higher cognition and long-term attitudinal change is desired.

Literature on central route processing of safety information is scarce. No literature could be found that measures central route processing of safety information among members of a high-risk profession like smokejumpers. It is reasonable to assume that smokejumpers view safety information different than college students, tourists, and members of the general public, which are the predominant populations utilized in the literature.

For example, the Zhu et al. (2011) study focuses on the public after a natural disaster and does not capture the effect of credible information and its persuasive effect in an organizational work environment. It would be difficult to extrapolate about how smokejumpers process safety information based on this study since risk communication in this context is dealing with the aftermath of a tragedy as opposed to perpetual organizational learning.

Hockett and Hall (2007) show that a fear appeal might be effective at increasing safety message processing, but safety messages based on fear appeals alone may not be the best way to communicate risk to those involved in a high risk profession. For example,
smokejumpers are constantly reminded that they are *jumping out of a perfectly good airplane* by members of the public, and such clichés desensitize the risks that smokejumpers face. Additionally, park visitors have somewhat limited knowledge about the risks that they may encounter, whereas smokejumpers are acutely aware of the risks they face and have significant knowledge about the safety needed for their job. Fear appeal messages may be too generic in nature for a group that is highly involved with safety. Langille et al. (2011) found something similar when they discovered that the general nature of their wellness feedback discouraged the highly involved members from processing it. In fact, counter arguments occurred. Smokejumpers are involved with safety and the general nature of safety communication that they currently receive may be getting brushed aside for this same reason.

It is likely that personally relevant information will promote central route processing of safety information (Cunningham, et al., 2010; Langille et al., 2011; Simard & Marchand 1997; Tarrant & Overdest, n.d.). However, “personally relevant” may be too broad of a term to achieve the focus of this study because this term can be used interchangeably with “personal involvement.” For example, Petty and Cacioppo (1986) use “personally relevant” messages as motivational cues, while “personal involvement” describes one’s “concern for the topic” (Reinard, 1988, p. 44). Tailored communication, as defined by Wan (2008), captures the essence of “personal relevance” and is “customized.” Both are needed if safety communication is going to be processed through the central route as described in the ELM.
Research Question

The literature reviewed provides a framework to complete a new study that will provide insight into the cognitive motivations of a population that has never been utilized in a theoretically based communication study. The following research question will be considered:

RQ 1: Does tailored safety communication among smokejumpers activate central route processing better than agency delivered safety information?

The following chapter details the scope and methodology that was used to answer the above research question.
Chapter 3. Scope and Methodology

This study explores tailored versus untailored safety communication and its effect on central route processing by smokejumpers. It is exploratory in nature and narrow in scope. The primary reason for this is that smokejumpers comprise such a small part of the overall wildland firefighter population, that preliminary research needs to be conducted to determine what communication insights, within this group, can be transferred to the overall population of wildland firefighters. Additionally, the time of year for which the study was conducted and the relatively limited amount of smokejumpers available, further narrowed the study. The findings from this exploratory research may lead to a hypothesis about wildland firefighters as a whole, which could lead to a much larger study in the future.

Scope

There are nine smokejumper bases in the nation accounting for a total of 467 smokejumpers. In the winter months this number decreases to approximately 100 smokejumpers, spread unevenly between the nine bases. This drawn down number is a result of wildland firefighting being seasonal work. Fire season runs from May through October and most smokejumpers are laid off from November through April. These laid off smokejumpers are subsequently re-hired the following season. This study was conducted in March, which is the time of year where most smokejumpers are off duty.

This study focused on one smokejumper base located in Northern California. The Northern California base was chosen because it has the largest fulltime workforce during
the winter months and also because the characteristics of the Northern California Smokejumpers are most closely representative of the smokejumper population as a whole. For example, the smokejumpers from the Northern California base are employed by the Federal Government, as are all smokejumpers, and also they range in age from 22 to 54 years old, which is the typical age range for smokejumpers in general. Additionally, all smokejumpers are held to the same physical and firefighting standards, and all of the smokejumper bases augment one another during periods of high fire activity utilizing standard operating procedures to conduct seamless operations. The smokejumpers that participated in the study are experienced (i.e., not rookies) and have a minimum of 30 jumps and a maximum of 675 jumps (smokejumpers average about 15 jumps a year). Of these smokejumpers, 39 are male and one is female. The Northern California base is below the national average for female smokejumpers; female smokejumpers make up six percent of the total smokejumper population.

Methodology

Research Design

To determine if tailored safety communication activates central route processing better than agency delivered safety information, this study enlisted a quasi-experimental design. This type of design is appropriate for two reasons. First, since the smokejumper population is limited during the time the study was conducted, a purposive sample was selected from one specific base. This is because the Northern California base has the most available workforce (i.e., 23 permanent full time smokejumpers and another 15 smokejumpers who were not working but available in the local community). Second, a
laboratory experiment is not practical for an exploratory study such as this because it would be cost prohibitive. Furthermore, a randomly assigned group of smokejumpers brought into a laboratory experiment would likely not give an authentic measure of safety information processing. The laboratory setting would, in of itself, provide a source cue (Petty & Cacioppo, 1986) that would influence elaboration likelihood. It is more important to conduct this research in the smokejumpers’ normal work environment so as not to influence safety information processing any more than necessary.

This study uses tailored safety communication and agency delivered safety communication independently in separate messages. Since there are not enough smokejumpers available to do a “random assignment design,” in which each participant is randomly assigned one message or the other, a “repeated measure design” will be used; that is, “all participants are in both conditions” (Hoyle et al., 2002, pp. 243-244). To limit the systematic nature of such a design, the participants will receive the questionnaire in randomized order. This is significant because, as Hoyle et al., (2002) state, “such designs are, in fact, randomized experimental designs as long as we randomly assign participants to be exposed to the various conditions in different orders” (p. 262). According to Hoyle et al. (2002), randomized experimental designs are “the best method for examining causal associations” (p.268).

One message describes a pre-existing safety program that was written by an expert in risk management but is really agency derived, and another message describes a safety program that was developed from a focus group consisting of smokejumpers. To ensure that elaboration likelihood would be high for both messages, it was important to create a
“high relevance condition” (Petty & Cacioppo, 1986). To meet this end, personal relevance was manipulated by providing a sentence in the beginning of the questionnaire stating to the recipient that one of these safety programs would be implemented into the smokejumper program immediately and it was up to them to determine which one it would be. This is important, because according to prior research, when elaboration likelihood is high, “peripheral cues become relatively less important determinants of persuasion” (Petty & Cacioppo, 1986, p. 152). The primary concern of this study is the difference in message processing between agency and tailored safety communication. A peripheral cue, such as the source of the message, would only detract from message scrutiny.

The first message describes agency delivered safety communication that already exists. Because there is a wide variety of safety information that is shared with the smokejumpers, and it would be prohibitive to cover it all, this study focuses on one specific type of safety communication. The selected safety communication was not chosen randomly to ensure that the safety communication program chosen met the following criteria: the safety communication had to be provided by fire management and the information needed to be such that it could be succinctly described in one paragraph. The Job Hazard Analysis (JHA) program was chosen because it is a safety program that is overseen by fire management, can be described in one paragraph pulled directly from the JHA manual, and is required to be used by all firefighters; not just smokejumpers. The purpose of a JHA is as follows:
Properly applied, this process ensures that safety and health of employees is fully considered during the planning stages of a project or activity. Each potential hazard is considered; and procedures that will ensure that employees are not exposed to that hazard in a way that could harm are established and implemented prior to beginning work on the project ("Job Hazard Analysis," n.d.).

All JHA’s are formatted row and column style on 8 ½ by 11-inch paper and are created for a specific project or activity. For example, daily physical fitness would be an activity requiring a JHA. There are three fundamental areas that need to be filled out for a JHA to be complete. The first area is the task or activity and this applies to the work being done. For example, running is an activity. Second, hazards associated with the activity are identified. For example, uneven terrain would be a hazard. Third, abatement actions are identified to ensure that the task can be done safely. For example, wearing proper footwear could be an abatement action for running on uneven terrain.

The second message was drawn from a smokejumper focus group and meets Wan’s (2008) definition of tailored communication; i.e., “customized, personally relevant” (p.472). One focus group consisting of seven employees was conducted at the Northern California Smokejumper base. Focus group members volunteered and met in a conference room away from the Northern California smokejumper facility. The focus group met at nine thirty in the morning and the discussion lasted one hour and fifteen minutes.

A non-smokejumper moderator and one note-taking observer facilitated the focus group. The moderator was an expert in safety for the federal agency that employs the
smokejumpers and conducted the focus group under normal business hours to promote organizational learning for the agency. Each group member was made aware at the beginning of the meeting that their identity would remain anonymous and it was only the information that they provided that was to be used for research. The participants were required to sign an informed consent paper prior to the start of the meeting. Focus groups have been shown to be effective at generating research concepts in two of the journal articles reviewed for this study (Cunningham, 2010; Sher & Lee, 2009). A focus group interview guide template was adopted from Hoyle et al. (2002).

The objective of the focus group discussion was to determine what type of safety communication, if any, could replace existing safety communication. To meet this objective, two primary questions were asked:

Question 1: What is it about current safety communication that you like or do not like?

Question 2: What type of safety communication would you prefer, if any, that would meet the same intent of what is already being provided?

Underlying these main questions were several sub issue questions that were asked to promote further discussion and understanding of the focus group responses to the above questions. The majority of the sub issue questions were open ended in nature.

Qualitative analysis of the notes from the focus group generated three thematic areas of interest for building a tailored safety message (Appendix B). Summaries of these areas are:

1. Safety communication needs to be streamlined (e.g., bullet statements as opposed to paragraphs).
2. Make safety communication more meaningful by sharing real life experiences (e.g., lessons learned stories or photographs).

3. Present safety information in the appropriate setting (e.g., talk about chainsaw safety prior to the beginning of a tree falling assignment as opposed to discussing it in the office months before such a project is to begin).

From these thematic areas, the following tailored safety message was created, and used, in the questionnaire:

A process will be developed that utilizes no more than five bullet statements to highlight safety considerations involved with any given project or activity. In addition, a symbolic device will be used (e.g., photograph, piece of equipment, or other relevant object) to help “tell the story” about any potential hazards. This information will be gone over prior to beginning work on the project or activity.

**Instrumentation**

Twenty-three paper-and-pencil questionnaires were handed out to smokejumpers at the Northern California Smokejumper Base during normal business hours. The same individual that conducted the focus group was responsible for all aspects of questionnaire distribution and collection. The recipients were asked to complete the questionnaire within one week and reminded that they were under no obligation to complete it. Follow up occurred after one week if the questionnaire had not been received. An additional 13 questionnaires were mailed to smokejumpers representing those who were laid off but still available to be part of the sample. A phone call was placed to those laid off employees informing them that they would be receiving a questionnaire in the mail and
that they would have a week to complete it and return in a postage paid envelope that was provided. The recipients were reminded that they were under no obligation to complete the questionnaire. A follow up phone call was placed after one week reminding the recipient about the questionnaire.

Paper-and-pencil questionnaires were used because it is common practice for researchers involved with studying safety communication or the ELM to use a questionnaire to assess message related thinking (Clarke, 2006; Harvey et al., 2002; Hocket & Hall, 2007; Simard & Marchand, 1997; Petty & Cacioppo, 1986; Zacharatos & Barling, 2005; Zhu et al., 2010).

**Procedure**

To determine if central route processing of either message had occurred, sample questions derived from the work of Petty and Cacioppo (1986) and Rucker and Petty (2006) were relied upon. Additionally, the order that each message was offered on the questionnaire was manipulated so that half of the questionnaires had the agency-derived message first and half had the smokejumper-derived message first. When the recipient finished reading both safety program messages, the questionnaire instructed them to choose one and to explain, in writing, why they chose that message over the other. To further measure information processing, two questions were asked, one for each message, “to assess the extent of thinking” and “simply ask people how much effort they expended in processing each message” (Petty & Cacioppo, 1986, p.136). These questions provided a summated four point Likert scale that covered a continuum from “very little thought” to “extensive thought and reflection” (Hoyle et al, 2002, p.171).
To measure the persuasive impact of the messages over time (Priester et al., 1999) attitude and attitude certainty toward this message were measured using guidelines prescribed by Rucker and Petty (2006). A question asked the participant “how certain are you that your attitude toward the safety message you chose is the correct one? ” This question uses a 1-9 graphic rating scale with “not at all certain” on the low end and “very certain” on the high end (Rucker & Petty, 2006, p.50).

**Data Management**

Each questionnaire was coded alpha numerically, with SMKJ and a corresponding number, in the order it was received (e.g., SMKJ 1). As soon as the study was complete, the questionnaires were divided, based upon which one of the two messages the participant chose. Those who chose the agency-derived message were classified into category one (Appendix C) and those that chose the smokejumper-derived message were classified into category two (Appendix D). A separate data matrix was designed for each of the two categories and the questionnaire codes were placed in a column as a unit of analysis. The corresponding variables of message relating thinking and attitude certainty were coded in the adjacent rows. Message related thinking was coded numerically between one and four, and attitude and attitude certainty were coded numerically between one and nine. Using the same questionnaire respondent codes, the written responses relating to why the participant chose one message over the other were transcribed word for word in the spaces below the respective data matrix.
Ethical Concerns

The primary ethical concern involved in this study was the fact that the researcher is a current smokejumper. The significance of this relates to the potential influence over other smokejumpers (i.e., influencing the focus group discussion or the responses to the questionnaire). Significant effort was made to remove the researcher from the focus group and questionnaire process. To ensure this, both processes were conducted by a non-smokejumper wildland firefighter who works as a safety manager for the same agency as the smokejumpers. A meeting was held between the researcher and the facilitator, prior to the beginning of the study, where clear instructions were given and understood by both individuals. Additionally, the Smokejumper Base Manager was made aware of the study, and subsequently granted permission to carry out the research utilizing Northern California Smokejumpers. The smokejumpers were compensated their normal salaries for participating in the study and this effort was justified as an organizational learning opportunity for the agency as well as the smokejumpers.

The following chapter explains the results of the study and offers insight into the significance of the findings.
Chapter 4: The Study

This study intends to determine the difference between tailored safety communication and agency delivered safety communication and its effect on central route processing by smokejumpers. This chapter describes the process of coding and analyzing the information provided by the study participants and presents the results as well as the findings, within the context of prior research.

Data Analysis

The study participants had two weeks to complete the questionnaire. After two weeks, the responses were segregated based upon which safety message the participant chose. Then, the information was transferred to its own data matrix to be analyzed (Appendix C and D). The first question on the questionnaire was open ended and the responses were transcribed into the appropriate matrix, precisely as they were written, save for any misspelled words that were corrected. The three questions that followed were closed ended and were numerically coded on the respective data matrix exactly as they were written on the questionnaire.

Summary analysis of the data retrieved from the questionnaire was the primary method used to answer the research question that was presented in chapter two. The research question resulting from the literature reviewed in chapter two stated the following: Does tailored safety communication among smokejumpers activate central route processing better than agency delivered safety information? A simple majority, showing that one message was preferred over the other, provided enough evidence to show which type of message was preferred by the smokejumpers. However, it was important to probe
deeper into the questionnaire and analyze the responses to the final three questions to determine whether or not central route processing of the chosen message had occurred. If the respondent gave the message they chose “above average thought” (i.e., above level three) and were certain about their choice (i.e., beyond level five), then central route processing of the chosen message had occurred. This assessment is based on Petty and Cacioppo’s (1986) explanation of central route processing; “a person’s careful and thoughtful consideration of the true merits of the information presented in support of an advocacy” (p. 125).

Results of the Study

Thirty-six questionnaires were distributed to Northern California Smokejumpers and 30 questionnaires were completed during the timeframe allotted for the study (Table 1). None of the questionnaires that were received were disqualified because they were all filled out properly and drawn from the desired population necessary for the study.

Table 1

<table>
<thead>
<tr>
<th>Message Choice</th>
<th>Message Related Thinking (Average)</th>
<th>Attitude Certainty (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency Delivered Safety Message</td>
<td>2.6</td>
<td>6.3</td>
</tr>
<tr>
<td>Six Respondents (20%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailored Safety Message</td>
<td>3.2</td>
<td>7.2</td>
</tr>
<tr>
<td>Twenty-four Respondents (80%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As Table 1 shows, 80% of the respondents chose the tailored safety message over the agency delivered safety message. Respondents who chose the tailored safety message
did so with “above average thought” for an average response of 3.2 on a four point Likert scale that was codified numerically. Those who chose the agency delivered safety message (6) did so with “average thought” for an average of 2.6 on a four point Likert scale that was similarly codified. For those respondents who chose the tailored safety message, the average response relating to their certainty about that choice was 7.2 on a graphic rating scale of 1-9. For those respondents who chose the agency delivered safety message, the average response relating to their certainty about that choice was 6.3 on a graphic rating scale of 1-9.

**Discussion**

This study primarily relies on data obtained from a focus group and a questionnaire. The following paragraphs are a discussion of the significance of the data obtained from these instruments. The elements of a tailored safety message that were produced in the focus group are significant to this study for two reasons. First, the tailored safety message was used in the research instrument for the purpose of providing an alternative choice to the agency-derived message. Second, the tailored safety message is, in of itself, a tangible product of this thesis, with potential to be incorporated into the day-to-day operations of the smokejumpers. However, the focus group was very clear to state that new safety information was not necessary, only better, more meaningful presentations of that same information is necessary to have an important effect on the operators (i.e., the smokejumpers).

In designing the questionnaire, it was important to present the safety messages as two distinct choices, and ensure that they were phrased so that one was not seemingly
preferred over the other. Prior research on the ELM was used to enlighten this process. When testing the ELM, peripheral cues have been used to determine which type of message processing is occurring (Petty & Cacioppo, 1986). It was not the intent of this study to measure message elaboration based on peripheral cues, but it was important to distinguish between the two messages so that one would appear tailored and one would appear un-tailored. Citing the author after each message was the chosen method for doing this. The author for the agency-derived message was cited as an expert in risk management and the author for the tailored message was cited as a smokejumper. Prior to the study, it was unknown to what degree such a distinction would factor in to the final results. Peripheral cues appear to have had very little effect on message processing. In fact, out of the 30 responses to the questionnaire, only one person alluded to the fact that a peripheral cue had an impact on their decision. SMKJ 25, who chose the tailored safety message, stated, “I also have personal buy in due to the fact that I am a smokejumper.”

The lack of influence of peripheral cues in this study could be due to the fact that personal relevance was manipulated in the study. Placing introductory sentences in the questionnaire that stated the following did this:

One of the following proposals will be adopted into your program for the upcoming fire season. It is up to you to choose which one.

This statement was intended to motivate the study participant to take the questionnaire seriously. Since personal relevance was manipulated, it was expected that message related thinking would be high for both messages, because each participant was to have a “stake” in the outcome. Specifically, as Petty and Cacioppo (1986) state:
As personal relevance increases, people become more motivated to process the issue-relevant arguments presented. As the personal consequences of an advocacy increase, it becomes more important for people to form a veridical opinion because the consequences of being incorrect are greater. Because of the greater personal implications people should be more motivated to engage in the cognitive work necessary to evaluate the true merits of the proposal (p. 146).

**Message Related Thinking**

The data shows that tailored safety communication was preferred over agency delivered safety information by a margin of four to one. Significant insight into why this was the case, was gained by analyzing the written responses from those who chose the tailored message. One respondent in particular captured the essence of why this message was chosen over the other. The following is a response written by a smokejumper respondent who was codified as SMKJ 16:

*Message two please:* I think that the five bullet statements are more than enough to fully express the hazards we face on a given project. Safety is ultimately the responsibility of the individual; the government can try to surround its employees in a bubble of safety, but if an individual chooses to lose focus or perform unsafe acts, please don’t take out his/her mistakes on the rest of us. No one here wants to get hurt. We all want to go home after a day of work unscathed. Give us a little credit. This safety crap is/has been rammed down our throat for years. We don’t need more, we need specific messages tailored to specific missions and that is all. If the government spent half as many dollars/person hours recruiting and hiring quality
individuals as it did delivering its “safety messages,” I predict its safety record or statistics would reflect those measures positively.

When considering message related thinking about both messages, the average score for all thirty participants was 2.7 on a numerical scale from one to four. Therefore, it is assumed that personal relevance had a positive impact (i.e., above average) on message related thinking. Interestingly, of the six participants who chose the agency derived safety message, the data shows that not one chose a “4” for either message, which equated to “extensive thought and reflection”. Of the 24 participants who chose the tailored safety message, a “4” was chosen by seven of those participants. Overall, the message related thinking demonstrated by those who distinguished between the two messages and chose the tailored message was higher on both counts than those who distinguished between the two messages and chose the agency derived message.

**Attitude Certainty**

Rucker and Petty (2006) show that “attitudes held with greater levels of certainty are more likely to influence behavior, persist over time, and resist attempts to be changed” (p. 49). Attitude certainty has also been shown to be a determinant of central route processing of a message (Petty & Cacioppo, 1986; Rucker & Petty, 2006). Therefore, it was important to measure attitude certainty in the questionnaire. Respondents who chose the agency derived message responded with an average of 6.3 on a graphic rating scale of 1-9 about the certainty of their attitude toward the chosen safety message being the correct one. Respondents who chose the tailored safety message responded with an average of 7.2 on a graphic rating scale of 1-9 about the certainty of their attitude toward
the chosen safety message being the correct one. The “above average certainty” for the tailored safety message is significant because attitude certainty was the final measure utilized in the questionnaire to help answer the research question proposed in chapter two, and is the measure that gives significant insight as to whether or not central route processing of the chosen message had occurred.

Conclusion

This study produced two significant outcomes. First, the focus group provided insight into what tailored safety communication should be. That is, safety communication that enlists a visual aid to help convey the message, is streamlined, and is relevant to the job. Second, this study confirmed that smokejumpers overwhelmingly would choose a tailored safety message over an agency derived one, and would process this message through the central route as described in the ELM. The following chapter will discuss the strengths and weaknesses of this study, and provide insight into its external validity. Additionally, Petty and Cacioppo’s ELM and Nilsen’s philosophy of significant choice will be discussed within the context of how they relate to the results presented in this study.
Limitations of the Study

Although this study provides significant insight into safety communication processing and the ELM, there were several limitations. First, the sample used for the focus group as well as the questionnaire was obtained from one specific smokejumper base. All smokejumper bases are standardized, and it is possible that there are region and location specific issues regarding safety communication that may not have been adequately represented. Second, it is possible that the source cues that were introduced into the questionnaire may have had more of an effect on message choice than was intended. For example, there was one respondent who mentioned in their narrative that a source cue was a factor in choosing a safety message, but it is possible that other respondents were unaware or unwilling to credit the source cue for why they chose a given message. Third, distraction could have played a factor in message elaboration since the study took place during the spring training season. With so much activity ongoing, it was typical for a respondent to be distracted with work related issues while filling out the questionnaire. This is significant because, as Petty and Cacioppo (1986) state, “just as arguments become less important determinants of persuasion as distraction is increased, simple cues should become more important determinants of persuasion as distraction is increased” (p161). It is unknown to what degree the study participants’ let distraction inhibit their processing of either of the safety messages. Finally, personal relevance may have been moderated by the smokejumpers’ issue involvement with safety. Issue involvement, as stated by Reinard, (1988), is “the degree to which the message addresses a personally
relevant issue (p. 8). It is very likely that “parallel processing” of the questionnaire’s safety messages was taking place, where message elaboration was occurring through central route processing while simultaneously being influenced by a peripheral cue (Reinard, 1988, p.8).

**Recommendations for Further Study**

The findings from this study provide an opportunity for a much larger study in the future. Since tailored safety communication has been shown to foster central route processing among smokejumpers better than agency delivered safety communication, a future study could determine whether tailored safety communication activates central route processing among all wildland firefighters. Furthermore, since wildland firefighting is similar to police and the military in regard to being a high-risk occupation, assumptions from this study could translate to these professions as well.

Any future study utilizing the ELM and safety communication should measure message strength, the influence of source factors, and there should be a measure of issue involvement. For example, Petty and Cacioppo (1986) have shown that message strength can be determined by the desired population by using a “thought listing measure” to determine whether or not the message is “strong” or “weak” (p. 133). This study assumed that the message derived from the focus group was strong, but did not test to see if the agency derived message was held in the same regard.

Source factors can significantly influence any study that tests the ELM. As mentioned earlier, it was not the intent of this study to allow source factors to influence message elaboration, but source factors may have influenced the outcome, because the author of
each message was cited at the end. The reason this was done was to show that one message was tailored (i.e., written by a smokejumper) and one message was un-tailored (i.e., written by an expert in risk management). Future studies should provide a question asking the study participant whether or not a source cue influenced their decision in choosing one message over the other.

Finally, this study assumed that smokejumpers would be highly involved with safety, but issue involvement was not measured in the study. A future study should provide a question to determine the questionnaire recipients’ involvement with safety.

Conclusions

This work contributes to the literature on safety communication and the ELM because it provides insight into how members of a high-risk profession process safety information. The emphasis of this study was to determine if tailored safety communication activated central route processing better than agency delivered safety communication. With the help of a focus group, a questionnaire was built around these two message types, and analysis of the results confirmed that tailored safety communication encouraged smokejumpers to think more deeply about safety than they would if the message was delivered by the agency for which they work. Ultimately, the tailored message was chosen because it was described as a streamlined version of what the smokejumpers already know and also because there was a visual stimulus enlisted that helped them identify with the message.

The philosophical and theoretical foundation that was posited in chapter two, is fundamental to this study because it provides a value-based framework from which to
move toward a deeper understanding of safety information processing by members of groups. Nilsen’s (1957) philosophy of “significant choice” is significant to this study because of its assumption that messages are a reflection of how the messenger values the receiver. Petty and Cacioppo (1986) sustain this philosophy by positing, “we regard attitudes as general evaluations people hold in regard to themselves, other people, objects and issues” (p.127).

Furthermore, the ELM states that people will generally think deeper about a message if it is personally relevant, if they are motivated and have the ability to do so, and also if the “nature of their cognitive processing” produces favorable thoughts (Petty & Cacioppo, 1986, p. 126). This study tested the ELM by using tailored safety communication to provide the study participant with a choice. A choice between a visually oriented and streamlined version of safety communication, and a form of safety communication that was verbose, but promising in its ability to consider all potential hazards that face the operator. The streamlined version was chosen overwhelmingly. Therefore, it seems appropriate that the controlling agency that employs smokejumpers provide them with the best information available regarding a safe work environment. Then, the smokejumpers develop their own safety communication processes based upon the personal relevancy of that information.
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THE COGNITIVE EFFECT OF TAILORED SAFETY COMMUNICATION


Appendix A

Smokejumper Questionnaire

One of the following safety proposals will be adopted into your program for the upcoming fire season. It is up to you to choose which one.

Message One: A process will be developed ensuring that safety and health of employees is fully considered during the planning stages of a project or activity. Each potential hazard is considered; and procedures that will ensure that employees are not exposed to that hazard in a way that could harm are established and implemented prior to beginning work on the project or activity. (Author, Expert in Risk Management)

Message Two: A process will be developed that utilizes no more than five bullet statements to highlight safety considerations involved with any given project or activity. In addition, a symbolic device will be used (e.g., photograph, piece of equipment, or other relevant object) to help “tell the story” about any potential hazards. This information will be gone over prior to beginning work on the project or activity (Author, USFS smokejumper)

Please choose one of the above proposals to be implemented into your program this season and explain why you chose it.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

There are three more questions on the back.
How much effort did you give while processing message number one?

Very little thought  Average thought  Above average thought  Extensive thought and reflection

1  2  3  4

How much effort did you give while processing message number two?

Very little thought  Average thought  Above average thought  Extensive thought and reflection

1  2  3  4

How certain are you that your attitude toward the safety message you chose is the correct one?

Not at all Certain  1  2  3  4  5  6  7  8  9  Very Certain
Appendix B

Focus Group (02/29/12)

Q1. What is it about current safety communication that you like or do not like?
   
   **Sub Issue 1.** How do your feelings about this affect your ability to process the information that it contains?
   **Sub Issue 2.** Do your co-workers or management have any effect on your feelings about safety communication?
   **Sub Issue 3.** Do you feel that you can influence any of the safety information you are presented from management?

A. The current method is effective, there are different ways to deliver a Safety Message where you don’t lose your audience and can keep them engaged.

Most felt that the Safety Journey was just another way to say “JHA” or “6 minutes for Safety”. A lot of the material that was covered in the Journey is already being utilized by the fire community, and seemed to fit better with office personnel who did not have exposure to JHA’s or 6 minutes for Safety.

A signed JHA doesn’t necessarily mean you will be safe; it is viewed more as a formality than a useful tool. JHA’s are very redundant and it is difficult to find a well written one that doesn’t inundate the employee with too much information.

Instead of introducing a new process, we already know how the paper process works – but how effective is it? Tailgate safety is a more effective way to get the message of project safety across.

Tailgate sessions are more flexible, and can be presented in a way that everyone present can relate to it (creative/lively/back story/experiences). AAR’s are also an effective tool that people can relate past experiences to.

On site, ask questions and take ownership as a leader on the job site.

Redundancy in hearing the same message year after year – it get tiring as well as individuals losing interest. As a 15+-year employee, someone shouldn’t have to “read” a JHA verbatim to him or her, or be given a lecture on how to do a routine project. People should rely on the experts on site, not a JHA.

Human Related – How the topic is presented and how the individual accepts the information presented.

*The paper method is effective, as long as the information is presented in a meaningful manner.*
Q2. What type of safety communication would you prefer, if any, that would meet the same intent of what is already being provided?

   Sub Issue 1. What effect would this new format have on your ability to process safety information?
   Sub Issue 2. Do you feel that your co-workers and management would support such a new format?

A. What we have now works – it’s up to the individual to take the information given and utilize it to their advantage. A new format would not necessarily be supported – a new system doesn’t mean it will be as effective or utilized like a JHA.

*Revamp the JHA so that it is only 1 page instead of 5+. Have the JHA on one side that hits the highlights for that particular project, and on the other side have a FLA that includes a picture(s) of accidents that have happened with a similar project, i.e. a chipping accident.

The information in every JHA is too redundant. A lot of the information that is found in one JHA can easily be found in another, even though the main topics are completely different. There is nothing that really specializes one JHA to the next.

On site, the project leader will usually take the highlights of the JHA that are applicable and share that with the rest of the work group.

One problem is not everyone doesn’t know the proper way to use a JHA, especially the most effective way possible.

There is a feeling of “this must be on record”, which then leads to having too much information included in the JHA. If the main focus is having the JHA signed, safety and project work accomplishment could be overlooked.

Another issue is that people feel like no matter what, the JHA has to be signed even if they have been to the project site multiple times and have previously signed the JHA.

6 Minutes for Safety seems to be geared to the new employee, but research shows that injuries occur to those who have been around for a while (complacency).

Use real life pictures with the JHA to illustrate what can happen.

Q3. Which one of the aforementioned proposals, if any, would you like to see implemented into your program?

A. Stream line the JHA.

Presenters should be animated, engaged and captivating to the audience.
Create an environment where people are not afraid to ask questions.

Create a package of 1pg. JHA, 1pg. FLA pictures that are relevant to the project.

Enhance the AAR into a more meaningful process, i.e. the sharing of real life learning experiences.

Consolidate the problem instead of getting rid of it or adding more to it.

Everyone seems to have his or her own way of writing a JHA. The proper way to write one has become a lost art; a template that shows the “how-to” would benefit people that just don’t know how to write one.

***It seemed that what we already have in-place is an acceptable way to communicate safety. The issue is the human factor. The presenter needs to deliver the material in a way to capture the listener’s attention. Then it’s up to those individuals to take ownership in the material and make it into useful info to provide for their safety. By developing a “new” process or changing things will not harbor an effective way to communicate safety.
Appendix C

Category One – Message One

<table>
<thead>
<tr>
<th>Questionnaire Respondent</th>
<th>Message One Related Thinking</th>
<th>Message Two Related Thinking</th>
<th>Attitude Certainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMKJ 1</td>
<td>3</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>SMKJ 8</td>
<td>2</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>SMKJ 9</td>
<td>3</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>SMKJ 14</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SMKJ 18</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>SMKJ 21</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>2.6</strong></td>
<td><strong>2.5</strong></td>
<td><strong>6.33</strong></td>
</tr>
</tbody>
</table>

Written Responses

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMKJ 1</td>
<td>I chose one because it states my safety and health will be fully considered. Where two states safety will be highlighted. One considers and procedures will be in place to ensure my safety. I don’t need pictures or to hear a story.</td>
</tr>
<tr>
<td>SMKJ 8</td>
<td>Message one. This is basically the old-fashioned tailgate safety brief. It would be project specific, timely, and easier to address specific issues.</td>
</tr>
<tr>
<td>SMKJ 9</td>
<td>I feel that message one is the best proposal. I chose the proposal because that process will cover all specific hazards related to that project or activity.</td>
</tr>
<tr>
<td>SMKJ 14</td>
<td>Message One: Seems like this method would work better out in the field</td>
</tr>
<tr>
<td>SMKJ 18</td>
<td>Message one because what we have in place is already around and it works.</td>
</tr>
<tr>
<td>SMKJ 21</td>
<td>Message one. Both have merit. In a complex mission, there may be more than five bullet statements needed. Symbolic devices are a good idea but may not be available. Message one can include all necessary information and still implement the good ideas of message number two.</td>
</tr>
</tbody>
</table>
## Appendix D

### Category Two – Message Two

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Message One Related Thinking</th>
<th>Message Two Related Thinking</th>
<th>Attitude Certainty</th>
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</thead>
<tbody>
<tr>
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<td>3</td>
<td>8</td>
</tr>
<tr>
<td>SMKJ 3</td>
<td>3</td>
<td>3</td>
<td>7</td>
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<td>SMKJ 4</td>
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<tr>
<td>SMKJ 5</td>
<td>2</td>
<td>3</td>
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<tr>
<td>SMKJ 6</td>
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<td>SMKJ 7</td>
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<td>SMKJ 10</td>
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<td>SMKJ 11</td>
<td>2</td>
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<td>SMKJ 12</td>
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<td>SMKJ 16</td>
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<td>1</td>
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<tr>
<td>SMKJ 20</td>
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</tr>
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<td>SMKJ 22</td>
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<td>7</td>
</tr>
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<td>SMKJ 23</td>
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<td>7</td>
</tr>
<tr>
<td>SMKJ 24</td>
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<td>3</td>
<td>7</td>
</tr>
<tr>
<td>SMKJ 25</td>
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<td>3</td>
<td>8</td>
</tr>
<tr>
<td>SMKJ 26</td>
<td>4</td>
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<td>8</td>
</tr>
<tr>
<td>SMKJ 27</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>SMKJ 28</td>
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<td>4</td>
<td>7</td>
</tr>
<tr>
<td>SMKJ 29</td>
<td>4</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>
**Written Responses**

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMKJ 2</td>
<td>Message two would be my choice. With 25 plus years in the service message one is a JHA. Message two would be short, keep my attention and be short enough to jog my memory to think safely. Message one would be good for a new employee with a few years in the service. JHA’s get old and do not keep my attention.</td>
</tr>
<tr>
<td>SMKJ 3</td>
<td>Message two: Simplicity, a departure from the usually long-winded JHA that we use. Message one also assumes that by reading and signing a document we will be safe from all hazards, which is a fallacy. Message two states the hazards present, but doesn’t assume that you are completely immune to it.</td>
</tr>
<tr>
<td>SMKJ 4</td>
<td>Message two: More effective way to capture wildland fire community. Also more practical getting the safety message to the folks out in the field.</td>
</tr>
<tr>
<td>SMKJ 5</td>
<td>Two: I think lessons learned stories and experiences from my peers would be a lot more valuable to me in the long run. They kind of give me a slide to choose from.</td>
</tr>
<tr>
<td>SMKJ 6</td>
<td>Message two: I have been exposed to both styles of safety briefs. I learn the best using the “hands on” approach. This includes visual aides and personal experiences. Using message one’s style, I feel that safety briefings tend to be redundant and less interesting.</td>
</tr>
<tr>
<td>SMKJ 7</td>
<td>Number two: I’m a smokejumper and I feel our program breeds a positive attitude in its employees. I read that the author was a smokejumper and this influenced my decision.</td>
</tr>
<tr>
<td>SMKJ 10</td>
<td>Let’s go with Method two. I like the idea of keeping it short with the five bullet statements. Also, using visual cues is good as long as they can be directly related to a project or a potential incident related to the project.</td>
</tr>
<tr>
<td>SMKJ 11</td>
<td>I think it would be impractical to consider every possible hazard for a given activity or project. It makes more sense to develop a framework or process that employees can use to ensure their safety in any given situation.</td>
</tr>
<tr>
<td>SMKJ 12</td>
<td>If given the option I would choose the second message. The reason I chose that particular message was because it seemed to be the shortest and</td>
</tr>
</tbody>
</table>
most in depth of the two. The first message makes the statement that it will consider every hazard, which I feel, is impossible or unnecessary.

SMKJ 13 Message two: Less planning for project leader and overhead. Less thinking involved, which is wanted at the smokejumper base. As long as option two comes with crayons and popsicle sticks.

SMKJ 15 Message two: I like this one because it covers five key points. Any more than five would lose people's attention. Also, I like the idea of the prop as well.

SMKJ 16 Message two please: I think that the five bullet statements are more than enough to fully express the hazards we face on a given project. Safety is ultimately the responsibility of the individual; the government can try to surround its employees in a bubble of safety, but if an individual chooses to lose focus of perform unsafe acts, please don’t take out his/her mistakes on the rest of us. No one here wants to get hurt. We all want to go home after a day of work unscathed. Give us a little credit. This safety crap is/has been rammed down our throat for years. We don’t need more, we need specific messages tailored to specific missions and that is all. If the government spent half as many dollars/person hours recruiting and hiring quality individuals as it did delivering its “safety messages” I predict its safety records or statistics would reflect those measure positively.

SMKJ 17 Message two seems to be more straightforward and basic. Safety is a high priority but we shouldn’t overanalyze it too much.

SMKJ 19 I chose message two. I did not care for the wording in message one.

SMKJ 20 Message two. I think message one tries to cover all hazards and is not job specific enough. Having bullet statements might help to cover the main safety considerations. I don’t think there should be a limit on bullet points because some jobs are more hazardous than others. I do like the symbolic device or lessons learned to help tell the story, but it may be difficult to come up with one for all jobs.

SMKJ 22 Message one sounds like the current status quo. The current JHA’s are not as effective as they could be. Message two would be a good addition to simplifying the JHA’s and making them more effective. However, JHA’s should never be the sole tool to minimize injury.

SMKJ 23 I would stick with message two which seems to be proposing an abbreviated JHA system. My assumptions are that a doctrinal approach would be employed, with the five bullet statements describing general safety theory rather than specific direction on how to accomplish the task at hand in a safe manner. Safety is a product of a culture that values and prioritizes safe work practices at the top of their objectives. It is merely lip service when safety is mandated by higher ups and safe work practices
are dictated down to minutia by policy. The safety culture of an agency or unit is devalued when, without reason, safety protocols are revamped or renamed in order to provide the illusion of progress. Draw from the experience and corporate knowledge of a field of work and develop a plan that anticipates future risks while avoiding past missteps. Don’t take current practices and assign new buzzwords, then call it a safety journey.

SMKJ 24

If I have to choose, I choose number two. However, I feel this process is already in place. We have what we call tailgate safety sessions prior to work projects and I feel they are effective.

SMKJ 25

Message two. I chose this option due to the visual hands on approach. Keeping it simple, do not overdo the safety message overload; there are too many variable out there. Consider the group of folks; are they experienced in task or are they novice. Message one seems to talk down towards more experienced task workers. I also have personal buy in due to the fact that I am a smokejumper.

SMKJ 26

In my opinion, both statements have information that pertains to my opinion. Both statements suffer from the fact that it is impossible to determine all potential hazards that could arise from any activity. It is similar to predicting who or what you are going to come in contact with when you are driving. The risk is determined by the individual and there experience on the road. The more experience the risk level goes down, less experience, the higher the risk. This is methodology used by insurance companies to dictate their rates.

In my experience, actual pictures or hands on experience influence my opinion. Specifically personal accounts come to mind. These are the best pictures that never fade. For instance classroom training only gave me information needed to deal with my experience with my mother’s stroke and what I witnessed and dealt with at the Reno Air Races last year. You can’t train on simulated stroke patients so personal experience is extremely valuable. As for the air races, pictures can be taken of injuries that I would treat from training received. We use pictures in training all the time to describe a situation or environment that all of us could be “potentially” exposed to. Sand tables are a valid example of this type of training. Smokejumper training towers are another. Though the towers are simply that “simulators”, they are steps taken to limit the potential of an individual to risk. Though there is still substantial risk, the environment is still controlled.

We will never be able to address all potential hazards during an activity. That comes to down to the experience of the individual in question. For me having some tangible examples work best for me. There are times where just reading is not enough to explain the situations or hazards. How does one recognize a hazard unless it’s pointed out? How do we learn not
to play with fire? We get burned. Running out in the street? Our parents discipline us on the danger. These are simple examples but look to our 10 and 18? They are examples that we address every year and are supported through history and experiences of our own. I myself teach relating my experiences with a commonality that everyone can relate to. Think of it like a comedian. Why do we laugh at their stories? Because we all relate to the truth of the story or joke. Those are mental images that help to relate an experience.

Option #1 is similar to our JHA’s that we already have. We only understand what is being stated because of training and experience.

Option #2 has five highlighted considerations, that won’t be able to cover all potential hazards, it’s the hands on aspect of a picture, story or object that pertains to me and is my choice for training.

SMKJ 27 I think that message two is more relevant with the procedures and training. Having a good visual of equipment is key with understanding things properly. I am more of a visual learner so this works the best for me. I think that making hazards known and having procedures known and done properly is key instead of assuming people know.

SMKJ 28 I believe most folks within the agency would pick message 2. Being visual and familiar with the work being performed, that would allow some expediency in an environment, which is flooded with checklists and every potential hazard being reviewed. On the contrary, Message 1 lends itself to covering all those aforementioned hazards that an individual may not be accustomed to. For the sake of the questionnaire, I’ll choose Message 2. However, my experience in this agency would make me combine both message 1 and 2. Both have points that can be applied to the potential hazards one may face in performing said duties.

SMKJ 29 I chose message two because it sounds like it is simple and uses less paper. Without examples of the safety proposals you cannot visually, compare them but based on the descriptions, message two is more concise.

SMKJ 30 I choose message two. This option seems more applicable to FS employees working in the field. It would bring safety hazards to everyone’s full attention, while still allowing the job to be done. If we were to not be exposed to potential hazards, as stated in message one, we wouldn't leave our duty station. I feel I process hazards and safety considerations the minute I get to work. Message two is a good plan to ensure we are aware of them all.