STAYING ALIVE: THE EXPERIENCE OF *IN EXTREMIS* LEADERSHIP

by

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DEDICATION

To my family, husband Paul, for his unwavering and endless supply of positivity and support. Caneel, my oldest and my sunshine who has taken over much responsibility for the family since I first began this process. You have never shied away from adventure and your leadership of the kids has been invaluable. Carlin, the middle child, with the kind and generous heart, your industriousness and hard work helped the family make it through when mom was working on her homework—you even learned to cook along the way. Cowboy, the youngest, certainly learned patience through the process. I'm not sure many kids could have waited four years counting down the days to get a dog. It's finally here; the "dog paper" is done! To my parents, thanks for instilling in me my love of learning, and my in-laws for showing me what a successful professor looks like!

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Staying Alive: The Experience of *In Extremis* Leadership

Abstract

by

DEIRDRE DIXON

In extremis situations present unique and difficult demands on a leader because they involve highly unstable conditions and life threatening danger for all involved. Not surprisingly, leading during *in extremis* situations is one of the least studied areas of leadership. This research helps to fill this gap by using a mixed-methods approach that includes three distinct phases. Each phase utilizes the *in extremis* setting to distill core elements of leadership that emerge in that unique context. The goal is to help leaders to be more effective when entering situations where their lives and the lives of others are in immediate danger.

In the first phase, I interviewed thirty US Army platoon leaders who had recently returned from Iraq and/or Afghanistan about their experience of *in extremis* leadership. The findings that emerged were modeled and tested with a 494 leader sample from all military branches. Those findings were then extended to professions that are often considered to be facing similar life threatening situations, with a sample that included 514 *in extremis* leaders from police and fire fighting as well as the military.

Results of the first qualitative study included finding a simultaneous, rather than a sequential occurrence, of sense-making and sense-giving during *in extremis* situations.. This suggests that the process proceeds best when leaders are in a heightened state of situation awareness. Training facilitates leaders' sense-making by freeing up cognitive capacity, and sense-giving can be an interdependent social activity with subordinates in certain circumstances.

The second study revealed that situation awareness and team training were most relevant to outcomes. The final study explored leader characteristics and their impact on situation awareness and self-efficacy across a broader set of professions facing *in extremis* situations. The findings show that a leader's mental flexibility can be a delicate balance between being too flexible and not enough. Surprisingly, it was found that leaders in the dangerous occupations of police, fire, and military experience perilous environments in different ways. This suggests that understanding the different *in extremis* experiences of these three occupations is imperative, especially because they are often grouped together for social science studies.

Key words: *in extremis*; leadership; situation awareness; sensemaking, sense giving,; self-efficacy; mental flexibility; stress tolerance; military; Army.

CHAPTER 1
INTRODUCTION

> …Lieutenant Murphy walked out into the open ground. He walked until he was more or less in the center, gunfire all around him, and he sat on a small rock and began punching in the number to HQ. …"My men are taking heavy fire…we're getting picked apart. My guys are dying out here…..we need help." And right then Mickey took a bullet straight in the back….Only I knew what Mickey had done. He'd understood we only had one realistic chance, and that was to call in help….Knowing the risk, understanding the danger, in the full knowledge the phone call could cost him his life, Lieutenant Michael Patrick Murphy, son of Maureen, fiancé of the beautiful Heather, walked out into the firestorm…….(Luttrell, 2007: 270-271)

Leadership *in Extremis*

Marcus Luttrell's first-person narrative of Operation Redwing in Afghanistan dramatically illustrates *in extremis* situations. His story of the fallen heroes of SEAL Team 10 vividly demonstrates the importance of leadership in its most demanding moments.

Kolditz defined *in extremis* leadership as "giving purpose, motivation and direction" in high stress situations, "when there is imminent physical danger and where followers believe that leader behavior will influence their physical well-being or survival" (Kolditz, 2006: 657). Under stress, people have a tendency to exhibit well-learned responses; but, because the military environment today is more ambiguous and less predictable than in years past, the military cannot train for every situation (Delahaij & Soeters, 2006). This is also true for the majority of the hazardous occupations, such as law enforcement and firefighting (Sweeney, Matthews, Lester, & Lester, 2011). Dangerous situations are intolerant of protracted learning (Bowman, 2006; Spick, 1988),

and research is needed on leader characteristics that make a difference in all types of *in extremis* environments.

In extremis leadership, or leading when lives are at high risk (Gardner, Avolio, & Walumbwa, 2005), contrasts sharply with leading under stable environments (Baran & Scott, 2010). Unlike the military commander who makes strategic decisions from a home base where he or she is safe, *in extremis* leaders are on the ground facing personal danger and possible death as well. Knowing the leader's and usually his/her followers' lives are on the line, is thought to require a different type of leadership because the outcomes mean the difference between life and death for the leader and followers (Kolditz, 2005).

Brief Leadership Theory Background

Effective leadership has been studied for thousands of years. Scholars dating back to the ancient Greeks, Romans and Egyptians have sought to explore and better understand the nature of great leadership (Bass & Stogdill, 1981). To narrow down the overwhelmingly broad field of leadership literature, researchers have used various lenses and taxonomies. From the Feudal system and the "divine right" of men to rule, Great Man theories emerged in the early 1800s (Carlyle, 1849). At the turn of the century, the evolution of leadership inquiry found the emergence of trait theories, and then behavioral and situational theories followed later. Later in the 20th century, the leadership theories at the forefront included transactional, contingency and transformational leadership (Bass & Bass, 2008). Each of these theories added to the knowledge base, but had little to say on *in extremis* leaders, and has left scholars and practitioners searching for answers. It is generally agreed that leadership is a complex multi-dimensional process and there are

many approaches and applications (Northouse, 2013; Yukl, 2002), but a comprehensive theory on leadership in dangerous situations has yet to emerge.

The leadership literature has generally grouped the *in extremis* occupations of police, fire fighting and military together, since they are all unpredictable and ambiguous settings, which leaders must enter to accomplish their objectives (Kolditz, 2005, 2007; Sweeney et al., 2011). Law enforcement, firefighting and military can all face *in extremis* situations, and this research includes each of these hazardous occupations.

Research Gap

Despite the interest in perilous leadership, little is known about the process because it is difficult to conduct empirical research in these dangerous environments (Hannah & Lester, 2009). *In situ* research is challenging and beyond the resources of a dissertation, but learning more from experienced *in extremis* leaders could help other leaders to better handle these treacherous, ambiguous situations. Instead of entering the actual life-threatening environment, phenomenological interviews that ask leaders about their experiences of perilous situations are a good starting point to learn about the context.

A military leader is not the only actor facing perilous environments. Other occupations have leaders placed in harm's way to accomplish organizational objectives; studying beyond simply the military is constructive to these other occupations as well. In an increasingly unstable world, a more general understanding of how leaders function in *in extremis* situations is essential for complex and dynamic circumstances, and may also inform leaders in more stable but stressful environments.

Although scholars have begun to look at different occupations where the leader is in life threatening situations, including military (Matthews, 2014), fire fighters (Dow, Garis, & Thomas, 2013) and law enforcement professionals (Saus et al., 2006a), there has been little research concerning the context as a whole. Calls for such research have gone unanswered, until now (Hannah, Campbell, & Matthews, 2010).

Motivation for Research

My motivation is to explore leadership styles under *in extremis* conditions in order to better understand their "process and context" and ultimately to help leaders make better decisions while facing death. This research journey began on a cold desert night in Iraq, when I was an ammunition company commander, as I was reflecting on the dead enemy bodies that were lying in front of me. Stressed and sleep deprived, I wondered what thin line separated me and my unit, from those dead soldiers.

Through the passing years, I would ponder events that transpired that night and wonder what causes one leader to be successful and another to fail. I often discussed leadership in these dangerous situations with my compatriots. After I returned from Iraq, I taught leadership at the United States Military Academy (West Point); I read Two Wars (Self, 2008), a first-person account of the now famous battle of Takur Ghar; and I decided that I would study *in extremis* leadership in an attempt to make a difference to future generations of leaders who may face enemy soldiers or other hazardous situations.

My experience as a career Army officer serving in Iraq was the impetus for this research. My principal interest was to investigate how leaders could be better prepared in these hazardous conditions. My personal experiences, and my discussions with others about their combat stories, made me wonder how leaders can accomplish their missions

in these terrible circumstances. How can the nation better prepare leaders encountering these life-threatening situations?

I began by examining prior research in relevant areas, including sense-making and high reliability organizations (Weick, 1995; Weick & Roberts, 1993); *in extremis* leadership (Hannah et al., 2010; Hannah, Uhl-Bien, Avolio, & Cavarretta, 2009; Kolditz, 2007); psychology of war (Laurence & Matthews, 2012; Matthews, 2012b). These scholars all confirmed the value in learning more about leadership in dangerous situations, but none offered an in-depth study of leaders faced with *in extremis* situations. This three-stage approach for studying leaders' *in extremis* experiences is a start, and if these leadership lessons can be generalized, then all leaders can become better (Matthews, 2014).

Research that benefits *in extremis* leadership can potentially enhance the effectiveness of other types of leaders as well. Although individuals in business may not be facing death, they are often in stressful situations that could mean death to their organizations or the livelihood of their employees. Losing big accounts, stocks/markets collapsing, or situations where an individual may lose the capacity to reason and to not see “the way out,” can lead to catastrophic assessments and decisions. Reports of suicide were rife after the various crashes on Wall Street (1929, 1987, 2008) because individuals thought their situations were cataclysmic (Altucher, 2010; Rothbard, 1972). Therefore, learning to deal with these stressful situations may be beneficial to others not facing actual death.

Research Questions

To advance the understanding of leadership in perilous, *in extremis* conditions, I address the following research questions:

- How do leaders experience *in extremis* situations and which factors and contexts affect outcomes? (overall dissertation question)
- How do Army leaders in *in extremis* situations make sense of their environment and then, in turn, give sense to their team? (Study 1)
- How do commonly studied factors such as training and experience, among others, affect military leaders during *in extremis* outcomes? (Study 2)
- How do outcomes in *in extremis* contexts (military, firefighting, law enforcement) differ across various individual and demographic characteristics? (Study 3)

Research Method

This study employed a mixed-method approach (Johnson & Onwuegbuzie, 2004) to capture the richness the participants' experiences and to gain a more thorough understanding of the complex issue of *in extremis* leadership. Qualitative and quantitative methods were used in sequence. The first was qualitative, followed by two quantitative studies, which were all combined into one holistic study of *in extremis* situations. Faced with the intricate nature of the research questions, a mixed-methods approach is an apropos choice because one method alone could not illuminate the whole issue. Using mixed methods allows a more complete picture of the *in extremis* phenomenon. Each phase of the research provided new understanding and insights into the research questions; however, the original vision of learning about *in extremis* leaders remained constant.

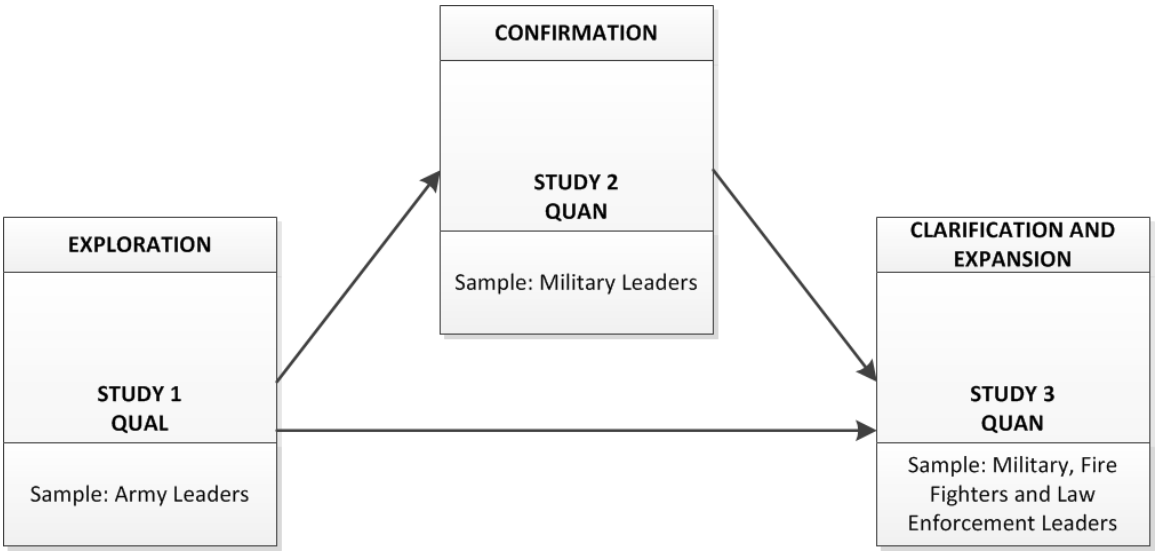
Leadership *in extremis* has different consequences than other types of leadership, and most of the literature on *in extremis* situations is theoretical. Short of collecting empirical evidence of how it manifests in actual practice, individuals who were in *in extremis* situations were asked to tell about their experiences. The original qualitative research sample was comprised of Army leaders. It was then expanded quantitatively to other military branches, and subsequently to fire fighters and law enforcement leaders, which broadened the source of data and applicability of research findings. These occupations were selected as representative of leaders who could be in dangerous situations based on their jobs.

After returning from West Point in 2011, my personal discussions with leaders revealed raw, deep, genuine, introspective, and emotion-packed narratives. From these conversations, I learned that it took time to process these experiences; and that often, no one else had talked with them about their situations. What was revealing was that some of these leaders were reliving their *in extremis* situations for the first time with me. I realized that as the wealth of experience, knowledge, and insights from these unique leadership experiences were revealed, I needed to record their stories to share them with practitioners and scholars alike. And perhaps, I could make a difference to those who had not yet experienced *in extremis* leadership.

The first study on Army leaders used grounded theory (Corbin & Strauss, 2008) to explore how leaders make sense of their *in extremis* environments. The findings of the first qualitative study became the framework and the research direction for the next two quantitative studies, which further examined the problem of *in extremis* leadership. This mixed-method approach blends the advantages of exploratory, discovery research—

generally associated with qualitative methods—and the statistically-driven confirmatory nature of quantitative method, which permitted study multiple aspects from multiple perspectives (Tashakkori & Teddlie, 2008). Figure 1 illustrates the flow of the study.

FIGURE 1
Overall Study Flow



This research allows the findings from one study to inform the next. The first study, a qualitative examination of how Army leaders made sense of *in extremis* environments, is found in Chapter 3. Chapter 4 contains the second study—which addressed how military leaders and their training protocols, as well as their on-the-ground experience and other factors, affected outcomes. The third study is found in Chapter 5, and examines *in extremis* leaders from other branches of the military, law enforcement, and firefighting domains. The reader can examine each chapter as an individual research project, as well as to comprehend their synergy as one robust contribution to leadership community. Chapter 6 integrates the study in its entirety and presents conclusions and contributions. Chapter 7 discusses limitations and future research agendas.

Research Findings

My research reveals that: 1) contrary to current literature, sense-making and sense-giving in dangerous environments can occur almost simultaneously instead of sequentially, and it can be an interactive social activity with subordinates; 2) situation awareness can improve sense-making, and situation awareness should be trained in environments that closely mirror the dangerous environments; 3) when a leader senses that he or she is in eminent danger of dying, mental flexibility is a delicate balance in which he or she needs to have sufficient mental agility to consider alternative responses, but not so much flexibility that he or she is overwhelmed with possible responses to the situation; and finally, 4) not all *in extremis* occupations are the same, even though they are categorized as one group by most current research. These results indicate two distinct kinds of *in extremis* situations. Fire fighters and law enforcement leaders are in "protector" roles, and those in the military are in a "vanquisher" role. Most research has examined all *in extremis* occupations together (Kolditz, 2007; Sweeney et al., 2011), but there are important differences between them that call for further research. The quantitative portion of this study helped to bring out the protector-versus-vanquisher distinction among the three populations (fire fighters, law enforcement and military), which was not evident in the initial qualitative research on military leaders only.

What makes this research more poignant is that these accounts reflect experiences of only those that survived. This research contributes to the literature of *in extremis* leadership and provides important implications, such as training and personnel selection. In addition, it may provide insights for the relative *in extremis* dynamic of modern business executives.

The remainder of the dissertation is organized as: chapter 2 includes the literature overview and research design for the entire project. Chapters, 3, 4 and 5, each include the progressive studies and Chapter 6 integrates the entire study and makes conclusions, while Chapter 7 discusses implications, contributions, limitations and considers future research possibilities.

CHAPTER 2
BACKGROUND AND LITERATURE OVERVIEW

Several theories impacted this dissertation; a few are highlighted here and a table is presented that shows the progression of the theories throughout the studies. Each chapter includes a relevant literature review for the specific study.

In Extremis Context

In extremis leadership is when the leader is facing death for him or her self and those being led. The followers are relying on the leader, and the leadership style needed may differ from other leadership opportunities because lives are on the line. Who are these people willing to take on *in extremis* occupations? They tend to be individuals who value service above self; the type of people who value the good of the community and are willing to risk even their lives for others (Sweeney et al., 2011). Motivations for people who have public service occupations differ from many other members of society (Perry, 1996) because these leaders often do not focus on remuneration, as it is not a primary motivator for selecting their occupation (Kolditz, 2007). In the literature, this type of behavior is often classified as Organizational Citizenship Behavior (OCB).

Organizational Citizenship Behavior

OCB has its roots in the protestant work ethic, where individuals learned to do what a good worker should do regardless of the reward (Merrens & Garrett, 1975). The definition today includes individual behavior that goes above and beyond the job description (Organ, 1997). Smith, Organ, and Near (1983) believed OCB has two primary components: altruism and conscientiousness. Conscientiousness—sometimes called generalized compliance—is a behavior more in line with being a good worker for the system. Example characteristics are being on time, not leaving early, or taking too many

breaks; it could almost be classified as being a “good citizen” or “good soldier” (Smith et al., 1983: 662).

Altruism, on the other hand, is more about helping individuals versus the job or workplace (Smith et al., 1983). The altruism aspect of the construct is focused on because part of “doing one’s duty” is having altruism. Individuals who select dangerous occupations (police, fire fighters, etc.) that help others may be more inclined to have this trait of altruism.

Presentation of Self

In *in extremis* situations, leaders seem to think deliberately about how they communicate to others. Even in dangerous, tense, chaotic moments, they prioritized maintaining a duty-bound standard of behavior equated with the role of being in control and as a leader. Goffman (1959) elaborated the criticality of roles by observing, “When an actor takes on an established role, usually he finds that a particular front has already been established for it” (p. 27).

In these dangerous situations, leaders *in extremis* may well have recognized the importance of avoiding a discrepancy in actions that might affect their message to subordinates. They sought to look competent and in control to their teams by projecting calmness and confidence, qualities equated with leader status. Failure to do so risked that others might be confused with their leadership capabilities. This capacity for self-presentation, coupled with capacities for OCB behavior, help advance understanding of how leaders understand *in extremis* situations.

Sense-making

An individual must make sense of a situation before he/she can give sense about it. In Weick's (1995) terms, sense-making is the way people understand, or make meaning of their experience; people do things they may not understand until they think about it afterward. Weick's ideas are comparable to Gidden's (1986); they both discussed "unintended consequences and the limits of practical consciousness" (Eisenberg, 2006: 1695) and examined the interaction of action and thought, but the origins of their theories were in pragmatism (James, 1907).

Sense-making is not a new concept for *in extremis* organizations. Deciphering how military leaders act in various situations often begins by analyzing sense-making (Jensen, 2009). It has also been used frequently with fire fighters (Klein, Calderwood, & Clinton-Cirocco, 1986b; Weick, 1993), and even law enforcement (Maguire & Katz, 2002). See Chapter 3 for a more in-depth review of sense-making.

Situation Awareness

Although much as been written about the challenging topic of situation awareness, it remains controversial (Salmon et al., 2007). Situation awareness has three levels: Level I is the fundamental perception of cues, Level II is the understanding of what the cues mean, and Level III is the projection for future outcomes (Endsley & Garland, 2000; Matthews, 2014).

The roots of situation awareness in the military go as far back as World War I, and has now spread to other *in extremis* situations, including firefighters and pilots (Endsley & Garland, 2000). Since a special issue on situation awareness in *Human Factors* journal in 1995 drew attention to the topic, many scholars have begun examining

it in different aspects and areas (Salmon et al., 2007). Although still primarily investigated as an individual construct, team situation awareness has also been studied. However, there is currently no universal or accepted theory or definition of the construct (Salmon et al., 2008). The interest in the construct for this study remains at the individual leader level. The primary difference between the two approaches is the question of the concept being a cognitive construct or a systems construct.

Individual situation awareness is generally viewed as a cognitive construct (Matthews, 2012a). This suggests that situation awareness involves more than perception or pattern recognition and requires more cognitive aspects (Vidulich, Dominquez, Vogel, & McMillan, 1994). Meanwhile, it does not mean the same as 'mental models' or the use of the term 'situation assessment' (Salmon et al., 2008; Sarter & Woods, 1991). More information on situation awareness in the literature can be found in Chapters 4 and 5.

Self-Efficacy

Self-efficacy connotes an individual's belief in their ability to accomplish something (Bandura, 1997). Current leadership theory reports a strong positive relationship between a leader's self-confidence and successful leadership (McCormick, 2001). Self-efficacy is discussed in greater depth in Chapters 4 and 5.

The following table serves as a literature overview, indicating which study the theme initially emerges from, and where it is continued in follow-on studies. Table 1 illustrates the distribution of the theories among each of the studies. For a further elaboration of this table, including the primary sources for each theory, see Appendix B for the Major Article Literature Review.

TABLE 1
Literature Overview

THEORY	Study 1	Study 2	Study 3
In Extremis Leadership	X	X	X
Sense-making	X		
Sense-giving	X		
Communication	X		
Presentation of Self / Sense of Duty	X		X
Situation Awareness	X	X	X
Self-Efficacy		X	X
Stress Tolerance / Mental Flexibility	X	X	X
Self Esteem	X		X

Research Design

The research flows from one study to the next, and answers the management call to improve research by utilizing mixed methods (Gardner, Lowe, Moss, Mahoney, & Cogliser, 2010; Yammarino, Mumford, Connelly, & Dionne, 2010). Both qualitative and quantitative methods of research were given equal priority. The initial qualitative research, Study 1, helped me discover without preconceived notions what the data may reveal (Corbin & Strauss, 2008). My objective was to discover how leaders sense-make and in turn sense-give to their teams in dangerous environments. Hearing the actual voices of leader's experiences helped with the true understating of their incidents. A rigorous comparative method (Boyatzis, 1998) and theoretical sampling (Strauss, Corbin, & Lynch, 1990) was then used to evaluate and assess their experiences.

For the second phase, I tested a model developed from the qualitative interviews, in which three variables were identified by *in extremis* leaders: situation awareness, self-confidence in their ability to accomplish the mission (self-efficacy); and an ability to

handle stress (stress tolerance). These concepts were incorporated into a research model and quantitative survey instrument that was administered to experienced military leaders.

For the final study, after referencing the initial interviews, new questions related to the traits of effective leaders in *in extremis* were asked to respondents in non-military situations. I re-analyzed what the subjects were communicating about "successful leaders" when the team was in danger. Three elements seemed to be paramount; first was a sense of duty, which can be divided into both helping others and a willingness to sacrifice oneself; second was mental agility, or flexibility; and the third element was self-esteem.

After hundreds of years of research on leadership, the results lead to returning to examine traits as an important aspect of *in extremis* leadership. Taking this retrospective on leadership may seem usual in these modern times, close to a century after trait theory was introduced (Smith, 2012), but Bass and Stogdill's (Bass & Stogdill, 1981) comment still rings true:

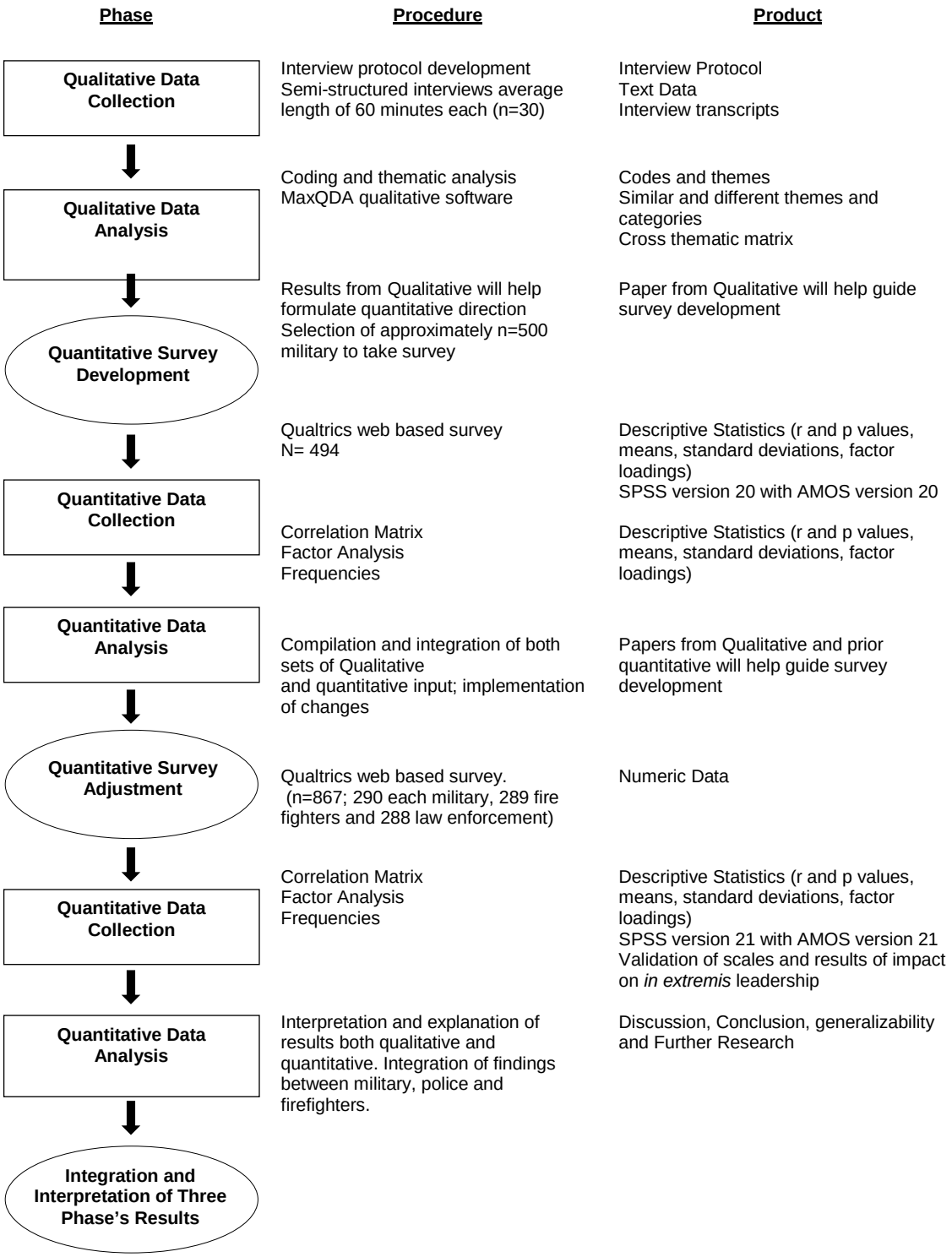
> The conclusion that personality is a factor in leadership differentiation does not represent a return to the trait approach. It does represent a sensible modification of the extreme situationalist point of view. The trait approach tended to treat personality variables in an atomistic fashion, suggestion that each trait acted singly to determine leadership effects. The situationalist approach, on the other hand, denied the influences of individual differences, attributing all variance between personas to fortuitous demands of the environment.

Examining traits are still an important contribution for this context. It seems helpful for both the leaders and the organizations to be aware in advance of who may operate best when lives are in danger.

Mixed methods allows different aspects of the research to address different questions. Qualitative research was used to access the "how" questions, and the quantitative questions addressed the "what" questions. Triangulation of the data then allowed analysis of the data across different themes (e.g. situation awareness). In the first study, situation awareness was found to be an important aspect of sense-making during life threatening situations. In the second study, it was found to be the best predictor in the model of *in extremis* outcomes. These threads among the studies aided in the interpretation effort of the data analysis.

A procedural diagram for the flow of the complete mixed methods study is illustrated in Figure 2.

FIGURE 2
Procedural Diagram[1]



[1] This diagram follows "Ten Rules for Drawing Visual Models for Mixed Methods Designs" Ivankova, N. V., Creswell, J. W., & Stick, S. L. 2006. Using mixed-methods sequential explanatory design: From theory to practice. ***Field Methods***, 18(1): 3-20..

Summary of individual research questions and approach are included in Table 2.

TABLE 2
Research Questions and Approach

Study Number	Research Questions	Methodical Approach
Overall	How do leaders experience *in extremis* situations and which factors and contexts affect outcomes?	Mixed Methods – Qualitative, Quantitative, Quantitative
1.	When a military leader perceives his team in danger, how does he make sense of the situation (sense-making) and communicate that sense (sense-giving) to team members?	A qualitative study conducted through thirty interviews to construct grounded theory for discerning how Army leaders make sense of their environment and then give sense (sense-giving) to their team.
2.	How do commonly studied factors such as training and experience—among others—affect military leaders during *in extremis* outcomes?	A quantitative study composed of all military subjects was used to provide insights on impacts of training, experience, team leadership, situation awareness on military outcomes.
3.	How do outcomes in *in extremis* contexts (military, firefighting, law enforcement) differ across various individual and demographic characteristics?	A quantitative study comprised of military, firefighting, law enforcement personnel was used to compare and contrast human characteristics on situation awareness and self-efficacy.

This dissertation helps further the understanding of the role of leadership in dangerous situations. Leaders in any occupation who willingly place themselves in harm's way need to be as prepared as possible. Leaders facing not just loss of life, but catastrophic loss or extreme stress, may also benefit from this research. Even more broadly, this research could help anyone who has ever been faced with something so devastating that it inhibits their ability to function normally. Enhanced leadership ability is not limited to any specific occupation or context; this study provides some light on the dearth of leadership in the *in extremis* context.

The next chapter contains the qualitative study to learn more about how leaders make sense of their dangerous environments.

CHAPTER 3
MAKING SENSE WHEN IT MATTERS MOST: LEADERSHIP *IN EXTREMIS*

Preface

The first study in this series about leadership in deadly situations begins with a grounded theory approach (Corbin & Strauss, 2008). This allowed me to gain an understanding of how Army leaders make sense of the *in extremis* environment and then give sense to their team through inductive exploration. The results of this study yielded a conceptual model and established the ground work for continuing the investigation in the follow on studies in Chapter 3 (study two) and Chapter 4 (study three).

Introduction

Interest in "*in extremis"* leadership—defined as leading when lives are at high-risk (Gardner et al., 2005)—is surging. Leading in perilous environments contrasts sharply with doing so under stable conditions (Baran & Scott, 2010). In an increasingly unstable world, understanding how leaders function in *in extremis* situations is essential for military personnel (Yammarino et al., 2010), fire fighters (Baran & Scott, 2010) and other first responders or critical action organizations (Hannah et al., 2009), but it is also relevant for those at the helm of traditional and other organizations.

Conducting research on leadership is difficult in itself, but research on leadership in perilous conditions has been deemed "nearly impossible" (Campbell, Hannah, & Matthews, 2010: S2). *In extremis* leadership research has its roots in military stress, which has been studied since the 1950s (Egbert, Meeland, Cline, & Forgy, 1957), but it remains one of the least addressed areas of leadership research (Hannah et al., 2009). Most of the empirical work on this subject has appeared in military journals (Baran &

Scott, 2010; Olsen, Eid, & Larsson, 2010; Samuels, Foster, & Lindsay, 2010), with a focus on how leaders construe their environments, how ethical behavior is impacted, and how a leader's self-control and assertiveness can be improved. Limited *in extremis* leadership research has also focused on fire fighters (Weick, 1993), first responders in natural disasters (Chow, 2008), and emergency medical technicians (EMT) (Popa, Raed, Purcărea, Lală, & Bobirnac, 2010).

Scholars have addressed how leaders sense-make in some *in extremis* environments (Baran & Scott, 2010; Weick, 1993, 1995; Weick & Roberts, 1993). Most notable is Weick's (1993) Mann Gulch study about a fire disaster that claimed the lives of thirteen smoke jumpers. Unfortunately, more common *in extremis* context, and the focus of the research reported here, is one as old as humanity: war. This study sought to explicate how military leaders during *in extremis* situations *sense*, make sense *of* (sense-make), and give sense *to* others in their command, which is a process elsewhere termed sense-giving (Gioia & Chittipeddi, 1991; Maitlis & Lawrence, 2007; Snell, 2002).

Sense-giving has been studied primarily in static organizational change contexts (Bartunek, Krim, Necochea, & Humphries, 1999; Gioia & Chittipeddi, 1991; Rouleau, 2005; Smerek, 2011), wherein a leader has time to decide what change is needed and to develop a purposeful response. Protracted availability of time, however, is commonly not an option in military *in extremis* situations. Lives are frequently dependent on instantaneous sense-making by a leader and the speed and effectiveness of the giving of that sense to others.

Because most of the literature on sense-making and sense-giving in military *in extremis* situations is theoretical, empirical evidence of how it proceeds in actual practice

was sought. To address this gap in the literature, a qualitative study was conducted based on semi-structured interviews with thirty U.S. Army leaders at West Point, all of which had recently led soldiers during *in extremis* situations in Iraq and Afghanistan. Fifty-one incidents were analyzed for patterns in reports about how danger was sensed, processed and communicated. The data yielded insight about sense-making and sense-giving—and, in some instances, sense-taking—by leaders during *in extremis* experiences. In contrast to previous studies in other contexts, these included the simultaneity rather than sequentially of giving/giving/taking and the significant role of a certain variant of situation awareness plays in the process.

The data yielded insights that led to developing an exploratory model on how leaders sense-make and sense-give during *in extremis* contexts and the work has implications for both scholarship and practice. Access to US Army leaders with very recent Middle East military experience provided a rare opportunity to probe the black box of *in extremis* leadership. It yielded insights of import for leadership development and training, not only for those in military, but also other organizational domains. While dangers faced by managers in more benign environments may not be life threatening, *perceptions* of organizational danger and responses to it may be similar (Weiss, Donigian, & Hughes, 2010).

The initial interview stage revealed the importance of sense-making and sense-giving for *in extremis* leadership. Unlike previous research, my findings suggest a simultaneous, rather than a sequential, occurrence of sense-making and sense-giving during *in extremis* situations, and it suggests that the process proceeds best when leaders are in a heightened state of situation awareness. Training facilitates leader sense-making

by freeing up cognitive capacity, and sense-giving can be an interdependent social activity with subordinates in certain circumstances.

Literature Review

The research was informed by theories from several streams of literature: organizational behavior, social science, psychology, and leadership. In this section, the literature on *in extremis* leadership, sense-making, sense-giving, and communication is reviewed. Accordingly, Campbell et al.'s definition of *in extremis* was adopted as a situation "in which leaders or their followers are *personally* faced with highly dynamic and unpredictable situations and where the outcomes of leadership may result in severe physical or psychological injury (or death) to unit members" (2010: S3). The study examined leading when the leader was *in situ*, with the team.

Context

The term *in extremis* describes perilous situations in which actors are "at the point of death" (Kolditz, 2006: 657). Kolditz and Brazil (2005) argued that in *in extremis* contexts, followers believe that leader behavior will influence their survival. This description emphasizes that not just the context, but also the *perception* of the context by involved individuals is important. Kolditz (2007) illustrated this nuance by describing an expert mountain guide and a novice, both on the same mountain, but with dissimilar views on the danger involved; one may perceive the situation as "*in extremis*," but the other may not. Extreme events can occur in myriad situations and across organizations (Hannah et al., 2009). The study's definition does not include crisis leadership, which can occur when "a situation that threatens high priority goals… suddenly occurs with little or no response time available" (Pearson & Clair, 1998: 60). For example, physicians

performing emergency surgeries may be in crisis, but not *in extremis*-situations, because their own lives are not in danger.

Scholars of leadership distinguish between leading and leadership (Day, 2000; Day, Zaccaro, & Halpin, 2004; Hannah et al., 2010), the latter being a collective or "social process that engages everyone in the community" (Day, 2000: 583. See also (Lichtenstein & Plowman, 2009; Palmer, Hannah, & Sosnowik, 2011). In *in extremis* situations, shared understandings are often critical to survival. The collective, interactive notion of that shared process suggests the importance of understanding not only how a leader makes sense of an *in extremis* situation, but in surfacing how that sense is shared, received and responded to by others.

Sensemaking

Weick (1995), who observed sense-making at the organizational level with a special focus on situations that tend to be ambiguous or changing, defined it as the way people understand and make meaning of their experience. The first of seven properties Weick (1995) assigned to sense-making was "grounded in identity construction" (p. 17), referring to how one thinks about one's self as part of a team, and how one is viewed by them. *Who* people think they are in a given context shapes how they enact and interpret events (Currie & Brown, 2003; Thurlow & Mills, 2009; Weick, 1993).

Weick's second property of sense-making, "retrospective," gives one a frame of reference. There is a hindsight bias, but retrospective provides clarity and the time to decipher what is really important (Dunford & Jones, 2000; Gephart Jr, 1993; Huzzard, 2004; Weick, 1995).

Defining the third property of sense-making, "enactive of sensible environments," Weick (1995: 17) argued that people are part of the environment and what they expect to have happen is usually what they get. How people enact with their environments occurs within their own narratives (Bruner, 1991; Currie & Brown, 2003). Speech and writing help individuals figure out how they feel about events after they occur (Abolafia, 2010; Isabella, 1990; Weick, 1995).

Weick's fourth sense-making property, "social," refers to human connectivity and shared understandings. The sense we make about phenomena is preserved in narratives shared with others (Isabella, 1990; Maitlis, 2005).

Weick's (1995: 17) a fifth property, "Ongoing," references the continuous nature of sense-making; individuals are always in the middle of something and often use past events that are similar to understand their present environment. Thus, people both shape environment and react to it; they look at results and evaluate their identities (Thurlow & Mills, 2009) through a feedback loop.

Weick invoked the use of schemas in which individuals use what they know to figure out things they don't know, surmising that they are "focused on and by extracted cues" (1995: 17). Environmental cues, he argued, help to decipher what material is important and what makes sense (Brown, Stacey, & Nandhakumar, 2008).

Weick concluded that people are "driven by plausibility rather than accuracy," suggesting that we need to know enough to start something, although the information does not have to be correct (1995: 17). This notion has roots in the expectancy theory of motivation. When people choose one behavior over another, their choices may be

influenced by the end they desire; i.e., they must believe they can actually do something to even try (Porter & Lawler, 1968; Vroom, 1995).

Sense-making, recognized today as a function of the military decision-making process in dynamic and uncertain environments (Army, 2010), has been acknowledged in military journals since 1989. However, it was really accelerated after research linking it and leader effectiveness was revealed at a 2001 Department of Defense symposium specifically devoted to the topic. Sense-making allows individuals and organizations to transform complex situations into events or information they can comprehend, and hence, act on (Mills, 2003). This is something all military commanders continually strive to do.

Military sense-making studies have addressed sense-making with respect to planning and command and control (Alberts & Hayes, 2007; Jensen, 2006, 2009; Jensen & Brehmer, 2005), military training (Klein, 1993; Klein et al., 2007; Klein, Phillips, Rall, & Peluso, 2003; Larsson, 2001), and trust (McGuinness & Leggatt, 2006) between military members. Both leader sense-making and sense-giving are paramount in a military environment (Fallesen, Keller-Glaze, & Curnow, 2011).

Sensegiving

Gioia and Chittipeddi (1991) originated the term "sensegiving," defining it as, "The process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational reality" (1991: 442). Sensegiving is an expansion of sensemaking; where sensemaking is about understanding, sensegiving is about influencing (Holt, 2009) and persuading (Bartunek et al., 1999). Sensemaking and sensegiving occur together, but the cognitive process oscillates between understanding and then influencing (Corvellec & Risberg, 2007).

Most authors have adhered to Gioia and Chittipeddi's (1991) approach of using sensegiving in the strategic change arena (Bartunek et al., 1999; Dunford & Jones, 2000; Maitlis, 2005; Maitlis & Lawrence, 2007; Rouleau, 2005; Smerek, 2011), while a few have considered it in an entrepreneurial context (Hill & Levenhagen, 1995; Nicholson & Anderson, 2005). Kuperman (2003), for example, examined firms (sensegivers) aiming to influence financial analysts' (sensemaker's) meaning construction and the importance of cognitive schemas in that process. The majority of prior research on sensegiving has examined situations where organizational structures are being developed (Hill & Levenhagen, 1995; Nicholson & Anderson, 2005) reevaluated (Ravasi & Schultz, 2006), or undergoing strategic change (Bartunek et al., 1999; Smerek, 2011).

Sensegiving has been examined predominately as a way to impact the sensemaking of others. However, little is actually known about what individuals do when they are giving sense to others (Corvellec & Risberg, 2007), or the conditions associated with sensegiving; i.e. who, what, when, etc. (Maitlis & Lawrence, 2007). When sensegiving does occur, leaders can use narrative, language, symbols and other methods of communication to give their sense to others in order to lead them towards an intended perception of a situation (Dunford & Jones, 2000; Maitlis & Lawrence, 2007; Snell, 2002; Vuori, 2011).

In an *in extremis* military context, sensegiving must be conveyed quickly and clearly to help reduce ambiguity and provide common meaning, as misconstrual can cause acute errors (Connaughton, Shuffler, & Goodwin, 2011). Miscommunications can be inconvenient or problematic in normal conversations, but deadly in *in extremis* situations. During *in extremis* contexts, sensegiving can help create leadership by

bringing others into the thinking process. Maitlis and Lawrence (2007) showed there are two conditions under which stakeholders and leaders are motivated to engage in sensemaking: first, when the issue has important consequences to the stakeholder; and second, when there is ambiguity and unpredictability or the involvement of numerous stakeholders. *In extremis* environments naturally elevate emotions, and recent research shows leaders can use emotions to strengthen the effectiveness of their sensegiving through their communications (Vuori, 2011).

Communication Theory

Lasswell's classic maxim on communication defines the process as: "who says what to whom in which channel with what effect" (Lasswell, 1948: 216). A mathematical theory considers communication from the aspect of probability (Shannon & Weaver, 1949). If data were always the same, then it is not data because it is not telling the researcher anything new; contrarily, when a novel element in the data appears and the researcher finds something unexpected, learning can occur from the communication (Weaver, 1949).

Effective communication is not just the message, but also how the sender—taking into account social factors—delivers the message. Sociologist Erving Goffman (1959) emphasized that individuals are all actors, and our performance of self is how we frame communication. The holistic message, the significance of expression, style and performance are all incorporated into communication and should be understood by the receiver. In a military situation, communication is a powerful part of a leader's performance. Each member of a team occupies and fills a position, and team members can effectively communicate without knowing one another because they know the role

each plays (Eisenberg, 1990). Effective communication from a leader to his or her team becomes an essential aspect of team performance.

An *in extremis* context could be interpreted as a physical distraction that can interfere with messages on both the sender's and/or the receiver's ends. Clarity of communication from the leader to the team during perilous situations, thus, is vital. A leader's capacity to synchronize team efforts to ensure accomplishment of a mission is contingent upon the ability to effectively communicate (Prince & Associates, 1988). The leader's comprehension of the importance of communications and factors that can impact it is essential for organizational effectiveness (Prince & Associates, 1988), and hence, survival of the team and success of the mission.

Methods

Methodological Approach

Qualitative research, whose power was described by Maxwell (2005) as deriving from its focus on phenomena and people and its emphasis on words over numbers, facilitates discovery versus testing of variables (Corbin & Strauss, 2008). This method was an appropriate choice for inquiring about how military leaders understand and operate in *in extremis* situations. The objective was to generate insight about sense-making and sense-giving, grounded in data emerging from the narrative recollection of the informants' actual experiences in life-threatening situations. Access to soldiers at West Point, who had recently returned from Iraq and Afghanistan, gave a rare and unique opportunity to capture the lived experience of sense-making and sense-giving during *in extremis* contexts.

We used a rigorous "constant comparative method" (Glaser & Strauss, 1967: 105) to code and analyze vivid narratives of survival, derived from in-depth semi-structured interviews, identifying pertinent patterns in the data. Charmaz (2006) argued that symbolic interactionism is relevant during interviewing, and a researcher's own insights and experiences can be an important part of the process. The background of the principle researcher, a retired Army officer with *in extremis* leadership experience in Iraq informed both the collection and analysis of data.

Sample

The sample consisted of thirty mid-level soldiers with at least eight years of leadership experience, including recent roles in *in extremis* situations in the Middle East. The majority held the rank of Captain or Major. Many were enrolled in the Eisenhower Leadership Development Program (ELDP) at West Point to train as Tactical (TAC) Officers (17 out of the 30), and several were West Point instructors. For comparison purposes, we also interviewed two officers not stationed at West Point.

The sample included 27 officers and three Non-Commissioned Officers (NCO) between the ages of 27 and 45. Three were African-Americans, three were Hispanic and one was female. Women, although officially comprising fifteen percent of Army personnel, are still banned from most direct combat roles (McSally, 2007; Simons, 2001), thus making it difficult to include them in the sample. Sample demographics (including gender, position at West Point, and ethnicity) were mapped against tactical officer versus other jobs and are identified in Table 3.

Approval to conduct this research was obtained from the United States Military Academy at West Point. The head of the Behavioral Sciences and Leadership Department

had final approval of all incoming TAC officers slated to participate in the study. For the instructors who participated, the head of their specific departments gave concurrence. Participation was voluntary and all individuals who volunteered for the study were interviewed.

TABLE 3
Sample

		Leadership Position	
		Tactical Officer	Other Job
Gender	Male	17	12
	Female	0	1
	Total	17	13
Race	Caucasian	14	10
	African American	2	1
	Hispanic	0	2
	Other	1	0
	Total	17	13
Position	Officer	17	10
	Non-commissioned Officer	0	3
	Total	17	13

Data Collection

Data were collected between May and July, 2011. Semi-structured face-to-face interviews of approximately sixty minutes were conducted at West Point and were digitally recorded with the interviewees' permission and transcribed by a professional service. The audio recordings yielded 627 pages of text. Twenty-seven of the interviews were conducted face-to-face, and three were at the interviewee's convenience done by telephone.

Each participant was asked to think about a time when he/she felt his/her team's lives were in danger and to describe in detail how the event transpired and was resolved.

Probes were used to elicit elaborate detail (see Interview Protocol, Appendix A). Thereafter, if time permitted, the respondent was asked to narrate a story with a different outcome: if the first narrative had a positive outcome, the second was a narrative with a negative outcome and vice versa. All leaders interviewed shared at least one story. The majority of the respondents had more than one story, but for some, their timing was such that one hour was not sufficient to discuss both. About a quarter of the interviewees shared more than one story; one individual shared four stories. A total of 51 incidents were reported.

Many participants acknowledged not having previously detailed the events they reported to the interviewer with anyone other than the subordinates directly involved. Many became emotional reliving the events and some revealed that narrating them triggered recollection of details not consciously considered since the event.

Data Analysis

Data analysis commenced with data collection. The audio recording of every interview was listened to and each transcript read several times before formal analysis began. Immediately after the transcription of each interview, they were "open-coded," which is reading line by line to identify words, sentences or phrases with possible significance by the researcher (Boyatzis, 1998: 1). This process resulted in the capture of over 1,100 fragments of text, each of which was tentatively labeled, then sorted into preliminary categories with similarly labeled text from previous interviews. This first phase of coding resulted in 48 categories. These categories were further examined by looking for relationships between them, in some cases merging and/or relabeling the categories and documenting ideas and themes emerging from them. Throughout this

rigorous process, category meanings were loosely held and ready to change based on emergent themes (Miles & Huberman, 1994). The data were then interpreted using comparative analysis throughout (Glaser & Strauss, 1967), narrowing down to 29 sub-themes. In the final phase of analysis, we focused on the five key categories from which the findings described below emerged (see Table 8 for data structure).

Findings

The data revealed novel insights about how military leaders make sense of *in extremis* situations and communicate that sense to others whose lives may depend on their interpretation and response to it. How these leaders sense-make and sense-give differs from what has been observed in studies of sense-making in more benign situations.

Finding 1

Finding 1: In contrast to static states, wherein sense-making and sense-giving have been found to ensue sequentially, in *in extremis* situations, they are ongoing and concurrent. Consciously or not, leaders make and give sense simultaneously, continually refining or revising both. As such, *in extremis* sense-making and sense-giving are iterative, recursive, intertwined and overlapping parts of a single process.

In *in extremis* situations, there is often not a moment to lose. The first inchoate "sense" that a leader and his or her command may be *in extremis* triggers a sense-making/sense-giving cycle. Although the leader may not have time to rationally process the incipient "sense" of an *in extremis* moment, he/she must swiftly communicate it to subordinates. As one officer observed, "…it happens so fast that you don't have time to think. You just react (I15)." Another, who was suddenly shot during a mission and lacked sufficient information to make immediate sense of the situation reported:

> So I'm thinking, I don't even know which way to send everybody. I don't have time for that or I won't be able to give orders in a minute because I'll be gone, so I just yell out, "cover", (meaning) find yourself some cover and then we'll work it out. (I12)

A fuller "sense" of the perilous situation, iteratively communicated to this leader's unit reflected an evolving understanding of it, adjusted and refined as additional information became available. As similar quotes in Table 4 suggest, a military leader's immediate "sense" of an *in extremis* situation is often sudden, emotional and unclear. But, despite the pressures of time and insufficient data on which to act, he/she begins sense-making and sense-giving to subordinates spontaneously. Once initiated, a continuous cycle of sense-making and sense-giving ensues as information about the situation accumulates and is processed.

TABLE 4
Sense-making and Sense-giving Occur Simultaneously

Int	Initial trigger	Communication & Thoughts
I13	We were surrounded, probably way outnumbered.	I was screamin' on the radio, "Steady on the guns! We don't know what – we don't know." It was real close. It was very tense, very scared. But I didn't know what it was. I knew it wasn't good. I knew – I knew it was bad. I was scared, but I didn't want to initiate the fight.
I16	The attack happened so fast that you don't have time to think.	I just knew, okay, if it didn't make sense, all right, they're shooting. I need to go tell the squad leader, hey, we need to slide down there or, hey, they're a little too high on the berm.
I29	So, my heart was racing just like everybody else's.	Calling back, talking to the aircraft just forcing myself to talk calm and collected, like very composed. Well, I mean communicating to my platoon leaders and the soldiers that saw me, it was important to you know, say, hey look, there's nothing to be afraid of because I'm not afraid. I think it was because I wanted to create the perception that we had everything under control.
I30	Vehicle Borne IED hit the truck and instantly just put it into a ball of flames. From then, it was followed by an ambush.	I was very cognizant of my voice and I tried to communicate on the radio effectively and clearly, and I didn't wanna scream or make it out worse than it was 'cause I knew that everyone was listening on the net and they would take cues from that.

Finding 2

Finding 2: Sense-making and sense-giving intensify when a leader is "in the zone" or "in the moment," which is a state of heightened mindfulness in an *in extremis* situation when he/she is most highly immersed in the receipt and sending of signals.

During *in extremis* situations, our respondents often reported becoming hyper-focused, a state described *in vivo* as "in the zone" or "in the moment" and characterized by a concentration of energy and attention on the problem they faced. As one leader, describing an event when he was "in the zone," explained:

> Being in the moment is not worrying about anything else; about experiencing what is going on at that particular point in time. I think it allows you to strip away all the peripheral that doesn't matter. It allows me to make quicker judgments about friend or foe…or what I think we need to do. (I16)

Another informant, discussing this state called it having "your head in the game," he said, "… I mean you're focused. You know what needs to be done; and you go do it, and you ensure others around you do it" (I20). A third described it as "a heightened state of arousal that tells me that this is important" (I17). While another explained it as being "…hyper focused…(having) inherent ability to see through all the fog and make the kind of decisions and do the kind of things that are absolutely necessary to help control the chaos" (I27). Another leader revealed that in that state, one is, "…focused…committed and wholeheartedly in it," while "*not* having your head in the game (is) going through the motions…" (I26).

In narrative after narrative, respondents related this super-attentive state to their ability to absorb environmental cues, make quick decisions based on inadequate data and convey critical orders to subordinates. When in this state, leaders reported filtering out

data they deemed superfluous or irrelevant to problem solving, including in some cases their own physical injuries:

> I banged my knee really hard on the blue force tracker, which I didn't even notice at the time. I saw, a couple of days later, a huge bruise, but I didn't feel or even remember. I'm sure that that's what happened, so I knew that I was pretty focused or single-minded. I don't worry about the compartmentalization of being able to deal with the here and now and not be distracted by other things that don't contribute to the solution of the immediate problem. (I30)

> …when you're being shot at, you shouldn't have any other choice or option but to be in the moment… you have to focus on what you're doing at this particular point in time…the good thing about being in the moment is when you're well trained, you don't have to think about a lot of things. (I16)

Finding 3

Finding 3: Despite being hyper-focused in *in extremis* situations, military leaders remained acutely self-aware, subjugated feelings of fear and strove to perform to a perceived "standard."

Nineteen of the thirty military leaders (63%) explicitly commented on striving to "do my duty" during *in extremis* situations. This included presenting themselves favorably to their soldiers and performing to a perceived standard. As one officer, describing his priorities said:

> More than coming home alive, which I obviously wanted to do, more than that, I wanted to do my duty, and I didn't want to be a coward. I used to pray, "God, let me do my duty today, No. 1, and let me live through the day, No. 2." (I30)

A commander, recounting a situation in which he was the only person in proximity when someone else was hit, remarked:

> I was worried about not performing up to the standard that I would expect of anybody else, of him dying right there, of not knowing what to do. But I think the biggest fear was not performing…I'm supposed to be the man, and if I f*** this up, I'd never live it down whether or not the guys would

> be okay with it. And that was almost more of a fear than him actually dying, I think, at the moment. That was really important to me. (I26)

Twenty-six of the soldiers (87%) independently acknowledged consciously striving to project calmness and confidence to subordinates in *in extremis* situations. While the leaders conceded fear and anxiety, they were aware of the importance of projecting control and understood how their physical and emotional demeanor might affect subordinates' behavior. This reflects a recent Army study (Army, 2012b) of junior officers in Afghanistan that identified the top five leadership attributes necessary for success included both confidence (ranked first) and duty (ranked fifth). Note Table 5 for illustration:

TABLE 5
Importance of Showing Calmness/Confidence

Int	Representative Quotes
I3	I wanted them to see confidence, and I wanted them to see that I was remaining calm. I think that it's very important that the senior person in any situation brings a calming effect to that situation. So you've got that responsibility to bring that calm to them.
I14	Taking away the imminent death that's in your face, what was the single-best thing for me was competence and confidence. I know that's cliché. Most people at that point hadn't deployed. When we got the mission, it was like day three in country; and they're like, hey, you're leading patrols. I had to project that to my soldiers.
I9	It's basically, just having confidence. As a leader, you're depended on to make decisions. Everyone is depending on that from you, so when you are pushed to that heightened sense of awareness that you're not looking over your shoulder for somebody else to provide guidance, and you're the person in charge, your senses kind of open up.
I30	I wanted to stay calm. I assumed that if I was freaking out, that would cause the panic button to be pushed for more people.

Finding 4

Finding 4: Sense-making and sense-giving are not the exclusive domain of a military leader in an *in extremis* situation. Subordinates may assist leaders to make and give sense to others, either by delegation or by proactive intervention.

Several respondents narrated *in extremis* experiences in which subordinates participated in sense-making and sense-giving, either having been delegated to do so or having proactively seized that opportunity. The latter was explained by leaders as occurring when they were emotionally overcome in an *in extremis* situation, no longer "in the zone" and operating with reduced decision-making capacity. At such times, subordinates might intervene to interpret a situation, suggest appropriate action and encourage communication of it to others, thereby, facilitating and sometimes retriggering the leader's own sense-making process. Eight of the thirty respondents shared an occasion where subordinates helped them make sense of a situation when they had become overwhelmed. Table 6 illustrates instances of sense-giving by subordinates and the leaders' reactions:

TABLE 6
Sensegiving by Subordinates and Leader's Reactions

Int	Environment Overwhelming	Subordinate Sensegiving to Leader	Leader Acknowledgement
I9	Everyone is depending on you, I was an intel guy, doing all the products for our battalion's movement.	And then my NCO basically just grabbed my shoulder and was like, "What are you doing? We are here – we've trained for this. We know how to do this stuff. Why are you doing all the work?" He just grabbed me.	And he was right. He was absolutely right. My son's middle name, he's named after this NCO.
I8	And so I started yelling, I said, "What the f*** are you guys doing?" Just really sort of irrational. I mean, I know that now. I wasn't cognizant of their intention.	So he just reached over and just sorta grabbed me. It was like, "Sir! Calm down!"	I said, "Okay. Okay." And then it was over. But I was pretty – I wouldn't wanna say panicked, but anxiety maybe would be the right word.
I28	And when there was just a lot of gunfire and some of the guys that were in the front were like, there's no way we're getting through this.	And when the platoon sergeant came back and really talked me through, you know, we've got two bridges right now. How many more do they need?	And when I really had no answer for him, I wanted, basically, to talk to the company commander at that point.

I25	All of a sudden the mortar alarms started goin' off. I've got my vest and I'm puttin' that on. I'm puttin' my helmet on. I run in a bunker. And I remember really, really, really, really being scared at that time and thinking, "Hey, I have to take cover, so I don't –we don't get killed by this big mortar coming," expecting a big explosion to happen.	Everybody else that I'm working with, they're looking at me like, "What the heck you doin'?" And I remember I was horrified. I was horrified. And the next thing you know is I have X saying, "Get you're a** out of there. What are you doing?"	And I think after a while, it becomes second nature to you. You can hear them whizzing and by the sound of it, you can actually kind of predict how close it is when it's comin' in. And I would hear those and kind of, "Oh, whatever."
I1	It's like, "I'm thinking we just say f*** it, move to the next village, hold up there, get reinforced, and then go back through and reclear it."	He's like, "Sir, we need to get the hell out of here. We cannot be here."	So he, Sergeant X, helped me come to that decision because I was – the adrenaline is starting – my quick reaction thinking is now starting to break down, I think.

Finding 5

Finding 5: Reliance on "instinct" and training in *in extremis* situations frees up a leader's cognitive capacity.

Ninety percent of respondents referenced the role of training in surviving *in extremis* situations. They said it allowed them to respond "instinctively" or "intuitively" to certain circumstances when time consuming, purposeful consideration of alternatives was not an option. As one leader, describing his spontaneous reaction to a sense of unanticipated danger, said:

> You're sometimes not truly thinking through the decisions you're making on a conscious level. I didn't think, "Oh, we need to get the vehicles up," or "we need to lay down, suppress the fire to consolidate the elements." I didn't think through it like that. It was just…instinctive. (I26)

The instinct comes, our respondents revealed, from training:

> Battle drills are the key to successful units…. you rehearse, rehearse, rehearse battle drills, saving time. What will truly matter is how do your soldiers, how does the unit react in that situation? And it comes like muscle memory, they just do. They just execute because they've done it so much already. It's a rehearsed action. They know how to react because it's subconsciously built into them. That's how vital battle drills are in my opinion. (I1)

As evidenced by the interview excerpts in Table 7, most leaders acknowledged the importance of training because it freed them to act without thinking.

TABLE 7
Training Examples

Inter-viewee	Training that is so routine it becomes instinctual
I16	The better trained you are, the more time you have to react appropriately and not think about it. Because when you take seconds to think, that second can be from when that soldier got shot at, to when that soldier got killed. I mean, it's very instinctive; because you trained.
I6	When you're well trained, you don't have to think about a lot of things. It's almost – it is second nature for the most part. Whereas if you're not well trained, you're kinda second-guessing in yourself; and then, I mean, you second-guess yourself by the time you're thinking, okay, what should I do now? That split second between, all right, should I move this guy here or move this guy here? When you're waiting to decide what you're gonna do, it could be too late.
I1	So up to this point, we'd been in, this was towards the end of the deployment and we'd been shot at tons, like I've been in 40, 50 fire fights, direct fire contacts up to this point. So I mean we were seasoned veterans. We'd been doing this. It was like another thing, you get into fights, just another fire fight. No big deal. You know, all the guys knew how to fight, knew how to react.
I29	The training allowed me not to think about what line comes first in a call for fire. Or what line comes next in talking to an Apache and stuff like that. And it allows all of that mental energy for thinking about which one do I use first or you know these are the preplanned targets, I'm not going to think about how to call them, but I do need to think about how to adjust them.
I19	(It's) really (important) to not over think a situation. You need to rely on your instincts, and you have to rely on your training.
I15	It's the muscle movement stuff. As soon as something happened, you knew what to do just because you had worked on it so hard.
I30	It allows me to make quicker judgments about friend or foe, what we need to do, or what I think we need to do.
I10	So a lot of it is just reaction, but it's reaction based off of prior experiences. A lot of it's just instinct based on training, I guess I could say. When I'm working with a group of guys, my team leaders know how I'm gonna react.
I17	I want my men to have an instinct and react rather than being told to react. I don't have time for that.
I9	Well, I think it's very instinctual. One, the training kicks in, but you're very familiar with who you're with.

Discussion

We were privileged to conduct phenomenological interviews with 30 soldiers (mainly with the rank of Captain or Major), who had recently returned from duty in Iraq and/or Afghanistan, where they had led troops in *in extremis* situations. We are indebted

to West Point for providing access to them. By recounting the details of specific instances in which they led imperiled troops, these soldiers promoted understanding how leaders make and give sense in life threatening situations. Clear patterns emerged from their stories that clarified how *in extremis* situations are experienced and managed. The data characterized *in extremis* situations as a special case of dynamic states in which distributed cognition, heightened by situation awareness, informs a perceptual cycle of sense-making and sense-giving

Situation awareness (SA) refers to how much knowledge an individual has about a situation (Endsley, 1995b, 1995a; Strater, Endsley, Pleban, Matthews, & TRW Inc Fairfax, 2001) and the degree to which the individual can use it to predict what will ensue (Jensen & Brehmer, 2005). SA has been defined as "an intermediate state in the decision-making process of dynamic systems where one should be able to comprehend the situation in order to make an appropriate decision for future development" (Artman & Garbis, 1998: 1). Endsley (1995a) argued that SA involves the perceptions of elements in the environment, their synthesis to achieve comprehension of a current situation and the envisioning of possible future states of the situation. More expressively, Dominguez (1994 as cited in ESSAI (2000)) described SA as requiring the extraction of information from the environment, *its integration with relevant internal knowledge* to create a *mental picture* of a current situation and the use of the picture to guide *continued perceptual exploration* (all emphasis mine). This constitutes, she argued, a "perceptual cycle" in which perceptions of a situation are continually and actively modified by incoming information (Dominguez (1994) as cited in ESSAI (2000: 38). This inquiry into how

military leaders in life threatening situations make, communicate, and act on their senses provides a vivid picture of the perceptual cycle of SA in operation.

SA has been suggested to involve more than perception or pattern recognition and to require "use of all the higher cognitive functions a person can bring to a task (Vidulich et al., 1994: 18)." This may include accessing "…things that may not *at that moment* be in consciousness (or working memory, if you choose). But you have to be able to grab them when you need them" (Vidulich et al., 1994: 18). Evidence of this was clear in the many references informants made to their military training when recounting their sense-making in *in extremis* situations. The SA literature, indeed, emphasizes that SA is largely (though not entirely) cognitive and can be enriched by experience (Hartman & Secrist, 1991), abilities and training (Endsley, 1995a: 35). Thus, it requires both "active attentional and inferential processes and …significant perceptual and cognitive resources" (Banbury, Andre, & Croft, 2000: 519).

As input from the environment is imperative because of the dynamic nature of things (Endsley, 1995a), even ordinary, routine behaviors rely on situational awareness, or on a consistent, almost unconscious current appraisal of relevant facts. But many variables can deleteriously affect SA, including—as observed both in the literature and this study—fatigue, stress, and anxiety (Strater et al., 2001). This study demonstrated, as Endsley (1995a) has maintained, that when environmental complexity increases, SA is more difficult to both acquire and maintain. In that case, respondents distinguished, as reported in Finding 2, a particular, heightened state of SA they called "being in the zone," when they were "hyper-focused" on interpretation and comprehension of environmental cues.

We recognized the similarity of "Being in the zone" is similar to the state described by Weick (Weick, Sutcliffe, & Obstfeld, 2008), in a discussion about SA and high reliability organization actors who "have the bubble." Weick borrowed the phrase used by the Navy to describe how crews create cognitive maps from disparate information to get a single picture of a situation. "Whereas situational awareness refers generically to the big picture that any operator forms, having the bubble refers to an effortful achievement of a *high level of situational awareness*" (Weick et al., 2008: 43). Weick (1988) quotes LaPorte as observing, "The effort and intensity of purpose required to build what we sometimes characterize as the 'bubble', the state of cognitive integration and collective mind that allows the integration of tightly-coupled interactive complexity as a dynamic operational process, is enormous." This heightened sense of awareness, Weick argued, infers "ongoing action occurs simultaneously with attention and people act thinkingly with wisdom and heed" (p. 43). In Psychology literature, this mental peak focus and immersion in an activity (Tardy & Snyder, 2004) has been called "flow" (Csikszentmihalyi, 1997; Csikszentmihalyi & Jackson, 1999; Nakamura & Csikszentmihalyi, 2002).

The data demonstrated that for military leaders who are in the "flow," the "bubble" or the "zone," attention and action are intense and concurrent and the making of mental models (or sense**)** from what is noticed, comprehended, integrated and projected evolves in a "perceptual cycle" of sensemaking and sensegiving. As expressed in Finding 1, informants emphasized the dynamic, cyclical, non-sequential process of making and communicating sense in an *in extremis* situation, in contrast to previous conceptions of it

in non-dynamic contexts as a sequential and often elongated process (Gioia & Chittipeddi, 1991; Maitlis & Lawrence, 2007; Smerek, 2011).

Most situations involving dynamic decision making and control of dynamic systems are undertaken by a team, not by an individual acting alone (Artman & Garbis, 1998); therefore, a distributed cognition (DCog) approach to understanding such situations has been recommended. As reflected in Finding 4, the data revealed that in *in extremis* situations sense-making and sense-giving may be performed, not just by leaders, but subordinates as well. And, even when the sense-making process resides principally with the leader who communicates it uni-directionally to subordinates, the goal is "shared SA," i.e., "The sharing of a common perspective between two or more individuals regarding current environmental events, their meaning and projected future" (Wellens, 1993b: 272).

According to DCog theory (Hollan, Hutchins, & Kirsh, 2000; Hutchins, 2000; Hutchins & Lintern, 1995), the cognitive process can: 1) occur within a group of individuals (social); 2) involve artifacts or aids from the environment; and 3) be temporal, inferring what has already happened can influence what will happen next (Hutchins, 2000). Informants revealed drawing on this complex combination of people, environmental factors, artifacts and heuristics when making and giving *in extremis* sense.

Finding 4, referencing the first of these characteristics, the role of others in dynamic state sense-making, was based on revelations of leaders who solicited or were otherwise given "sense" from subordinates. This occurred under various circumstances, such as when leader's sense-making was impaired by stress or when their SA was inhibited (or that of others was enhanced) by proximity or access to environmental or

other cues. This finding tracks with recent military research that promotes the benefit to leaders of actively soliciting counsel and assistance from subordinates (Laurence, 2011). According to DCog scholars, "collaborative" and "robust" decisions can result when every team member understands a mission and knows what others will do in a situation, yielding "knowledge redundancy" that allows any one of them to make a decision if a leader cannot (Hansen, Gogan, & Baxter, 2012: 6).

The data included poignant revelations by several informants who became emotionally overwhelmed in specific *in extremis* situations and were aided by subordinates who proactively guided their sense-making and giving. The notion of knowledge redundancy may explain why training that becomes instinctual can help facilitate cognition in *in extremis* situations, which is Finding 5. Although, as Dreyfus (1997) observed, actors cannot rely on a memorized set of rules to deliver a successful solution, informants suggested that training sometimes accelerates sense-making by allowing them to respond instinctually to certain environmental cues, thus "freeing up" cognitive space to attend to others. Training is critical in such situations, but may not be sufficient for effective sensemaking in all situations.

Moreover, leaders seem strongly influenced by training with respect to "how" they communicate to others the sense they are making in *in extremis* situations. Many of the informants talked about how they sought to control others' perceptions of them in such contexts. Even in dangerous, tense, chaotic moments, they prioritized maintaining a duty-bound standard of behavior equated with the role of "being a leader" and "in control." As Goffman (1959), in elaborating the criticality of roles, observed, "When an actor takes on an established role, usually he finds that a particular front has already been

established for it" . This was certainly true for the leaders who were well trained to understand their "duty" and hence, their "front."

So strong was this inclination, that informants reported consciously taking stock of and monitoring their demeanor in the midst of *in extremis* events. Aware that an uncontrollable shaking leg might send an unintended signal to subordinates. For example, one leader purposefully moderated the tone, intensity, and speed with which he talked to communicate calmness and control:

> You see the bullets going, the tracers, rounds are snapping nearby, and I remember I had a physical fear – a physical reaction to fear that very first time. My leg was shaking. I was in my Stryker, in my hatch and we were moving along in a convoy and every single vehicle in front of me was just getting lit up: RPG's (Rocket Propelled Grenade), IED's (Improvised Explosive Device), and we were just driving right through it. I was thinking, okay, we're next, my leg was just shaking uncontrollably; I was hyper conscious about how my voice was gonna sound on the radio. Some of it was because it's the pride thing; you don't want to sound like you're chicken or whatever, and also just so I can speak clearly, they can understand what's going on, and receive the information without being, "Wow, he is scared out of his drawers right now, it must be really bad," or whatever the case is. So from then on forward, I always took the approach of no matter how close it gets, I would think how to control my own physical fear and my own physical reaction. (I12)

This behavior exemplifies Goffman's (1959) notion of "presentation of self," a theory of human behavior that defines humans as actors who perform on two stages: front and back. On the front stage, we present our "public" or ideal selves—behaving the way we wish others to see us—while on the backstage, an actor can "step out of character" revealing his "real" self. According to Goffman (1959), "The expressiveness of the individual (and therefore his capacity to give impressions) appears to involve two radically different kinds of sign activity, the expression that he gives and the expression

that he gives off." (1959: 113). Front stage performance, Goffman observed, must thus be impeccably crafted: "Even sympathetic audiences can be momentarily disturbed, shocked, and weakened in their faith by the discovery of a picayune discrepancy in the impressions presented to them" .

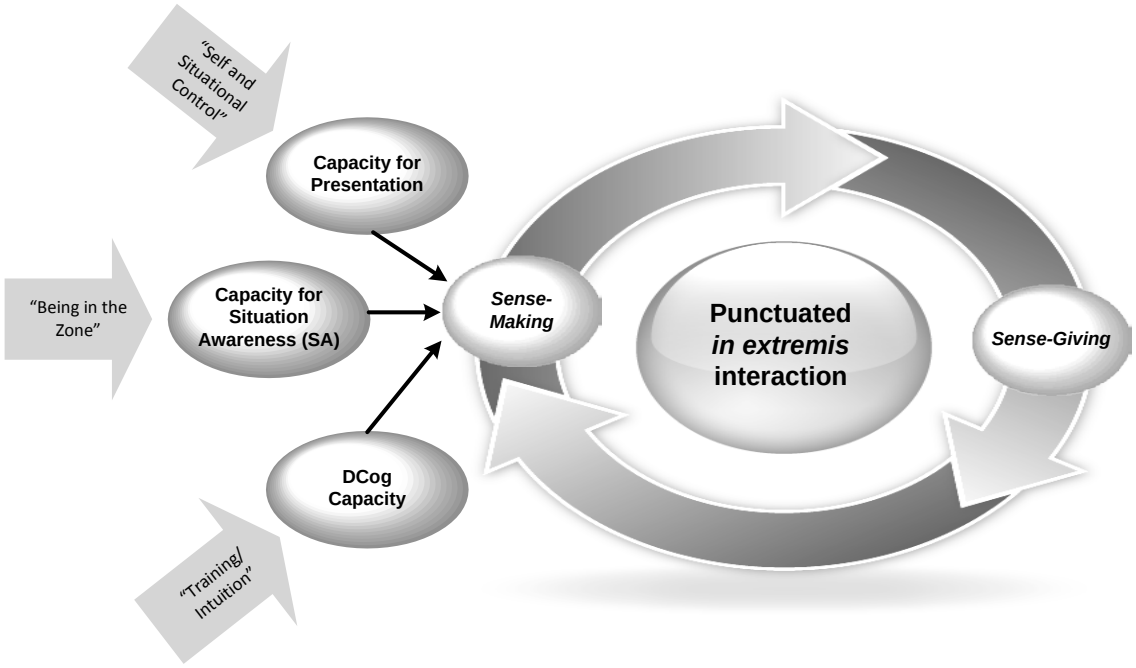
The leaders recognized the importance of avoiding a discrepancy in demeanor that might affect their sensegiving to subordinates. They sought to "look competent" to their teams by projecting calmness and confidence, qualities their training equated with leader status. Failure to do so risked that others might be "torn between two possible realities" (Goffman, 1959: 140).

This capacity for self-presentation (so indicative of Goffman), coupled with capacities for situation awareness (especially that heightened sense of it our informants called "being in the zone"), and distributed cognition (reflected in the use of training and intuition) advance understanding of how military officers make and give sense in *in extremis* situations.

Evocative stories about such experiences in Iraq and Afghanistan revealed a process of punctuated interaction between sense-making and sense-giving, suggesting they are, as conceptualized in Figure 3, not partitioned phenomena, but aspects of a complex dynamic system that proceeds in starts and stops as the sense maker filters and interprets incoming information and stimuli. According to Weick (1995), by punctuating flows of information coming to them, individuals prioritize what is important and reduce process load. The data suggest that how military officers punctuate information flows in *in extremis* situations so that they can make and give sense about them, may be

influenced by their sensitivity to environmental cues, self-awareness and access to and ability to tap distributed sources of cognition.

FIGURE 3
Punctuated *In Extremis* Interaction



Limitations

The sample was limited to recently repatriated Army officers and some NCO leaders currently stationed at West Point. Including officers of other military services (e.g. Marines, Air Force, and Navy) who had also experienced *in extremis* situations may have produced different results. The methodological approach required interviewees to recall past experiences and incidents—often emotional—and the potential influence of retrospective biases was there. The research design did not include interviews with other military personnel involved in the actual *in extremis* situations reported by informants, including subordinates. The perspectives of other actors may have affected the results.

Implications for Practice and Future Research

The results have implications for both future research and practice. They highlight the importance of individual capacities in the sense-making and sense-giving process should be of interest and possible use to developers of military and/or other leadership training programs. While the theoretical notions of sense-making and sense-giving may be appreciated by program developers, likely few curricula specifically specify and introduce them in a practical way to participants. Training programs may also not focus on the factors the data suggests powerfully influence sense-making and sense-giving; e.g., honing participants' skills in sensing environmental cues or the role of self-awareness when sense-giving. While critical in *in extremis* situations, these factors may also be very relevant in more benign organizational settings as well.

With respect to future research, findings suggest several promising paths. Access to participants for this study was limited to individual Army leaders, and much could be learned by researching not only the leader in an *in extremis* situation, but also the followers. Doing so would allow fuller modeling of the dynamic dimensions of sense-making/sense-giving in life or death situations. Studies that compare sense-making and giving in different situations are also recommended to identify factors that affect them in varied settings or circumstances.

TABLE 8
Data Structure

1st Order Code Examples	Sub-Themes	First Aggregate Finding
It was unusually quiet; feeling something you don't know why	Leader sense-making activities	A duality to sense-making and sense-giving exists
I was cognizant of relaying the info I received; I was trying to covey; prioritizing was key	Leader sense-giving activities	
On radio; hand and arm signals	Leader communication methods	
It was an ambush; on patrol; walking;	Information about the specific incident	
Time felt like it slowed down; it was chaos	Time frame for the leader during the incident	
I knew they were looking at me; I didn't want them to see me like that; I was afraid	Leadership thoughts/perceptions during the incident	
1st Order Code Examples	**Sub-Themes**	**Second Aggregate Finding**
Not worrying about anything else; they were focused	Leaders discuss being in the zone	Leader is in a heightened state when in the "zone"
I was single-minded; you're focused; you observe	Leaders converse about having their head in the game	
I wanted them to keep their heads in the game	Leader talking about staying in the moment	
You rely on situational awareness to figure out what it will look like outside the Stryker	Leader remarking on situational awareness	
They have this inherent ability to see through the fog	Leader describing mindfulness	
I had not eaten but I was not hungry; all of a sudden the tiredness disappeared	Leaders describing adrenalin rush	
1st Order Code Examples	**Sub-Themes**	**Third Aggregate Finding**
I wanted them to see confidence, and I wanted them to see that I was remaining calm; Confidence is key	Confidence is helpful to the team	Military leaders remain self-aware and subjugate feelings of fear and strive to perform to a perceived "standard."
When bullets are flying you have to set the example	Leaders striving to remain calm	
More than anything I wanted to do my duty; I wanted to do the right thing; they were looking	Leader trying/wanting to do their duty	
I was cracking jokes; I asked them to reenlist in a fire fight	Calmness/joking around on part of leader	
the single best thing for me was confidence; I like showing competence; you get confident	Leader showing confidence and competence	
1st Order Code Examples	**Sub-Themes**	**Fourth Aggregate Finding**
It was an ambush; we were separated; they were looking to me; it was stressful	The situation is stressful to the leader	Leaders can become overwhelmed and when sense-giving breaks down they extract cues from subordinates.
They wanna grieve; they want to cry; it is emotional	Someone in unit is hurt/killed	
I was scared; afraid; it was chaotic;	The leader is scared/anxious/confused and there is chaos	
Calm down sir; we gotta get outa here;	The subordinate helps the leader with sense-giving	
We wanted to kill the bastards	There is an intensity about the situation	

Sir, what are we doing? Sir, we need to get the hell out of here.	The subordinate is not overwhelmed by the situation	
1st Order Code Examples	**Sub-Themes**	**Fifth Aggregate Finding**
We could do it cause we were trained; we were serious about training	Leader thinks about the benefits of training	Training is routine and becomes instinctual so it benefits sense-making.
Reaction based off prior experience; you have to rely on what you've done prior	Leader reflects on value of prior experience	
It's very instinctive; honestly we just knew it; you have to trust your instincts;	Leader reveals the advantages of instinctual behavior	
Battle drills were key; we knew what to do because of drills	Battle drills and doctrine can be important for a team	
We were cohesive; we knew each other well; we were shit hot; I didn't have to explain	Cohesion of the team helps in training	
You're familiar with who you're with; we were a family	Relationships within the team are important	
I learned from different scenarios;	Adaptability is a positive outcome of training	
I learned it in JRTC; our train-ups were helpful; live fires	A leader can learn from the outcome of training	
it bound us closer as a team; that we had lived through and experienced that and performed how we were supposed to	Morale is a consideration in training	

CHAPTER 4
LEADING IN COMBAT: THE ROLE OF SITUATION AWARENESS AND PERCEIVED CONTROL DURING *IN EXTREMIS* SITUATIONS

Preface

Building on the prior study, "Making Sense When it Matters Most: Leadership *In Extremis*," this study employed the use of quantitative methods though a psychometric survey methodology (Guilford, 1954) that maps individual responses to the concepts in our model developed in Chapter 3. The survey respondents expanded from Army to include all military branches of service. We wanted to widen the audience to include all branches of the services to see if predictions from the past study were more generalizable and focused on training and experience. The research question for this study was:

- How do commonly studied factors, such as training and experience among others, affect military leaders during *in extremis* outcomes? (Study 2)

Introduction

The threat of death in military combat can, unsurprisingly, have a "powerful and unique influence on human behavior" (Kolditz, 2006: 656). Observing how people behave in *in extremis* situations when life itself is at high risk (Gardner et al., 2005) is, however, almost impossible (Campbell et al., 2010) and consequently *in situ* research about it is seldom conducted (Hannah & Lester, 2009). Nonetheless, knowledge about how the threat of death affects the way soldiers (particularly leaders) think and act is an important military concern that can also inform understanding leadership and followership in other high-risk contexts.

A rare *in situ* qualitative study on combat motivation in Iraq in 2003 emphasized "the human dimension" as possibly more salient than training and experience on the combat performance of soldiers (Wong, Kolditz, Millen, & Potter, 2003). This triggered

our curiosity about the relevance of both sets of factors at the military leadership level in similar *in extremis* situations. While traditional military literature lauds the effect of training on performance, it has been observed that contemporary "acute crisis military situations" require "adaptive" rather than "well-trained" responses (Delahaij & Soeters, 2006: 17A–14). Training in perceived deadly situations may actually provoke maladaptive responses.

The first study interviewed thirty military leaders who had recently experienced *in extremis* events in Iraq and Afghanistan, in which the ability to quickly interpret a situation and make adaptive responses to it were revealed as key to their survival. This informed the conceptual model for a quantitative study of the relationships between situation awareness, performance and two sets of factors: training and experience, on the one hand. On the other, interviewees identified two human dimensions as salient survival factors: self-efficacy and stress control.

Results revealed that human dimensions trump training and experience in surviving threatening, uncertain, ambiguous and novel military situations. The firmness of a soldier's belief that he or she possesses the specific qualities required in an *in extremis* situation and his or her capacity to cope with manifestations of stress triggered by it will heighten his or her ability to "read" and react. Similarly, situation awareness has been documented in previous (but not *in extremis*) studies to influence performance outcomes.

This paper contributes to knowledge about improving outcomes in *in extremis* situations, which is of obvious interest to individuals in life-endangering occupations such as police, fire fighters and other first responders. It is also of interest to ordinary

people confronting threatening events such as physical disasters, social crises or terrorism, or less acute, but stressful and threatening circumstances.

Theoretical Framework

In Extremis Outcomes

For over a decade, interest in leadership in dangerous environments as escalated, most specifically those involving the military (Campbell et al., 2010; Hannah et al., 2010; Laurence & Matthews, 2012; Wong et al., 2003), fire fighters (Baran & Scott, 2010; Hytten & Hasle, 1989; Weick, 1993), law enforcement personnel (Bechky & Okhuysen, 2011; Johnson et al., 2011; Murphy, 1965) and other critical incident responders (Graen & Graen, 2013; Kolditz, 2006, 2007; Sweeney et al., 2011). The preponderance of this research has sought to identify factors associated with positive and negative outcomes of leader behavior in acute crisis situations.

Failure in *in extremis* contexts can be calamitous not only for the individuals directly involved, but for many others and for the organizations they serve. It has been noted, for example, that under extreme conditions, leadership and life are often "placed on the line, so that *others* may live" (Pfeifer, as cited in Kolditz, 2007: xi). Thus, an *in extremis* setting, an outcome that ends in death for the immediate participants in it, may, in a wider perspective, yet be deemed a "success." As indicated in the Army Leadership Field Manual (Army, 2006) and is generally observed in the literature (Groysberg, Hill, & Johnson, 2010; Haskins, 2009, 2011), the Army underscores mission accomplishment as a leader's primary responsibility, even above surviving the mission. The official definition of Army leadership is "the process of influencing people by providing purpose, direction, and motivation while operating to accomplish the mission and improve the

organization" (Army, 2006: 1–2). The field manual also promotes personal growth and the betterment of a leader's unit and his or her organization as positive outcomes of leadership (Varljen, 2003). Emphasized, in particular, are results that heighten morale and advance organizational values.

We considered all of these as integral elements of a positive outcome of *in extremis* leadership in the context studied. We assumed that the potential for exposure to mortality-salient circumstances was high in the military venues that respondents were assigned—Afghanistan and Iraq—and that the outcome of an *in extremi*s event in those contexts could affect leaders, their followers, their organization, the mission and team morale. Because existing literature did not provide a scale reflecting these five dimensions of positive outcome as emphasized in the Army Manual, we carefully created, following standard scale development procedures (DeVellis, 2001), a single scale to measure each. The scale was validated and based on Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA) and correlations; all were representative of the construct.

In Extremis **Context**

Kolditz' defined *in extremis* leadership as "giving purpose, motivation and direction" in high stress situations "when there is imminent physical danger and where followers believe that leader behavior will influence their physical well-being or survival" (Kolditz, 2006: 657). Under stress, people have a tendency to exhibit well-learned responses. But, because the military environment today is more ambiguous and less predictable than in years past, it is "not possible to train in detail for every situation that will be encountered" (Delahaij & Soeters, 2006: 17A–16). Dangerous situations are

intolerant of protracted learning (Bowman, 2006; Spick, 1988). Soldiers may consequently experience diminished security, feel less in control of situations they confront and perceive themselves less equipped to interpret them. This is salient because how a situation is interpreted—acknowledged variously as "situation appraisal" or "situation awareness"—influences how an individual responds to it (Blandford & William Wong, 2004; Delahaij & Soeters, 2006; Dominguez, 1994; Endsley & Garland, 2000).

Situation Awareness and Appraisal

The military has been researching "situation awareness" for years because of the importance of appraising and interpreting an acute threat environment (Eid et al., 2004; Juarez-Espinosa & Gonzalez, 2004; Laurence & Matthews, 2012; Matthews, Beal, & Pleban, 2002; Matthews, Pleban, Endsley, & Strater, 2000; Matthews et al., 2001; Strater et al., 2001; Taylor, 1990). Situation awareness reflects information an individual has garnered about a situation (Endsley, 1995b, 1995a; Strater et al., 2001) and how he/she uses that knowledge to envisage a future state (Jensen & Brehmer, 2005). It is, thus, "an intermediate state in the decision-making process of dynamic systems where one should be able to comprehend the situation in order to make an appropriate decision for future development" (Artman & Garbis, 1998: 1).

Situation awareness likely involves more than perception or pattern recognition, and requires "use of all the higher cognitive functions a person can bring to a task" (Vidulich et al., 1994: 18). This may include accessing "things that may not *at that moment* be in consciousness (or working memory)…but you have to be able to grab them when you need them" (Vidulich et al., 1994: 18). The literature describes situation

awareness as largely (though not entirely) cognitive and able to be enriched by experience (Hartman & Secrist, 1991), and abilities and training (Endsley, 1995b: 35). As such, situation awareness offers an expedient paradigm to study important components of the environment and helps in forecasting improved outcomes during *in extremis* conditions (Matthews, 2012a).

Training/Experience

Experience and training have long been analyzed to discover their relationship to higher performance (Ericsson, Charness, Feltovich, & Hoffman, 2006; Galton, 1979). However, different types of experience and training have differing effects on outcomes (Ericsson, 2002; Ericsson, Krampe, & Tesch-Römer, 1993; Ericsson & Lehmann, 1996). Overall, experience and training frequently have "only a weak link to objective measures of performance" (Ericsson et al., 2006: 686). Some examples from a wide range of fields include clinical psychologists (Dawes, 1996), software designers (Sonnentag, 1998), and financial advisors (Hensler, Perelli, & Lingham, 2011). In addition, experience appears to affect performance positively, up to a certain point; thereafter, it can have a diminishing effect (McDaniel, Schmidt, & Hunter, 1988).

Training, at times denoted as "deliberate practice" (Ericsson, 2006: 694), can promote automatic responses that are useful in certain, but not all, circumstances. According to Gaillard (2008: 69), unpredictable events and uncertain outcomes promote anxiety and reliance on "…well-learned, basic strategies that are rigid and non-adaptive." Under extreme threat, people are "unable to think in a flexible way which inhibits their problem solving," diminishes attentional control and incites, "primitive behavioral patterns that may be inappropriate" (Gaillard, 2008: 69).

Self-Efficacy

Much of the ample literature on self-efficacy, the central component of Bandura's (Bandura, 1980: 263) social cognitive theory, has focused on what he described three decades ago as relationships between environmental influences, self-percepts of efficacy and action. In this context, self-efficacy precepts are seen to affect "thought patterns, actions, emotional arousal and performance accomplishments" (Bandura, 1982). According to Bandura and Locke (2003: 1), no mechanism of human agency "is more central or pervasive than beliefs of personal efficacy…rooted in the core belief that one has the power to produce desired effects; otherwise one has little incentive to act or to persevere in the face of difficulties." A strong belief in one's performance efficacy is essential in mobilizing and sustaining the very effort necessary to succeed (Bandura, 1997) "in the face of impediments, failures, setbacks and bouts of discouragement" (Bandura & Locke, 2003: 92). As such, self-efficacy affects choices made at decisional points, influences responses to complex environmental cues, and impacts vulnerability to stress (Bandura & Locke, 2003).

Stress Control

The relationship between stress and performance has a large and diverse body of literature (Kavanagh, 2005). Stress is experienced when the demands of a given environment exceed the perceived resources of an individual to respond to them (Lazarus & Folkman, 1984).

Stress tolerance has been defined as "the ability to withstand adverse events, stressful situations, and strong emotions without 'falling apart' by actively and positively coping with stress" (Bar-On & Parker, 2000: 365). Not "falling apart" is critical in *in*

extremis situations, where errors in judgment and suboptimal performance can be lethal. As Thompson and McCreary (2006: 4–2) observed, "Despite technological advances, humans remain the central element in military operations and are required to maintain emotional, cognitive, and behavioral control to ensure their own safety, the safety of their comrades, and to maximize operational effectiveness," which are all components of "outcome" as conceptualized in our study. Exposure to an extreme stressor can have severe negative consequences (Kavanagh, 2005). Even with experience and training, complete immunity to the effects of stress on performance is unlikely.

Research suggests that threat to life may allocate attentional resources to "process dysphoric emotions and intrusive thoughts" (Ben-Zur & Zeidner, 2009: 123), while inhibiting neural activity in higher cortical areas associated with executive function. This means that the ability of individuals to process information, solve problems, and make decisions may be reduced in acute stress situations. Higher cortical area inhibition results, instead, in more 'automatic' responses to govern behavior (Drevets & Raichle, 1998).

Research Model and Hypotheses

The recognition that training and practice can have a positive effect on performance in most domains (Galton, 1896 as cited in Ericsson, 2006) suggests that training and experience may enhance the outcome of an acute crisis encountered by a military team leader. Outcome includes, as understood in an *in extremis* military context and operationalized in our study, and as articulated in the Army Field Manual (2006): leader and follower safety, unit morale, organizational advancement and mission success. Accordingly, it may be conjectured that frequency of exposure to *in extremis* situations,

general military training and, in particular, military team leadership experience, will all positively impact an *in extremis* outcome.

> *Hypotheses 1a, 1b and 1c: Frequency of acute crisis experience, amount of military training and extent of team leadership experience will have a direct positive effect on* in extremis *outcomes.*

Despite training and experience, dynamic and complex systems sometimes tax humans' ability to make effective decisions and perform. The literature identifies situation awareness (SA) as a critical construct on which outcomes under such circumstances hinge (Endsley, 1995a). Situation awareness has been previously linked in the literature to experience and training (Shebilske, Goettl, & Garland, 2000). The relationship between these variables and situation awareness have been studied in a number of dynamic contexts, mainly in conjunction with military training (Matthews et al., 2000; Matthews et al., 2001; Strater et al., 2001), but not specifically in situations involving a military team leader's confrontation of an *in extremis* event in which his own and/or his teams' lives may be at risk. Recent work, however, indicates a possible mediating role for situation awareness. As Endsley observed, "There is evidence that an integrated picture of (a) current situation (*situation awareness*) may be matched to prototypical situations in memory, each prototypical situation corresponding to a 'correct' action or decision" (Endsley, 1995a: 34, italics ours). Studies have demonstrated in a variety of contexts the use of pattern-making processes that utilize experience or training-based memory to read and respond to certain dynamic states, including military situations (Laurence & Matthews, 2012). Thus we conjecture situation awareness may mediate the effect of training and experience on an *in extremis* outcome.

Hypotheses 2a, 2b, and 2c: Situation awareness positively mediates the relationship between a) frequency of acute crisis experience, b) amount of military training, and c) extent of team leadership experience on in extremis *outcomes.*

Studies document that attainable performance may be constrained by one's basic endowments, such as abilities and characteristics. For example, extensive literature exists on perceived control—linked both to preparation for performance and to performance itself—indicating direct and indirect effects on outcomes. Research has amply demonstrated, for example, that if subjects believe they have control over aversive stimuli, deleterious after effects are reduced (Bandura, 1997; Folkman, 1984; Miller, 1979).

Two key components of control are self-efficacy and stress tolerance. Traditional training of military personnel has been credited as effective in increasing perceived control in some threatening situations (Delahaij & Soeters, 2006). A number of other studies have demonstrated that training and experience can both elevate confidence and decrease stress (De Ruyter, Wetzels, & Feinberg, 2001; Gist, Schwoerer, & Rosen, 1989). Thus we recognize the effect of the frequency of *in extremis* experiences, training and team leadership experience, on perceived control.

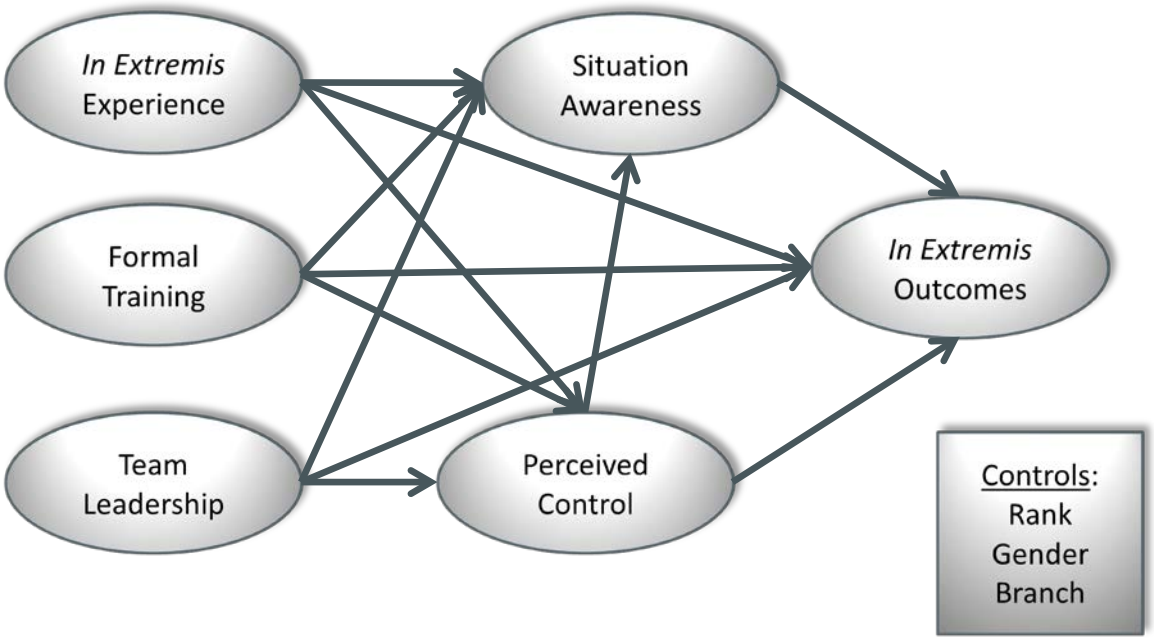
Hypotheses 3a, 3b and 3c: a) Frequency of in extremis *experience, b) amount of military training, and c) extent of team leadership experience will have a positive effect on an individual's perceived control in an* in extremis *outcome.*

The literature also links perceived control and situation awareness. For example, "As a result of the high demands an acute crisis situation places on people and the cognitive deterioration caused by stress, people cannot access or create a cognitive schema" (Delahaij & Soeters, 2006: 17A-3). Perception of control is documented to have

facilitative consequences for performance, while perceptions of lack of control have been seen as cognitively and/or physically debilitative. Thus, we hypothesize:

> *Hypothesis 4. Situation awareness positively mediates the positive relationship between perceived control and outcomes.*

FIGURE 4
Military Model for *In Extremis* Outcomes



Research Design and Methods

We employed a psychometric survey methodology (Guilford, 1954) that maps individual responses to the concepts in our model. As our study context was dangerous military environments, our respondents came from the Armed Forces—primarily the Army.

Measurement of Research Variables

Leveraging existing research, we used constructs operationalized from extant literature to test the research model.

Construct Operationalizations

The U.S. Army Field Manual (Army, 2006) was referenced to operationalize the dependent variable: ***in extremis* outcome**. The field manual links leadership success with: mission accomplishment, positive leader-follower and team results, enhancement of unit morale, and advancement of organizational values. Indigenous items were created for each of these factors and used to evaluate the results of recent *in extremis* situations in which respondents had served in a leadership role. Based on EFA and correlations, all of the indigenous items were representative of the single variable, *in extremis* outcome.

For **training** questions, respondents were queried about the percentage of time they had spent training for deployment in the 18 months prior to their dangerous experience, along with how many times they had trained for a week or more for the specific deployment. They were also asked for the percentage of career time spent in schools for military training. Using Hair et al.'s (Hair, Black, Babin, & Anderson, 2010: 679) contention that single-item constructs are allowed when simple and "directly observable," **frequency of *in extremis* experience** was determined by asking how many times individuals were deployed to *in extremis* contexts. **Team leadership experience** developed by a composite score, combining team and leadership questions. For example, the respondent was asked if he or she had lead a team in a dangerous environment prior to this specific dangerous event, and if he/she had lead this or any team in a significant field training exercise prior to this event (see Appendix G for a complete list of items).

The **situation awareness** construct was derived from the SART scale (Endsley & Garland, 2000; Endsley, Garland, Wampler, & Matthews, 2000), which has ten generic constructs and three broad domains. The two situation awareness constructs were broken

into: *situation awareness*—how complex the situation was at the time, and *situation awareness info*—the amount and the relevance of the information coming into the individual at the moment. Capturing both aspects lined up with Endsley et al.'s (2000: 118) definitions of the constructs included for situation awareness: "variability of situation, complexity of situation, division of attention," and for information: the "amount of knowledge received and understood and degree of goodness or value of knowledge communicated." It also aligns with two of the three levels of situation awareness: Level 1, perception of the situation; and level 2, comprehension of the situation (Laurence & Matthews, 2012).

To measure **perceived control**, we employed two subscales that included *self-efficacy* (adapted from the New General Self Efficacy Scale by Chen, Gully, and Eden (2001)) and *stress tolerance* adapted from Bar-On's (1996) Emotional Quotient Inventory. Lastly, our model recognizes two fairly standard controls in military research, including rank and gender, to which we also added the military component (Active Duty, National Guard, or Reserve) to account for the different military experience within the sample.

Where necessary, we adapted the existing measures to the military vernacular and then validated these changes using Bolton's (1993) approach of listening to three pertinent respondents read the questions aloud to assess comprehensibility and ambiguity. If meanings were not clear, appropriate adjustments were made to the instrument. As a consequence of these pretests, three of the items were altered, deleting two questions and breaking up another into two separate questions. To standardize the similarity of the responses, a five-point Likert scale was used, ranging from "Strongly Disagree" to

"Strongly Agree." Only demographic data relating to training and experience deviated from this format. Items for each constructs are summarized in Appendix C.

Sample

Respondents were sourced from Facebook and Linked-in posts and from links posted on 29 online military sites targeting: Army Veterans, Bronze Star Medal Recipients, 82nd Airborne Division Veterans, Ranger School, Connected Marines, etc. The first author, a retired Army officer, also sent the survey link to 175 military associates. Military members with at least one *in extremis* situation during their military careers were eligible to take the survey. Over five hundred military members completed the online survey. Five hundred and twenty-three responses yielded 494 useable surveys. Most (426) were completed by members of the U.S. Army. However, 19 Marines, 22 Air Force, 22 Navy and five Coast Guard members also participated. Nearly half (49%) of respondents were 48 years or older. Fewer than 8% of respondents were female, which aligns with the congressional mandate that women are not allowed in "direct" combat roles. The data was collected between June and August of 2012. See Table 9 below for a table of the sample's characteristics:

TABLE 9
Sample Characteristics

Construct	Value	#	%
Gender	Male	449	91%
	Female	45	9%
	Total	494	100%
Education	GED/High School	35	7%
	Associates Degree	40	8%
	4-Year Degree	128	26%
	Master's Degree	256	52%
	Doctorate Degree	35	7%
Rank Structure	Officer	346	70%
	Non-Commissioned Officer	148	30%
	Total	494	100%
Component	Active Duty	431	88%
	Reserves	34	7%
	National Guard	29	6%
Officer Rank	Warrant Officer	15	3%
	Lieutenant (O1-2)	35	7%
	Captain (O-3)	112	23%
	Major (O-4)	92	19%
	Lieutenant Colonel (O-5)	142	29%
	Colonel and above (O-6 and up)	98	20%
Enlisted Rank	Private to Specialist (E1-4)	15	3%
	Sergeant (E-5)	98	20%
	Staff Sergeant (E-6)	88	18%
	Sergeant First Class (E-7)	127	26%
	1st Sergeant/Master Sergeant (E-8)	78	16%
	Command Sergeant Major /Sergeant Major (E-9 and above)	99	18%
Age	18-23	1	0%
	24-29	15	3%
	30-35	49	10%
	36-41	74	15%
	42-47	103	21%
	48 and over	252	51%
Relationship Status	Single	64	13%
	Married/Committed	415	84%
	Other	15	3%

Statistical Analysis

The data were analyzed using Statistical Product and Service Solutions (SPSS, version 20) for windows and Analysis of Moment Structures (AMOS, version 20). The initial data set of 524 responses was screened to ensure statistical assumptions could be made with confidence (Mertler & Vannatta, 2005). This meant checking for missing data, outliers, normality, linearity, homoscedasticity and multicollinearity. The missing data for each was less than .2%, and there were no outliers; the data was adequate for analysis.

Since the data was derived from Likert-type scales, there was no reason to eliminate variables based on skewness or kurtosis unless they displayed no variance. Instead, we checked to ensure no standard deviations of less than 0.5 for any variable (which would indicate that the majority of responses fell right on the mean – i.e., displaying insufficient variance). Interval variables had standard deviations all above 0.8, with most over 1.0, indicating no univariate normality issues in the Likert-scale items that might affect results. The data showed sufficient quality to proceed exploring the measurement model.

Measurement Model

We performed an exploratory factor analysis (EFA), a procedure that describes data by grouping variables that are associated (Mertler & Vannatta, 2005) using Maximum Likelihood[2] with Promax rotation.[3] An EFA is normally used to explore the underlying factor structure of data without presuming a structure to start (Suhr & Colorado, 2006). We examined the variable loadings, adequate correlations, and checked reliability and validity in the conceptual model with the following results:

Adequacy. The Kaiser-Meyer-Olkin (KMO) value was 0.837, Bartlett's Test of Sphericity was significant (0.000) and the communalities for each variable were sufficiently high (lowest was 0.381 and most were above 0.59), indicating that these variables were adequately correlated for a factor analysis. Although low factor loadings are acceptable for such a large sample (494), values over ".5 are considered necessary for

[2] Maximum Likelihood was selected to determine unique variance among items and correlation between factors.

[3] Promax was chosen because of the large data set (over 300) and Promax can account for the correlated factors.

practical significance" (Hair et al., 2010: 118). The reproduced matrix had only five (or 5%) non-redundant residuals greater than 0.05, further confirming the adequacy of the variables and of the model. The four-factor model had a total variance explained of sixty percent, with all extracted factors having eigenvalues above 1.0. (See Pattern Matrix, Table 10).

TABLE 10
Pattern Matrix[a]

	Factor				
	SEFF	Outcomes	ST	SA	SAInfo
SEFF3	.865				
SEFF4	.850				
SEFF1	.818				
SEFF2	.813				
O2		.901			
O3		.895			
O1		.748			
O4		.673			
ST3			.791		
ST6			.781		
ST8			.673		
ST5			.654		
SA7				.809	
SA2				.772	
SA3				.655	
SA9					.858
SA11					.707
SA8					.588
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.					
a. Rotation converged in 7 iterations.					

Reliability. Table 11 below reports the Cronbach's alpha for the factors in the model, all of which were above 0.74.

TABLE 11
Cronbach's Alpha

Factor	Cronbach's Alpha	Number of Items	Specification
Self-efficacy	.93	4	Reflective
Stress Tolerance	.80	3	Reflective
SA	.78	3	Reflective
SA Info	.75	3	Reflective
Outcomes	.87	4	Reflective

Validity. Factors demonstrated convergent validity, with all loadings above the recommended minimum of 0.30 (average was 0.596) for samples of over 300 (Hair et al., 2010). The factors also demonstrated sufficient discriminant validity, as the correlation matrix showed no correlations above 0.550 and there were no major cross-loadings. (See Appendix D for Factor Correlation Matrix.)

Having identified the five-factor structure of the data, we proceeded to Confirmatory Factor Analysis (CFA). CFA (see appendix E) is used to verify structure and test hypotheses to authenticate the relationship between the variables in a model and their underlying latent processes (Mertler & Vannatta, 2005). The model fit for the measurement model was adequate without any modifications (see Table 12).

TABLE 12
Measurement Model Fit

Measure	Our model tested
Chi-square/df (cmin/df)	186.1/123 1.51
P value for the model	.000
CFI	.985
GFI	.959
AGFI	.943
SRMR	.033
RMSEA	.032
PCLOSE	1
NFI	.958

Validity and Reliability of Latent Constructs

To test for *convergent validity,* the AVE for all factors (should be greater than 0.50) was calculated. To test for *discriminate validity,* the square root of the AVE (bold on the diagonal above) to all inter-factor correlations was compared. All factors demonstrated adequate discriminate validity because the diagonal values were greater than the correlations. The *composite reliability* for each factor was also computed. In all cases, the CR was above the minimum threshold of 0.7 (see Table 13).

TABLE 13
Validity and Reliability of Latent Constructs

	CR	AVE	MSV	ASV	SA_info	SEFF	ST	Outcomes	SA
SA_info	0.770	0.530	0.150	0.087	**0.728**				
SEFF	0.904	0.702	0.334	0.153	0.274	**0.838**			
ST	0.805	0.515	0.334	0.109	0.152	0.578	**0.718**		
Outcomes	0.888	0.666	0.099	0.072	0.315	0.265	0.159	**0.816**	
SA	0.793	0.564	0.150	0.107	0.387	0.365	0.232	0.304	**0.751**

Common Method Bias (CMB). All of the variables were collected via a single method (online survey), so a CMB test was conducted to determine if a common factor may have influenced the results. We did not collect data on a social desirability scale, therefore the test used—one specifically designed for studies that do not measure a common factor—was the common latent factor (CLF) method (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Even after adding the CLF, sufficiently strong composite reliability and AVE scores were observed for each construct. See Table 14 below for common method bias with common latent factor results:

TABLE 14
Common Method Bias with Common Latent Factor Results

	CR	AVE
SA_info	0.771	0.532
SEFF	0.869	0.624
ST	0.809	0.520
Outcomes	0.882	0.654
SA	0.792	0.561

When comparing indicator loadings before and after adding the CLF, there were no differences greater than 0.200; thus, the measurement model was not significantly affected by common method bias.

Structural Model

The structural model was built using composites imputed from latent factor scores obtained from the measurement model (see Table 15). The fitted structural model (see

Appendix F for model in AMOS) demonstrated a good model fit. Mediation was tested following a combination of the Baron and Kenny method (1986), as well as using 2,000 bias-corrected bootstrapping resamples in AMOS as recommended by Preacher, Rucker, and Hayes (2007).

TABLE 15
Model Fit for Structural Model

Measure	Our model tested
Chi-square/df (cmin/df)	36.62/30 = 1.22
P value	.188
CFI	.994
RMSEA	.021
PCLOSE	.992
SRMR	.043
NFI	.970

Findings

The results of the hypotheses are presented in Table 16. A clear path exists from team leadership experience to perceived control (H3c: $\beta = 0.157$, $p = 0.039$) and situation awareness fully mediates the relationship between perceived control and outcomes (H4: Direct: $\beta = -.011$, $p = 0.844$; Indirect: $\beta = 0.296$, $p = 0.000$). The R-squares for Perceived Control equaled .03, Situation Awareness was .32, and for *in extremis* outcomes R-squared equaled .30. This model, therefore, finds that situation awareness and perceived control are both essential to positive outcomes in *in extremis* situations.

Situation awareness indicates positive and negative effects of training on outcome. Without including situation awareness, only a negative relationship is observed between those two variables (H2b: $\beta = -.179$, $p = .023$), which might imply that more training leads to poorer outcomes. However, once situation awareness is added, the positive and negative effects of training are seen to influence outcomes separately. The positive (but non-significant) effect of training was channeled through situation

awareness, while the negative (and significant) effect between training and outcomes (H2b: $\beta = -.179$, $p = .023$) was found in the direct path.

Lastly, the controls tested for had no significant effects, except for the path from rank to outcomes ($\beta = 0.09$ $p = .034$). The results are summarized in the Hypotheses Summary in Table 16.

TABLE 16
Hypothesis Summary Table

		Evidence Beta/P-value	***Supported?***
H1a	Frequency of IE experience has a direct positive effect on outcomes.	0.032/NS	No
H1b	Training has a direct positive effect on outcomes.	-0.179/*	No, negative, but see H2b
H1c	Team leadership experience has a direct positive effect on outcomes.	0.124/NS	No
	Mediation	**Evidence**	***Supported?***
H2a	Situation awareness positively mediates the positive relationship between experience and outcomes.	Direct no med: .032/NS Direct w/ med 0.000/NS Indirect: 0.050/NS	No
H2b	Situation awareness positively mediates the positive relationship between training and outcomes.	Direct no med: -.179/* Direct W/ Med -.223/** Indirect: 0.042/NS	SA separates the positive and negative effect between Training and Outcomes
H2c	Situation awareness positively mediates the positive relationship between team leadership experience and outcomes.	Direct no med: .124/NS Direct W/med. 0.123/NS Indirect: 0.055/NS	No
		Evidence	***Supported?***
H3a	Frequency of *In extremis* experience will have a direct positive effect on perceived control	0.064/NS	No
H3b	Training will have a direct positive effect on perceived control.	0.015/NS	No
H3c	Team leadership will have a direct positive effect on perceived control.	0.157/*	**Yes**
		Evidence	***Supported?***
H4	Situation awareness positively mediates the positive relationship between perceived control and outcomes.	Direct: -.011/NS Indirect: 0.296/***	**Yes, Full mediation**

*p<0.05, **p<0.01, ***p<0.001

Discussion

When it comes to surviving a near-deadly event, practice may not make perfect. The generally accepted positive effect on performance of training and practice observed across most domains (Galton, 1869 cited by Ericsson, 2006) was not demonstrated in the

highly atypical environment *of in extremis* studied. Positive outcomes of acute—or "at the point of death"—events encountered by military leaders did not correlate with general training, overall team leadership experience or frequency of experience. Training, in fact, had a significantly negative effect on outcomes in this study, diminishing rather than enhancing results. The more general training possessed by a military leader, the less positive an *in extremis* outcome.

In striking contrast, situation awareness was strongly positively related to *in extremis* outcomes. Perceived control and situation awareness were also highly correlated. These results empirically support the rapidly accumulating but to date, mostly theoretical literature on situation awareness in acute crisis situations.

This study began by noting the "powerful and unique influence on human behavior" that the threat of death in a military situation can have (Kolditz, 2006: 656). The results suggest, however, that it is not the threat of death itself, but how the life-threatening situation is comprehended and interpreted (situation awareness) by a military leader and the extent that he/she is able to control him/herself and the situation, that matters most.

Adaptive responses are essential in the increasingly dynamic nature of today's military environments (Dempsey, 2011; Useem, 2010; Wong, 2004). Training and experience, however, is most useful in situations requiring non-novel responses (Delahaij & Soeters, 2006). As Ericksson notes of chess players who, like military leaders, need to "read" continually evolving situations and project future moves:

> A major challenge…is that the chess players be able to represent the chess positions in working memory in a manner that allows evaluation and flexible exploration of sequences of moves. The skills required to

> represent and manipulate chess positions in long-term memory appear to develop slowly as a function of increased chess skill (Ericsson et al., 2006; Ericsson & Kintsch, 1995). Consequently, more-skilled chess players have been shown to be able to plan more thoroughly and to represent chess positions more effectively. In addition, their memory for briefly presented chess positions is vastly superior to those of less-skilled players (Gobet & Charness, 2006: Ch. 30). *However, this superior recall performance is limited to representative chess positions and disappears almost completely when chess positions are randomly rearranged…* (Italics ours.)

Eriksson concludes, and these results underscore, that performance improvements provided by experience and training are most beneficial in "representative" types of experience, but are also limited by "innate factors…that cannot be changed through training; hence attainable performance is constrained by one's basic endowments, such as abilities, mental capacities and innate talents" (Ericsson, 2006: 1). In the case of *in extremis* leadership, one such innate factor is **Perceived Control**, a focal construct investigated specifically in this study as general self-efficacy and stress tolerance.

Semi-structured interviews with military leaders conducted before surveying a larger sample emphasized the role of perceived control in mitigating the potentially deleterious effects of stress on outcomes of *in extremis* events. The quantitative results corroborated this finding; demonstrating perceived control had a strong direct positive effect on outcomes. Individuals exhibiting high levels of general self-efficacy and stress tolerance in *in extremis* situations reported better acute crisis outcomes.

Lazarus and Folkman (1984) intimated nearly three decades ago that how an individual experiences stress depends on situation appraisal—how he/she comprehends, interprets and interacts with an environment—which, in turn, may be influenced by learning and experience. The results shed light on several aspects of that general observation when considered from the specific perspective of a military *in extremis*

situation. Perceived control in an *in extremis* situation was positively affected by only one particular genre of experience and learning. Other studies have indicated that, over time, *in extremis* experiences may contribute to actual decrements in professional competence (Johnson et al., 2011). We found that specific prior experience as a military team member/team leader in an acute crisis situation had a positive effect on perceptions of competence expressed as perceived control. The results also suggest, however, that situation awareness fully mediates the relationship between perceived control and outcomes—underscoring the seemingly paramount role of situation awareness in *in extremis* environments.

We referenced earlier the recent spate in scholarly and practitioner-oriented work on situation awareness. To date, however, few empirical studies have explored its effect on the outcomes of dynamic (in particular *in extremis*) military events. Such work should, it has been recommended (Matthews, 2012a), include both cognitive and non-cognitive factors, which was advice followed in the present study. The resulting evidence of strong positive relationships between perceived control, situation awareness and *in extremis* outcomes—and the comparatively limited influence of general training and experience on these factors—should stimulate more research in this domain. The general literature on the relationship between training/practice/experience and performance is vast, but in this study seem, surprisingly, not to positively influence *in extremis* outcomes. Future research that expands upon this finding may lead to different and better ways of preparing military leaders for *in extremis* experiences. In today's military environment, *in extremis* events are likely to be unique, and general training—demonstrated to be highly effective in representative situations—may not optimize outcomes in novel situations. Domain

novelty, of course, is an obstacle to developing sound methods for evaluating the relationships between the aforementioned constructs. As Mathews (2012) pointed out, while core cognitive components of situation awareness are stable, other factors vital to developing situation awareness vary substantially across domains. Situation awareness metrics appear to be valid in one setting, but may be impractical in others; therefore, specific studies in *in extremis* contexts—although pointed out earlier as "almost impossible" (Hannah et al., 2010) to conduct—are essential.

Thus, this work thus sheds light, but also exposes shadows. The nature of present (and presumably, future), military engagement has changed and will change. While situation appraisal has always been an important part of successful combat outcomes, training situations are less likely today to be representative of actually-encountered situations. How then, can leaders be prepared to respond to them?

This work emphasizes the importance of situation awareness in dynamic situations, where life-preserving decisions depend on: perception, comprehension, interpretation and future-state projection of an actor's environment. Endsley (1995a) noted the criticality of learning "more about the SA construct as a whole" so that training programs can be created to facilitate decision-making in complex and dynamic environments. This is especially true—but particularly challenging—with regard to *in extremis* situations, where lives are in immediate peril. It is beyond the scope of this inquiry to demonstrate what that training should consist of and how it should be implemented. The results do, however, suggest perceived control positively impacts situation awareness. Consequently, it is logical to assume that training and experience that improves perceptions and actual self-efficacy in life-imperiling situations and

enhances perceptions of control over physical, cognitive and emotional manifestations of stress induced by *in extremis* exposure are indicated.

Limitations

As with any research project, there were several limitations to this study. The two most significant limitations resulted from the self-report survey itself and the population surveyed.

Due to the difficulty of observation *in extremis* environments, all data were collected through self-report processes. This includes the initial interviews and later surveys. Therefore, we were relying on participants to remember the details of the *in extremis* situation unambiguously, as well as their feelings at the time. Although people are capable of remembering stressful incidents very well (Christianson, 1992), issues regarding memory fidelity and social desirability could exist.

Social desirability has been a concern for self-report studies for well over half a century; the concern is that individuals may contaminate the data trying to present themselves favorably (Edwards, 1957; Fisher, 1993; Grimm, 2010). This study used military combatants who have sworn to support and defend the constitution of the United States (Suddarth, 1981). Doing the right thing morally and legally and saying and doing nothing that deceives others are part of the military value system. As a group, the military lives by a code of conduct (Suddarth, 1981) and those who are drawn to the military as a career, also seem to be more intrinsically motivated, than driven by extrinsic rewards (Thomas & Jansen, 1996). The respondents were relied on to complete the survey truthfully.

This study was restricted to a military context. While this homogeneity helped the theoretical development of the exploratory research, it is not clear whether the data is representative of other *extremis* environments.

Implications for Practice and Future Research

This is the first study to examine the relationship between situation awareness, perceived control and outcomes in a military *in extremis* context. Results point to situation awareness as the single most critical factor in leading a team though a life-threatening military event, but also emphasize the role of perceived control in maximizing situation awareness.

Long established military philosophy and doctrine indicates a deep-seated belief that leadership is a process that can be "learned and developed through proper training and education" (Fallesen et al., 2011). It is not clear, however, how situation awareness can be properly learned and developed. This data—which suggests that human factors trump traditional training and education when facing a near death event—may offer some clues. Although it is beyond the scope of this paper (and our expertise) to proffer military training recommendations, others have observed that traditional training is most effective when events encountered in the field are representative of those previously rehearsed. However, in today's increasingly dynamic military environment, it is difficult to predict and model likely-to-be-encountered events. Focusing instead on situation awareness and perceived control may improve a soldier's ability to make the fast, impromptu and critical decisions necessary to lead a team through an acute crisis. These results point to the need for substantially more empirical research about situation awareness and the variables that influence and affect it—measured in this study as self-efficacy and stress tolerance, but

possibly other important individual characteristics as well. Future research should also investigate the role of situation awareness and perceived control versus outcomes in other *in extremis* environments encountered by other organizations.

CHAPTER 5
IN EXTREMIS LEADERSHIP: FULL MENTAL JACKET

Preface

The prior two studies—the qualitative interviews in "Making Sense When It Matters Most: Leadership *In Extremis*," and the quantitative military study, "Leading in Combat: The Role of Situation Awareness and Perceived Control During *In Extremis* Situations"—led to this third investigation of leaders in other *in extremis* occupations. Again using quantitative methods with a psychometric survey methodology, the final study in this dissertation includes additional hazardous occupations. Because the previous two studies and the literature have revealed self-efficacy and situation awareness can have positive effects on outcomes, the final study examines human characteristics that may have an explicit effect on self-efficacy and situation awareness.

Leaders in both firefighting and law enforcement, along with additional military personnel, were examined to compare and contrast their recollections of a situation where they believed they could perish. Research has shown that public service attracts those who may have special attributes that oblige them to assist others (Perry, 1996). The addition of these other *in extremis* occupations allows for making generalizations about the *in extremis* context as a whole and also draw distinctions among them.

Current *in extremis* literature conventionally examines either one occupation (such as military) or groups all military, fire fighters and police together (Kolditz, 2007). This research groups them together.

Introduction

> **"**Another explosion rocked the helicopter. The gunfire was in a crescendo, coming from multiple directions. *If something doesn't change drastically, and soon, this helicopter will become a multimillion-dollar coffin. I'm the senior Ranger on the aircraft, and with the fate of twenty-one Americans still undecided, I know it's up to me to make the difference*" (Self, 2008: 154).
>
> --From Captain Nate Self's story on his experiences as a Ranger team leader in Afghanistan

Interest in critical incident leadership, particularly military combat operations, has escalated for more than a decade (Hannah et al., 2010; Laurence & Matthews, 2012; Wong et al., 2003). Nevertheless, critical incident research extends beyond military operations to fire fighters (Baran & Scott, 2010; Hytten & Hasle, 1989; Weick, 1993), law enforcement personnel (Bechky & Okhuysen, 2011; Johnson et al., 2011; Murphy, 1965) and other first responders (Graen & Graen, 2013; Kolditz, 2006, 2007; Sweeney et al., 2011). Previous research adds tremendous value and insight toward improving the effectiveness and efficiencies of many important organizations, yet many important issues remain unresolved. For example, fire fighters have faced increased fatalities in recent years, prompting calls for more human factors research (Lewis, 2013).

This study examines a subset of critical incident leadership situations, *in extremis* environments. *In extremis* leadership situations are those in which the life of the leader and the team are in peril. We assume that these environments have fundamental differences from traditional leadership environments, and even other critical incident environments like emergency rooms where a life or lives are at stake, yet the leader and team are not in imminent peril. Leadership *in extremis* warrants special attention due to

the heightened psychological stresses and other leadership concerns inherent in these environments (Baran & Scott, 2010; Matthews, 2014; Sweeney et al., 2011)

Empirical research on people *in situ* in these dangerous environments is challenging (Hannah & Lester, 2009), yet the potential for real life-saving returns from such research on leadership *in extremis* contexts compels examination. In lieu of actually being present in these environments, phenomenological interviews with leaders *in extremis* environments as well as surveys can aid understanding of these dangerous situations and how individuals can improve both personal and team performance.

This project began by interviewing thirty U.S. Army soldiers that had recently returned from combat zones in the Middle East. They were asked to reflect on a time when they were in an extreme situation, and then expound upon it. These soldiers understood their lives were at stake, and their first-person accounts provide remarkable insights into how they made enough sense of extraordinary conditions to live and tell about it. From these initial interviews, the research was expanded.

Background

Individual characteristics as a means for understanding a leader's *in extremis* performance were first explored. Understanding that there were hundreds of potential characteristics associated with positive outcomes, the interview transcripts were analyzed to see which factors were most salient in producing desirable outcomes. Desirable outcomes can include no loss of life, mission accomplishment, and improved morale. An examination of the resulting transcripts through open-coding and frequency of response counts suggested four factors warranted supplemental analysis. The interviews strongly underscored the pivotal roles of situation awareness and self-efficacy as salient

characteristics associated with surviving *in extremis* situations. The interviews also illustrated how leaders' behaviors were influenced by their mental flexibility, altruism, selfless service and self-esteem. Expanding from there, the study reported results of an effort to quantify the association of these four individual characteristics with the positive outcome features of situation awareness and self-efficacy.

The overall research involved three general stages. First, a grounded theory analysis (Corbin & Strauss, 2008) was conducted on the transcripts of the initial interviews to codify how and why leaders were successful in these *in extremis* environments. Second, those qualitative results led to development of a research model and survey to explore the findings from the qualitative study further. The resulting survey was then administered to all branches of the United States military, resulting in survey results from nearly 500 respondents. A final survey was then administered to a broader group of leaders including military members, fire fighters, and law enforcement personnel.

This chapter reports findings from the third phase of the research that included both military and non-military leaders. Specifically, survey responses from 123 law enforcement officers and 191 fire fighters were compared with those of 200 military respondents. The focus of this study was examining different *in extremis* occupations and the association of personal characteristics with situation awareness and self-efficacy.

Conclusions from the first two studies posit that a leader's ability to quickly and insightfully assess a dangerous situation and a strong *belief* in one's *ability* to do what is required to resolve it are associated with positive *in extremis* outcomes. This research

examines an important question, “How might individual characteristics affect this ability and belief for various *in extremis* occupations?”

This paper investigates how differing individual and demographic characteristics can affect situation awareness and self-efficacy when a leader’s life is in danger. Elaboration involves two fundamental research questions:

- How do characteristics associated from the literature on first-responder performance (flexibility, altruism, self-sacrifice and self-esteem) relate to the two factors (situational awareness and self-efficacy) suggested as characteristics of leadership success during *in extremis* outcomes?
- Are there differences conditioned on the occupational category (firefighters, military personnel, and law enforcement)?

I will now look at the four characteristics.

Flexibility

Respondents discussed flexibility (or adaptability) during dangerous environments as a critical element of their mental agility to adjust to changing conditions. Sun Tzu, a Chinese general born in 430 BC, stated that this type of flexibility was important in the *Art of War* (Tzu, 1963). Flexibility may also be vital to anyone faced with *in extremis* conditions in facilitating a rapid adaption to quickly changing situations. Today’s leaders, faced with dangerous and ambiguous environments, may be well served by increased capacities for flexibility, or fluidity, in thought.

Sense of Duty

Another characteristic the interviewees identified as paramount was an aspiration to “do their duty”—a factor that military leaders deemed was more important than a

concern about one's own pending death. One interviewee clearly illustrates this by saying:

> More than coming home alive, which I obviously wanted to do, more than that, I wanted to do my duty, and I didn't want to be a coward. I used to pray, "God, let me do my duty today, No. 1, and let me live through the day, No. 2." (I30)

Doing one's duty consists of two dominant orientations: the willingness to sacrifice oneself, and the willingness to help others or self-sacrifice and altruism.

Self-Sacrifice

Willingness to incur personal sacrifice is clearly a part of doing one's duty. One must be willing to risk oneself, and not simply direct others into harm's way. Individuals motivated to do public service may be drawn to this type of honorableness by helping others through a sense of duty, or at the extreme, to self-sacrifice (Perry, 1996).

Altruism

Whereas self-sacrifice centers on the individual, altruism relates to how much someone is willing to help others (Truckenbrodt, 2000). Altruism means someone is "consistently more generous, helping and kind than others" (Philippe Rushton, Chrisjohn, & Cynthia Fekken, 1981: 296). In general, an individual drawn to serve the public through exposure to dangers associated with hazardous occupations, generally has a high sense of duty towards helping others (Sweeney et al., 2011). Morality research shows that assisting others is considered an honorable act (De Waal, 2009); it is part of doing your duty. In this way, doing one's duty incorporates both the traits of self-sacrifice and helping others.

Self-Esteem

The final characteristic necessary for effective leadership in hazardous environments suggested from this study is self-confidence, or positive self-esteem. Self-esteem is defined as how one views one's self (Rosenberg, 1965). Respondents suggested that effective leaders had high confidence in their own abilities to lead and noted that such self-esteem was vital for survival. Of course the leaders had to have the ability to follow through with actual talent, but believing in that talent was important.

In sum, these four characteristics—flexibility, altruism, self-sacrifice and self-esteem—were reported by respondents as important to leading effectively during their *in extremis* situations. This research tested these self-reports from military leaders, while also extending the context to include other dangerous occupations, including firefighting and law enforcement.

This paper investigates how differing individual and demographic characteristics can affect situation awareness and self-efficacy when a leader's life is in danger. Surprisingly, results showed that although all *in extremis* groups are normally classified together, there were differences among the various groups examined in this study. The research suggests that the *raison d'être* of the organization matters when examining *in extremis* environments.

Theoretical Framework

In Extremis Context

Leadership in dangerous environments requires exigencies and urgency not present in ordinary life (Campbell et al., 2010; Hannah et al., 2010; Palmer et al., 2011). The *in extremis* context refers to situations where leaders believe their lives are "at the

point of death" (Kolditz, 2006: 657). *In extremis* situations can occur across various organizations (Hannah & Lester, 2009), but hazardous occupations such as law enforcement, military service, and firefighting often involve *in extremis* situations.

This leadership research is bound by this distinctive *in extremis* context, with the supposition that context matters. Leadership in life-threatening situations may be paramount, but the difficulty in collecting data in these environments has led to a dearth of research on performance in *in extremis* environments. Accordingly, more research in this context is needed (Baran & Scott, 2010; Campbell et al., 2010). The military focuses on this context for obvious reasons, while firefighting and police tend to look to military service for *in extremis* research (Lewis, 2013), which may not be the best approach (Cowper, 2000).

The *in extremis* context overwhelms most leaders with information that must be processed quickly for effective action. Situation awareness was identified as a critical factor in performing effectively in most leadership tasks (Endsley & Garland, 2000), and Weick (1993) reported that the chaos of crises can break down the situation awareness in teams. Baran and Scott (2010) added that leaders play an important role in teams in dangerous contexts through communicating and understanding each member's role in the team. What has not been studied in depth is the individual differences of the leader related to situation awareness during these turbulent environments, although it has been identified that firefighting (Klein et al., 1986b; Lewis, 2013), military (Matthews, 2012b) and police (Sweeney et al., 2011) would benefit from general increased situation awareness.

The premise for this research is that *in extremis* contexts matter for leaders. The fundamental underpinning of this research is about leadership and how leaders react when their lives are in danger. We believe that the leadership in these extreme contexts may be different from other types of leadership but similar among *in extremis* occupations.

Situational Leadership

Context matters, yet the foundation of this research is about leadership. Leadership theory ideas began with the great man theory and trait theory from the eighteen and nineteen hundreds (Carlyle, 1849). Theorists have moved beyond trait leadership theory—the idea that the possession of certain traits define effective leaders (Bass & Bass, 2008; Yukl, 2002). Situational Leadership Theory (Hersey & Blanchard, 1969) said there is no one appropriate style of leadership; leadership depends on the situation, and different situations require the leader to adapt with different types of leadership. The situation is also clearly important; Vroom and Yetton (1973) found that the *nature* of the leadership situation caused three times the variance as individual trait differences. They said effective leadership depends more upon the situational context than upon a leader's personality traits. Circumstances dictate behavior because the "situational forces have the larger effect when pitted against the person's inclinations or desires" (Vroom & Jago, 1995: 179). This research explored factors affecting a leader's performance in these unusual environments.

One of these factors is a leader's response to stress (Chemers & Ayman, 1993). Effective leader behaviors are linked to whether the leader's reaction suits environmental demands (Fiedler, 1993). When leaders are under stress, leadership requirements differ

from more staid conditions (Bass & Bass, 2008). Thus, an *in extremis* context surely evokes stress, often attributed to the leader's lack of control over situational factors (previous study) and the leader's concern for his/her own survival. Respondents in this study reported experiencing elevated levels of stress under varying situations. Situational leadership theory suggests their decisions were driven by the situation at hand (Miner, 2002).

Interdependency between the Leader and the Context

This research posits an interdependency between the *in extremis* context and various leader traits. The previous qualitative research identified several traits for examination. Additionally, several conditions warranted consideration to improve the study's validity in isolating what was occurring. For model completion, common control variables for leadership research included age, education, and gender. The *in extremis* component accounted for different amounts of *in extremis* experience within the sample, attempting to standardize factors. These standard controls were included since they may affect leadership performance.

After identifying several factors from the grounded examination of interview data, we sought to anchor the survey in the current literature. Consequently, this paper builds on prior literature establishing self-efficacy (Bandura, 1997; Ericsson et al., 2006; Feltz & Weiss, 1982; Laurence & Matthews, 2012; Sweeney et al., 2011) and situation awareness (Bandura, 1982; Endsley & Garland, 2000; Ericsson et al., 2006; Ericsson et al., 1993; Matthews, 2012b; Sweeney et al., 2011) link positively to outcomes within *in extremis* environments.

Self-Efficacy

Much of the literature on self-efficacy—the central component of Bandura's social cognitive theory—has focused on relationships between environmental influences, self-precepts of efficacy and action. In this context, self-efficacy precepts are seen to affect "thought patterns, actions, emotional arousal" and performance accomplishments (Bandura, 1982: 122). Self-efficacy denotes a perceived capacity for learning or completing actions at certain levels (Bandura, 1997). According to Bandura and Locke (2003: 1), no mechanism of human agency "is more central or pervasive than beliefs of personal efficacy…rooted in the core belief that one has the power to produce desired effects; otherwise one has little incentive to act or to persevere in the face of difficulties" (Bandura & Locke, 2003: 1).

Bandura's (1982), seminal work on self-efficacy in human agency has been examined with a plethora of prior research in many fields. The research shows a stable affirmative link between self-efficacy and various types of performance in areas such as sports (Moritz, Feltz, Fahrbach, & Mack, 2000), newcomers to a job (Saks, 1995), social workers (Holden, Meenaghan, Anastas, & Metrey, 2002), academics (Multon, Brown, & Lent, 1991) and work performance (Sadri & Robertson, 1993). As it relates to our research, the study of leadership has also shown links from self-efficacy to outcomes or performance as a manager (Chemers, Watson, & May, 2000; Hannah, 2006; Lent et al., 2008; Paglis & Green, 2002; Sadri & Robertson, 1993).

A strong belief in one's performance efficacy is essential in mobilizing and sustaining the very effort necessary to succeed (Bandura, 1997). As such, self-efficacy

can be developed and trained through experiences and role models, and it is not a trait-like characteristic (Bandura, 1982; Feltz & Weiss, 1982).

Situation Awareness

Situation awareness reflects information an individual surmises about a situation (Endsley, 1995b, 1995a; Strater et al., 2001) and how she or he uses that knowledge to envisage a future state (Jensen & Brehmer, 2005; Matthews, 2014). Situation awareness is "an intermediate state in the decision-making process of dynamic systems where one should be able to comprehend the situation in order to make an appropriate decision for future development" (Artman & Garbis, 1998). Because of the importance of appraising and interpreting an acute threat environment, occupations whose leaders encounter *in extremis* situations rely on situation awareness to decipher both what is occurring now and what may occur (Endsley & Garland, 2000; Matthews, 2012b; Sweeney et al., 2011). All three hazardous occupations, military (Matthews, 2012b; Strater et al., 2001), law enforcement (Salmon, Stanton, Walker, & Green, 2006) and firefighting (Dow et al., 2013; Salmon et al., 2006; Wellens, 1993a) believe situation awareness is important for their leaders, with numerous researchers looking at two or more of the groups together.

The military no longer officially defines the term situational awareness because it has become ubiquitous (Ancker & Scully, 2013), but they do distinguish between and define situation understanding as the "product of applying analysis and judgment to relevant information to determine the relationships among the operational and mission variables to facilitate decision making" (Army, 2012a). So individuals use situational awareness to come to a situational understanding.

In the firefighting world, situation awareness is "the understanding of what the fire is doing and what you are doing in relation to the fire and your goals. It involves an awareness of fire behavior and terrain and the ability to predict where the fire and you will be in the future" (Beaver, 2001: 8). Situation awareness training for fire fighters has also been deemed essential and a key part of preparation for *in extremis* events (Dow et al., 2013; Klein, Calderwood, & Clinton-Cirocco, 1986a; Klein, Snowden, & Pin, 2011; Salmon et al., 2006). Calls for commitment to research in this area were made as early as 1995 (Putnam) in a workshop sponsored by USDA Forest Service.

Similarly to military and firefighters, police training also encompasses situation awareness, and simulators have been helpful at approximating the life threatening, ambiguous decision making situations (Saus et al., 2006b). As such, situation awareness continues to offer an expedient paradigm to study important components of the environment and helps in forecasting improved outcomes during *in extremis* conditions (Matthews, 2012). With the expectation that situation awareness will help outcomes, we were interested in seeing what human factors may help with situation awareness.

Characteristics

Because our prior research and the literature revealed self-efficacy and situation awareness can have positive effects on outcomes, our next step provides a more detailed examination of the literature concerning the personal leader characteristics that may have an explicit effect on self-efficacy and situation awareness.

Flexibility. Being mentally flexible and adaptable have long been admired leadership traits across the business spectrum (Copeland, 1998; Groysberg et al., 2010; Klein, Ziegert, Knight, & Xiao, 2006), and are important parts of emotional intelligence

(Bar-On & Parker, 2000). Flexibility "makes it possible to adapt or respond to change, to be influenced, to make modifications and variations" (Scarnati, 1999: 194). Emergency and disaster response research has indicated that flexible leadership is vital for effectiveness (Goldsmith & Eggers, 2004; Waugh & Streib, 2006), as well as in law enforcement (Shusta, Levine, Harris, & Wong, 2002).

Sense of duty. Two key cognitive and motivational variables developed from the previous qualitative study, respondents' sense of duty was their willingness to put themselves on the line, self-sacrifice, and their willingness to help others, altruism. Altruism is about helping individuals in the job or workplace (Smith et al., 1983). Altruism is "an individual's personal behavior—for example, being cooperative, helpful, and other instances of extra-role behavior" (Truckenbrodt, 2000: 235); it is about behaviors—unexpected or required in doing the job—that help other people. If someone has the trait of altruism, they are more likely to help others, sometimes in dangerous situations.

A second component of a sense of duty in *in extremis* environments is self-sacrifice. Firefighters who rush into a burning building not only have altruism, a willingness to help others, but also self-sacrifice. They act with less concern for themselves in order to ensure success of the whole. Consequently, self-sacrifice is the readiness to forego personal rewards or safety for one's self to help others (Perry, 1996).

Self-esteem. Respondents repeatedly noted that self-confidence or positive self-esteem represented another important trait for successful leadership during life-threatening activities. Related to this factor is confidence, which past scholars have found important for leaders. The reasoning is that leadership involves influencing others, self-

confidence and self-esteem assures the leader and his or her followers that their direction is correct (House & Aditya, 1997; Locke, 1999; Yukl & Van Fleet, 1982).

It is important to note here that self-esteem is different from self-efficacy in that self-efficacy reveals if people believe they can accomplish a task (Bandura, 1982); whereas, self-esteem is "a favorable or unfavorable attitude towards oneself" (Rosenberg, 1965: 15). Self-esteem "is best employed as a predictor or intervening person variable…" (Robinson, Wrightsman, & Andrews, 1991: 117). Self-efficacy is more contextual and self-esteem is more personal.

Over the years, self-esteem has been used as a precursor in fields such as job satisfaction, job performance, and motivation (Chemers et al., 2000; Judge & Bono, 2001), academic performance (Marsh, 1990) and as helpful with regard to stress (Baumeister, Campbell, Krueger, & Vohs, 2003; Ganster & Shaubroeck, 1991; Pierce & Gardner, 2004; van den Berg & Soeters, 2009).

Research Model and Hypotheses

This study is based on the fact that both situation awareness and general self-efficacy were shown to have a positive effect on outcomes in various contexts. Examining the antecedent characteristics of these two constructs may prove beneficial. The research question included investigating what could benefit first-responder performance on these two variables. Analysis of the initial interviews led to examine three elements that leaders indicated helped them to be successful when their life was in danger: a sense of duty, self-esteem, and mental flexibility. This study examined differences in responses based on occupational category. Based on the past two studies and previous literature, we hypothesized that these characteristics would positively

influence both situation awareness and self-efficacy in all three *in extremis* groups: military, firefighting, and law enforcement.

> *Hypotheses 1, 2, and 3. The traits of flexibility (H1), self-esteem (H2) and altruism (H3) will have a direct positive effect on situation awareness.*

Self-efficacy showed consistent positive effect on performance through several meta-analysis reviews (Holden, 1992; Multon et al., 1991; Stajkovic & Luthans, 1998). Bandura (1997) reviewed well over 1,000 studies showing self-efficacy does impact performance.

The link between self-efficacy to the previously mentioned four traits also has precedence. Self-efficacy and mental flexibility—the ability of an individual to modify his emotions under varying circumstances—has been well documented (Martin & Anderson, 1998; Martin & Rubin, 1995). Flexibility, an emotional intelligence construct in many models, has been labeled cognitive flexibility (Martin & Anderson, 1998; Martin & Rubin, 1995), intellectual flexibility (Gecas, 1989; Kohn, 1989) and emotional fitness (Cooper & Sawaf, 1998). This greater mental flexibility leads to heightened self-efficacy (Gecas, 1989).

Altruism, or one's propensity to help others, was positively linked to self-efficacy, as volunteers tend to see themselves as competent and able to accomplish tasks (Allen & Rushton, 1983) (Giles, McClenahan, Cairns, & Mallet, 2004). The research followed this line of thinking and the hypotheses proposed that altruism would have a positive effect on self-efficacy.

Leader self-sacrifice was clearly linked with leadership effectiveness (Cremer & Knippenberg, 2004; Van Knippenberg & Van Knippenberg, 2005) and to self-efficacy,

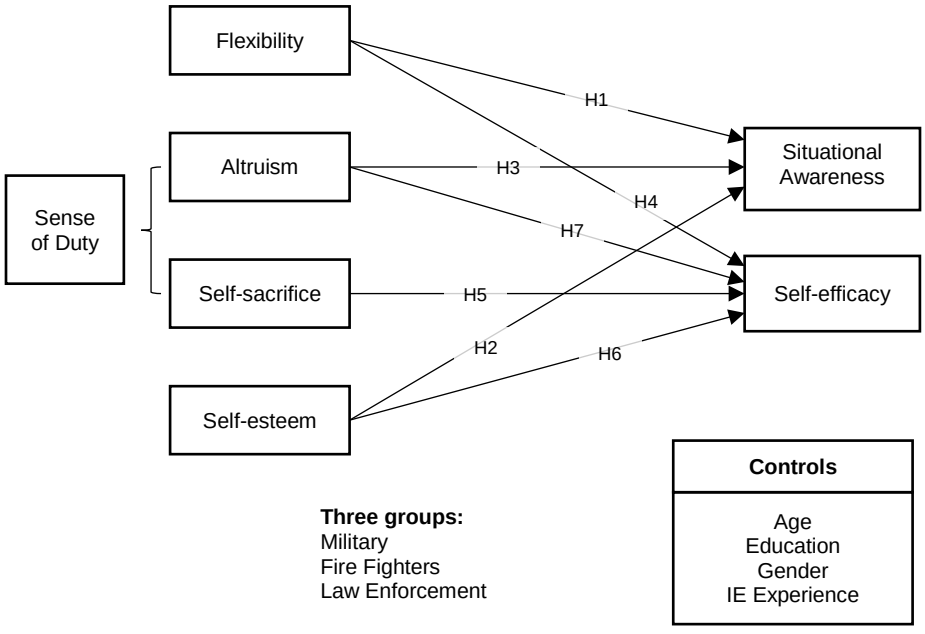
further strengthening the hypothesis that self-sacrifice will have a positive effect on self-efficacy.

High self-esteem was positively associated with job performance (for meta anaylsis see Judge & Bono, 2001) and job satisfaction (Bono & Judge, 2003). Past research also highlighted that leaders with high self-esteem respond more positively during conflict situations (Brockner, 1988). Leaders during *in extremis* conditions are often in difficult situations that may benefit from high self-esteem. Thus, we hypothesized that self-esteem would have a positive effect on self-efficacy.

Hypotheses 4, 5 and 6: The traits of flexibility (H4), self-sacrifice (H5) self-esteem (H6) and altruism (H7), will have a direct positive effect on self-efficacy.

See Figure 5 for illustration of the hypotheses.

FIGURE 5
Hazardous Occupation Model



Research Design and Methods

To analyze these hypotheses, a psychometric survey methodology was employed (Guilford, 1954) that maps individual responses to the concepts in this model.

Measurement of Research Variables

Leveraging existing research, constructs operationalized from existent literature were used to test the research model. Each respondent was part of a team and their role was either the leader (92%) or the assistant leader (8%). A summary of each measure used is provided in Appendix G.

Construct operationalization. The **situation awareness** variable was derived from the SART scale (Endsley & Garland, 2000), which has ten generic constructs and three broad domains. We focused on the three broad domains with the abbreviated scale, following Taylor's (1990) comment to use the shorter scale when it is more "advantageous" (Endsley & Garland, 2000: 118). The three situation awareness domains were broken into: *demand*—which examined how complex the situation was at the time; *supply*—focusing on the mental ability of the individual; and *understanding*—focused on one's understanding of the information coming in during the situation. Since this last domain is a self-report instrument, it was omitted because survey respondents may not be as objective when asked about how well they understood the situation at the time. The focus was the individual's attention to the variables of the situation. This focus aligns with two of the three levels of situation awareness: level 1, perception of the situation; and level 2, comprehension of the situation (Laurence & Matthews, 2012).

The next dependent variable, **Self-Efficacy,** was operationalized with the New General Self Efficacy Scale (Chen et al., 2001).

The independent variables, the characteristics, all had existing scales. **Flexibility** came from Bar-On's (1996) Emotional Quotient Inventory. Individuals who score high on this scale have a heightened ability to amend their emotions, thoughts and behaviors to varying circumstances (Bar-On, 1996). The **Altruism** scale asked individuals about their past and possible future behaviors and was derived from Smith, Organ and Near's (1983) scale. **Self-Sacrifice** differs from altruism as it focuses on the willingness of an individual, not just to help the other person, but to sacrifice himself for others. Individuals with high scores on this scale have a concern about the good of society, or doing their duty, over their safety (Perry, 1996).

Finally, **self-esteem** was developed from Rosenberg's (1965) scale on an individual's self-worth. Self-esteem levels are consistent over time within individuals, and it is a good "predictor" variable (Rosenberg, 1965: 117).

Controls. Additionally, this model recognized fairly standard controls in leadership research, things that could possibly influence the outcomes. **Age,** experience, and **education** have been normal validations of successful leadership, organizations tend to promote based in part on these attributes (Bass & Bass, 2008). **Experience** in this survey was based on the amount of times an individual had personally been in *in extremis* situations. This was to compare those that had only encountered danger once versus those that had faced danger frequently. Although research has generally failed to establish **gender** differences in leadership styles and effectiveness once the leader status has been achieved (Bass & Bass, 2008; Northouse, 2013), we chose to control for gender because of the male-dominated domains being researched. Indeed, only seven percent of the respondents were woman leaders.

Where necessary, the existing measures were adapted to the military/*in extremis* vernacular, and then these changes were validated using Bolton's (1993) approach of listening to three pertinent respondents read the questions aloud to assess comprehensibility and ambiguity. If meanings were not clear, appropriate adjustments to the instrument were made. As a consequence of these pretests, two of the items were altered, deleting two questions. To standardize responses, a five-point Likert scale was used, ranging from "Strongly Disagree" to "Strongly Agree." Only demographic data deviated from this format. Items for each of the constructs are summarized in Appendix G.

Sample

Respondents were sourced from Facebook, Linked-in posts, and from links posted on 36 online group sites targeting Veterans (examples: Bronze Star Medal Recipients, 82nd Airborne Division Veterans, Connected Marines), Fire fighters (examples: fire fighter nation, fire house.com), and Law enforcement (examples: police connect, National Tactical Officers Association). The first author, a retired Army officer, also sent the survey link with a personal note to 175 military, 93 firefighters and 158 law enforcement associates in her network.

Any member of these groups who had been on a team during at least one *in extremis* situation during their careers were eligible to take the survey. From the previous study, five hundred and fifty-three responses yielded 494 useable military surveys. Most (426) were members of the U.S. Army, while 19 Marines, 22 Air Force, 22 Navy and five Coast Guard members also participated. Almost half (49%) of respondents were 48 years or older. Fewer than 8% of respondents were female, which aligns with the congressional

mandate that women are not allowed in "direct" combat roles. These were then randomly sampled by Qualtrics to select 200 military responses.

Firefighters had 289 useable surveys and law enforcement personnel yielded 288 surveys. By nature of the chain of command, military units are always arranged in teams. Fire fighters also rarely go into a situation alone. Law enforcement personnel, however, can easily be faced with life threatening situations by themselves. Due to this dichotomy, we focused only on leaders and assistant leaders of teams. Once this discriminator was used, the final numbers were 191 fire fighters and 13 law enforcement personnel. The data was collected between June 2012 and February of 2013.

The demographics of respondents in all occupations revealed that they were mainly older, well-educated males. Close to half (46%) of these seasoned leaders have been in *in extremis* environments over six times. See Table 17 for a full report of demographics.

TABLE 17
Sample Characteristics

Construct	Value	#	%
Occupation	Military	200	39%
	Fire Fighter	191	37%
	Law Enforcement	123	24%
Gender	Male	476	93%
	Female	38	7%
	Total	514	100%
Education	GED/High School	48	9%
	Associates Degree	99	19%
	4 Year Degree	159	31%
	Master's Degree	183	36%
	Doctorate Degree	25	5%
Age	18-23	0	0%
	24-29	10	2%
	30-35	39	8%
	36-41	56	11%
	42-47	115	22%
	48 and over	294	57%
IE Experience	1 time in an *in extremis* environment	28	5%
	2-3 times total in *in extremis* environment	98	19%
	4- 5 times total in *in extremis* environment	76	15%
	6 times total in *in extremis* environment	27	5%
	Over 6 times total in *in extremis* environment	235	46%
	I'd rather not say	50	10%

Statistical Analysis

The data were analyzed using Statistical Product and Service Solutions (SPSS, version 21) for windows and Analysis of Moment Structures (AMOS, version 21). The initial data set of 867 responses was screened to ensure statistical assumptions could be made with confidence (Mertler & Vannatta, 2005). Accordingly, data were checked for missing data, outliers, normality, linearity, homoscedasticity and multicollinearity. The missing data for each variable was less than .2%, and there were no outliers. Since the data was derived from Likert-type scales, there was no reason to eliminate variables based on skewness unless they displayed no variance. Instead, we checked to ensure no standard deviations of less than 0.5 for any variable (which would indicate that the majority of responses fell right on the mean – i.e., displaying insufficient variance or kurtosis). Interval variables had standard deviations all above 0.8, with most over 1.0, indicating no univariate normality issues in the Likert-scale items that might affect results. The data showed sufficient quality to proceed to explore the measurement model.

Measurement Model

An exploratory factor analysis (EFA) was performed, a procedure that describes data by grouping variables that are associated (Mertler & Vannatta, 2005) using Principle Axis Factoring[4] with Promax rotation.[5] An EFA is normally used to explore the underlying factor structure of data without presuming a structure to start (Suhr &

[4] Principle axis factoring was selected to determine unique variance among items and correlation between factors.

[5] Promax was chosen because of the large data set (over 300) and Promax can account for the correlated factors.

Colorado, 2006). We examined the variable loadings, adequate correlations, and checked reliability and validity in the conceptual model as described next.

Adequacy. See Appendix L for adequacy details. Although low factor loadings are acceptable for such a large a sample (514), values over ".5 are considered necessary for practical significance" (Hair et al., 2010: 118). Table 18 includes the Pattern Matrix.

TABLE 18
Pattern Matrix

Pattern Matrix[a]

	Factor					
	SE	SS	Flex	SA	ALT	SEFF
SA1				.354		
SA2				.592		
SA7				.964		
A1					.563	
A2					.838	
A6					.621	
SE1	.713					
SE2	.720					
SE5	.799					
SE6	.925					
SEFF2						.577
SEFF5						.863
SEFF6						.741
SS1		.691				
SS4		.663				
SS6		.662				
SS7		.589				
SS8		.736				
F2			.698			
F4			.766			
F6			.693			

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Reliability. Appendix I reports the Cronbach's alpha for the factors in the model, the lowest of which was above 0.68.

Validity. Factors demonstrated convergent validity with all loadings above the recommended minimum of 0.30 (lowest average was 0.632) for samples of over 300 (Hair et al., 2010). The factors also demonstrated sufficient discriminant validity, as the correlation matrix showed no correlation above 0.6. There were also no problematic cross-loadings. See Appendix I for factor correlation matrix.

Having identified the six-factor structure for the data, Confirmatory Factor Analysis (CFA) was next. CFA is used to verify structure and test hypotheses to authenticate the relationship between the variables in a model and their underlying latent processes (Mertler & Vannatta, 2005). The model fit for the measurement model was sufficient. (See Appendix H for CFA) See Table 19 below for measurement model:

TABLE 19
Measurement Model Fit

Measure	Our model tested
Chi-square/df (cmin/df)	323.501 /212 1.526
P value for the model	.000
CFI	.977
GFI	.948
AGFI	.932
SRMR	.0372
RMSEA	.032
NFI	.937
PCLOSE	1

Validity and Reliability of Latent Constructs

Convergent validity was calculated by finding the AVE for all factors (should be greater than 0.50). Three of the constructs (altruism, self-sacrifice and situation awareness) did not meet this criteria. However, since each of the constructs was a valuable part of the model, they were maintained even with the slightly low AVE values (.476 for Altruism, .438 for Self-Sacrifice and .498 for Situation Awareness). As is evidenced by Table 19 above, the model fit is still good and all three of these constructs showed sufficient discriminant validity, thus letting the borderline convergent validity measures pass was justified.

The test of discriminant validity compared the square root of the AVE (bold on the diagonal in Appendix K) to all inter-factor correlations. All factors demonstrated adequate discriminant validity because the diagonal values were greater than the

correlations. The *composite reliability* for each factor was also computed. In all cases, the CR was above the minimum threshold of 0.7 (see Appendix K). Discriminant validity leads to believing that there were no illusionary relationships in the model (Mathieu & Taylor, 2006).

Common method bias (CMB). Because all of the variables were collected via a single method (online survey), a CMB test was conducted to determine if a common factor influenced the results. We did not collect data on a social desirability scale, therefore the test used—one specifically designed for studies that do not measure a common factor—was the common latent factor (CLF) method (Podsakoff et al., 2003). Even after adding the CLF, sufficiently strong composite reliability and AVE scores for each construct were observed. When comparing indicator loadings before and after adding the CLF, there were no differences greater than 0.200; thus the measurement model is not significantly affected by common method bias (Podsakoff et al., 2003).

Structural Model

The structural model was built using composites imputed from latent factor scores obtained from the measurement model (see Table 20). The fitted structural model demonstrates a good model fit.

TABLE 20
Model Fit for Structural Model

Measure	Our model tested
Chi-square/df (cmin/df)	18.462/6 3.077
P value for the model	.005
CFI	.992
GFI	.990
AGFI	.953
SRMR	.0313
RMSEA	.064
NFI	.988
PCLOSE	.212

The three SEM diagrams are illustrated in Appendix J (military in J1, fire fighters in J2 and law enforcement in J3).

Findings

The results of the hypotheses are presented in Table 21. Clear paths are supported from each of the independent variables to the dependent variables, and they are all significant for the entire group of 514. With the R-squares for Situation Awareness equal to .38 and .74 for self-efficacy, this model found that the human characteristics chosen were essential to both situation awareness and self-efficacy in *in extremis* situations. All results were positive with the exception of flexibility on situation awareness.

The hypotheses, when looked at grouped by occupations, examined four characteristics that lead to situation awareness and self-efficacy for each of the three careers. Four of the hypotheses were similar for all three occupations, but three of the hypotheses diverged. Flexibility had a positive effect on self-efficacy (H4), which was true for all. Self-esteem (H6) and altruism (H7) both had a positive effect on self-efficacy. Altruism also had a positive effect for all groups to situation awareness (H3). These results conformed to expectations based on prior research (Allen & Rushton, 1983; Giles et al., 2004; Philippe Rushton et al., 1981; Smith et al., 1983).

Where the protectors and vanquishers diverged was in flexibility to situation awareness (H1), Self-esteem to situation awareness (H2), and self-sacrifice to self-efficacy (H5). For H1 and H2, significant effects were observed only for the vanquishers. For H5, self-sacrifice had a positive effect on self-efficacy, but only for the protection occupations, fire fighters and police.

Lastly, the controls included age, education, gender and amount of *in extremis* experience. The only significant path was age to self-efficacy (β = -.05 p = .022). This idea that with the wisdom of age, perhaps, comes the realization of one's own limits has also been found in other research (Woodward & Wallston, 1987).

The final results are summarized in the Hypotheses Summary in Table 21.

TABLE 21
Hypothesis Summary Table

	Hypotheses	**Evidence Beta/P-value**	***Supported for whole***	***Occupations significant?***
H1	Flexibility will have + effect on SA	-.102/**	Yes but negative	Military only
H2	Self-esteem will have + effect on SA	.139/***	Yes	Military only
H3	Altruism will have + effect on SA	.583/***	Yes	All three
H4	Flexibility will have + effect on SEFF	.139/***	Yes	All three
H5	Self-sacrifice will have + effect on SEFF	.146/***	Yes	Only fire fighters and law enforcement
H6	Self-esteem will have + effect on SEFF	.578/***	Yes	All three
H7	Altruism will have + effect on SEFF	.236/***	Yes	All three

*p<0.05, **p<0.01, ***p<0.001

Discussion

This research indicates that while *in extremis* contexts share many similarities, *why* an individual is in a hazardous condition is crucial. This paper began by looking at the *in extremis* context as a whole, and all hypotheses were examined looking at respondents as one group. This was in keeping with most research on *in extremis* leadership, which focused on the similarities of the *in extremis* groups (Kolditz, 2007; Sweeney et al., 2011). However, these findings suggest that the *in extremis* context is critical. Military, firefighters and law enforcement personnel all may routinely enter dangerous environments, but their jobs differ and the reasons they are in the *in extremis* situation make different leadership demands and may require distinct leadership skills.

Contextual differences exist among the various occupations; lives are at stake in different ways. It is clear that these found differences are only an initial exploration and more research is necessary to explore further. Although these occupations are often grouped together when classified by similarities (Kolditz, 2007; Sweeney et al., 2011), or divided by the environment (Campbell, 2012), variances in roles in *in extremis* conditions may cause confusion or ambiguity in leadership development and/or in training if all groups are lumped together since firefighters and police are not always analogous to the military (Cowper, 2000; Lewis, 2013). The Bureau of Labor lists both law enforcement and firefighting as "protection services" (Pratt, 2013). Fire fighters' jobs are to protect the public by responding to fires and other emergencies; police protect lives and property (Statistics, 2013). We will adopt the Bureau of Labor terminology and refer to first responders as "protectors." While police officers may use deadly force, it is a last resort. The military role in many operations is distinctly different; killing the enemy may be a viable objective. Consequently, we will refer to this group as "vanquishers."

Mission accomplishment is paramount in the vanquishing group; whereas, in the protector group, loss of life impacts mission accomplishment more. A fire fighter faced with entering an empty burning building must assess whether saving part of the building is worth a life, possibly his/her own. The overall assessment would likely say no. Saving or protecting property is not as essential as saving and protecting lives. Law enforcement personnel face similar thought processes. Pursuing an armed felon who has stolen property may not be deemed to be an acceptable risk if there is no imminent danger to the civilian population. On the other hand, military leaders usually have an understanding of the risk of an operation, and the loss of life may be deemed an acceptable outcome to

accomplish the mission. Hence, the reason why a leader is acting and what they are trying to accomplish, as a protector or as a vanquisher, is significant.

Although the *in extremis* label covers anyone facing death, this research illustrates there are differences even in the *in extremis* context; these differences are also manifested culturally. Traditionally, society looks at the protectors and vanquishers differently. Examining how member deaths are processed within the different occupations provides revealing evidence on the contextual differences between the vanquishers and the protectors. Historically, the public views deaths in the military as heroic (Bilu & Witztum, 2000; Cole, 2005; Lacquement Jr, 1997); whereas, deaths of fire fighters and law enforcement officers are usually seen as tragic (Bacon, 2013; Fonseca & Dreier, 2013; Lowry, 2013; McGrail & Rogers, 1993).

Another societal difference between the emergency response occupations and the military includes unions. The military is not unionized, whereas fire fighters (IAFF, 2013) and police officers (Juris & Feuille, 1973; Mas, 2006; Reiner, 1978) frequently are part of a union. Union membership can lead loyalties to be with the union rather than to the boss or the company, but can also protect workers in regard to rights, safety and pay. Unions are not sanctioned in the military; loyalty to the organization, the leadership, and an individual's team are the principal driving forces.

Unexpectedly, flexibility was shown to negatively affect situation awareness; the *inverse* of what was expected. This was surprising since interviewees from the earlier qualitative study described mental flexibility as a trait that would help a leader survive during *in extremis* situations. A typical comment on flexibility from a respondent in a qualitative interview summed up the thought. He said, "You have to be an adaptive

thinker, flexible and agile to the point that if you get called, you can execute at any given point in time and not expect that every situation or every scenario can be trained on." Hence, we believed that flexibility would lead to more situation awareness for all occupations during *in extremis* conditions, but our data reveals the opposite. Looking at the whole group, it was negative; when separated out by specific jobs, only military was significant. Our supposition is that balance is the key. An individual needs some flexibility to be able to adjust from a plan, but too much flexibility may make it easy to lose focus and explore too many alternatives. Military leaders may be more overtly trained specifically on situation awareness to make it more effective than for either the firefighters or law enforcement groups.

The second hypothesis was that self-esteem has a positive effect on situation awareness. Again, although the effect was significant for the group as a whole, when tested with the careers as moderators, the effect held up only for military. For more than two decades, the United States has been involved in conflicts in the Middle East. Individuals who join the military understand that there is a high probability that they will be entering into *in extremis* situations. Soldiers come to believe the risk is manageable and the cause is worthy; they are taught that situation awareness is vital to their existence. Firefighters and police are usually in the protection mode, and therefore, may believe that they will not have to depend so strongly on situational awareness to survive.

The final hypothesis, self-sacrifice had a positive effect on self-efficacy, was not supported for military, but it was significant for both the law enforcement and fire fighters. Individuals drawn to the idea of protecting people and property, and the

willingness to sacrifice themselves through public service, may feel that they are better able to accomplish tasks set before them.

This work emphasizes that leaders facing serious personal danger are alike in some ways; however, examining the differences as to why an individual is in the *in extremis* situation is crucial. Is the leader there to protect or to vanquish? Situational leadership implies there are no consistent factors in any leadership situation and even if there is similarity among *in extremis* categories, the leadership will still be different because, to be effective, the leader has to adapt his/her style to each situation (Bass & Bass, 2008).

It is beyond the scope of this paper to postulate how training or hiring may be changed due to these differences among these occupations. However, results do suggest that the four characteristics of flexibility, altruism, self-sacrifice and self-esteem may lead to increases in both situation awareness and self-efficacy. It is, therefore, logical to assume that during *in extremis* situations these factors may help increase positive outcomes for all three groups. More research needs to be done on all three of these groups, focusing on their similarities and their differences.

Limitations

As always, there were limitations to this study. The most significant limitation is the result of the self-report survey. Due to the complexity of observations during *in extremis* environments, all of the data were collected through self-report processes. This means relying on participants to remember the details of the *in extremis* situation unambiguously, as well as their feelings at that time. Even though they were asked to keep in mind a specific *in extremis* situation while filling out the survey, it is not known

if they did. Although people are capable of having clarity over stressful incidents (Christianson, 1992), there can still be issues regarding memory fidelity and social desirability.

As another limitation, social desirability often affects self-report studies; the concern is that individuals may contaminate the data by trying to present themselves favorably (Edwards, 1957; Fisher, 1993; Grimm, 2010). Our study is comprised of senior leaders who are drawn to helping others as a career, and seem to be more intrinsically motivated, than driven by extrinsic rewards (Thomas & Jansen, 1996). We relied on the respondents to complete our survey truthfully.

Finally, there is certainly a survivor bias limitation to our research. Obviously, all of the leaders participating in this research survived their *in extremis* encounters. If the data from killed leaders could somehow be included, the results may be different. Examining encounters where the leader perished would require surveying team members about a leader's performance *ex post.* While possible, this would be an extremely difficult undertaking.

The study was restricted to occupations of service in *in extremis* contexts – military, firefighters and law enforcement personnel. While this homogeneity helped the theoretical development of this exploratory research, it is not clear whether the data is representative of leaders in other *in extremis* environments like mountain climbers or sky diving teams, etc. This contribution is important, complex, difficult to generalize, and challenging to encapsulate.

Implications for Practice and Future Research

Past studies have examined military and fire fighters, or police and firefighters, or even military and law enforcement; emergency management technicians are occasionally thrown into the research also. However, based on the results of this study, instead of routinely looking at all *in extremis* occupations as one population with identical roles, research into these differences needs to be explored further. Most of these studies have focused on the similarities of *in extremis* groups. To our knowledge, this is the first study focusing on all three groups in *in extremis* conditions to look at their differences with situation awareness and self-efficacy. The findings indicate that, although the groups are invariant and can be studied together, there are differences among the occupations that cannot be ignored, and the roles of both situation awareness and self-efficacy are paramount.

Discovering some of the antecedents for situation awareness and self-efficacy is a daunting task, and this study has only scratched the surface. The four human variables that were chosen were derived from the qualitative interviews of Army personnel. The data suggests that these four characteristics are important, but perhaps there are others that are more essential for fire fighters and law enforcement personnel. Today's changing environments make it difficult to predict what will be important in the future.

The results point to the need for substantially more empirical research about situation awareness and self-efficacy, and their antecedents in *in extremis* environments. Future research should also investigate the disparate roles of hazardous occupations in *in extremis* environments. Of particular interest may be the similarity to *in extremis* dynamics of modern business executives. Research that benefits *in extremis* leaders can

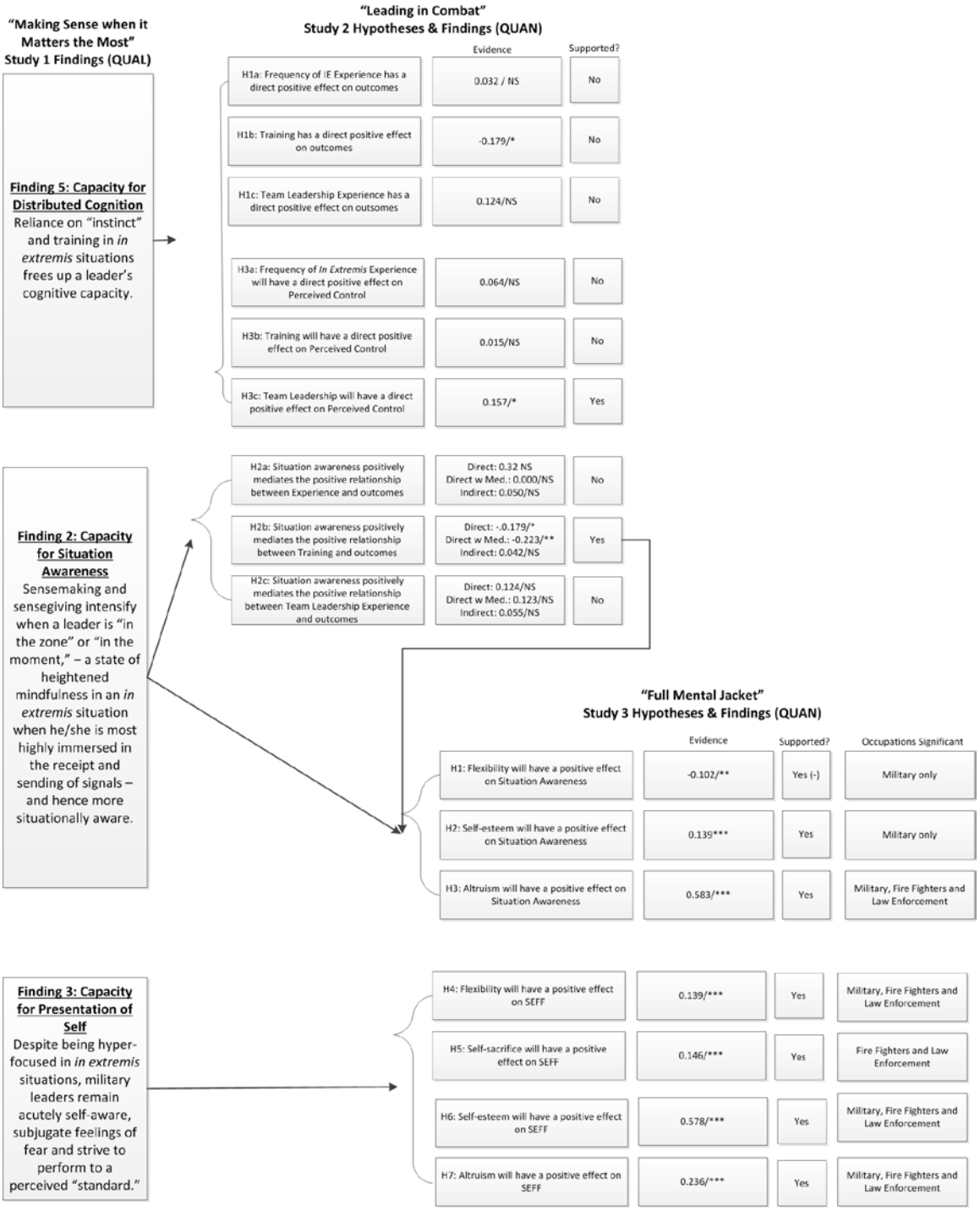
potentially be sources to enhance the effectiveness of other types of leaders. Although individuals in business may not be facing personal death, they are often in situations that could mean death to their organizations or the livelihood of their employees. Losing big accounts, stocks/markets collapsing, or situations where an individual may lose the capacity to reason and cannot see “the way out” can lead to catastrophic assessments and decisions. Reports of suicide were rife after the various crashes on wall street (1929, 1987, 2008) because people thought their situations were cataclysmic (Altucher, 2010; Rothbard, 1972). Learning to deal with these stressful situations may be beneficial to others besides those facing actual death. Examining what makes individuals successful during ambiguous, uncertain times could be advantageous to a myriad of occupations.

CHAPTER 6
INTEGRATED FINDINGS AND DISCUSSION

The initial qualitative study yielded insights that led to developing an exploratory model on how leaders make sense and give sense during *in extremis* contexts. This work yielded insights of import for leadership development and training. The subsequent quantitative study of military leaders revealed that situation awareness and perceived control prevail over formal school training experiences in persevering threatening, uncertain, ambiguous and novel military situations. The final quantitative study, examining three groups of hazardous occupations, revealed specific details for each group were different. Instead of routinely looking at all *in extremis* occupations together, research into these differences needs to be explored further.

Figure 6 captures the linkages of the findings among all three studies. Study 1 begins on the left, followed by study 2 in the middle and study 3 on the far right. Study 1 had three findings that were used in the follow on studies. Findings two and five from study 1 led to study 2, which was the military survey. Finding three from the first study and finding two from the second study led to study 3, which included samples from all of the hazardous occupations. See figure 6 below for dissertation flow in its entirety:

FIGURE 6
Dissertation Flow



Findings from the first Army leader study guided the second military study. The second study exposed many negative hypotheses, so the qualitative and quantitative findings were reexamined to devise the final study, which revealed additional linkages among the three studies and pertinent data for leaders of the three *in extremis* occupations.

Results are relevant to the military and other professional first-responders who potentially face life-threatening situations, and may also be beneficial in the hiring and recruitment of personnel with certain innate characteristics. Taken together, the results of these three studies of leaders themselves provide significant understanding of *in extremis* leadership. This chapter discusses the impact of the integrated results of these three studies. Rather than an exhaustive review of the preceding studies, this section concentrates on the most noteworthy results and possible new insight for both practitioners and scholars.

These research questions looked at factors that may help leaders facing hazardous environments and to illuminate which kinds of individuals, based on their ability to interpret and make effective decisions, are best suited for these work conditions. This discussion presents four unexpected findings about leadership in perilous conditions. The examples highlighted here represent the important aspects and the linkages between the studies concerning: sense-making and sense-giving; situation awareness and training; mental flexibility; and the distinctive characteristics of leaders in different occupations in *in extremis* conditions.

Sense-making and Sense-giving

Sense-making, or the way individuals make sense of their enactments, is a vital construct for understanding cognitive processes when situations are ambiguous or changing (Weick, 1995). Leaders share their sense-making with their team through sense-giving, which is occasionally characterized as an interdependent social activity with subordinates.

Although scholars have examined sense-making and sense-giving, this research uniquely found that during life-threatening conditions, the speed of sense-making to sense-giving occurs at a much more rapid pace than previously reported. *In extremis* leaders do not have days, hours, or frequently even minutes, to think strategically about how they can give sense to their team. In these life-threatening situations, conditions dictate simultaneity versus sequentially for making and giving sense. These findings illustrate that often during *in extremis* conditions sense-making and sense-giving happen faster through punctuated information flow. The complex dynamic system is characterized by starts and stops as the leader filters and interprets incoming stimuli and information. This punctuation helps individuals prioritize the importance of the information and, hence, reduce process overload (Weick, 1995).

Weick's concept of double interact (1979: 110) can be employed here to examine this simultaneity of sense-making and sense-giving as chains of action and reactions. Where an individual snips the action and begins to look at the reactions may be arbitrary, but it helps reduce, at least temporarily, the equivocality of the situation. Where one starts to understand the chain of action or interaction, or sense-making and sense-giving, is not as critical as the fact that the layers are being scrutinized and understood. With change as

the norm in dangerous environments, this contribution leads to a more sophisticated understanding of the apparent simultaneity of sense-making and sense-giving. It allows for seeing leaders unlayer, freeze, and disrupt the flow of their experience in order to make their situation more comprehensible and predictable.

If the concept of double interact helps leaders to examine patterns and reduce equivocality, it may benefit their situation awareness. Data from the first two studies suggests that *in extremis* outcomes can be influenced by a leader's situation awareness and training.

Situation Awareness and Training

A surprising result from the second study (quantitative) with military respondents found that "book" or "general" training had a negative effect on *in extremis* outcomes. Therefore, this counter-intuitive observation was explored further. This finding was corroborated by the initial qualitative study. For example, in the quote below by an Army Major discussing his experience in Iraq, he discussed why only training on the Standard Operating Procedures (SOP) could lead to problems:

> "…if you stick to your SOP, if you stick to the book every time, then you might get yourself hurt. And the example that we gave was early on in training for built-up operations we had always said that the group of guys always stacks up on the wall before they go into a room or something. And so that's what everybody trained in, everybody did all the time, and then maybe a year or two years into Iraq, we figured out that the wall was not a good place to be because rounds travel along walls. They don't just hit the wall and bounce off. They hit the wall and travel along the wall. So if you were stuck to the SOP, then you would be getting more injuries that way. " (I14)

When facing the possibility of death, leaders were inclined to rely less on "book" training and more on situation awareness—a critical cognitive ability—that was strongly

and positively statistically significant to *in extremis* outcomes, as was the general team training. These results are consistent with the rapidly accumulating literature on situation awareness in acute crisis situations. My research emphasizes the importance of situation awareness in dynamic situations where life-preserving decisions (for self and others) depend on perception, comprehension, interpretation and future-state projection of an actor's environment.

Firefighting and law enforcement training also encompasses situation awareness, and simulators have been helpful at approximating life threatening and ambiguous decision-making situations (Saus et al., 2006b). My results support the prevailing research that the most beneficial training should be intense and simulate complex and dynamic *in extremis* conditions as closely as possible (Matthews, 2014). My research has uncovered additional areas to explore; specifically, the appropriate type and balance of training to optimize performance in *in extremis* situations.

The findings suggest that scenario-based training versus activity-based training more closely replicates experienced conditions, offering the leaders cognitive and emotional manifestations of stress, induced by *in extremis* exposure and may, therefore, be appropriate. Training such as "live fire" training scenarios for the military, or training with "real fire" for fire fighters, and other operations accomplished through simulators, may best replicate the pressure and anxiety leaders face in *in extremis*. Although using these dangerous environments for training may be hazardous, participants may obtain accelerated learning versus the protracted learning not possible by *in extremis* environments.

Situation awareness training must encompass all three of its levels, but level 3, envisioning the future state, may be the most important for leaders. This idea of future-perfect thinking discussed by Weick (1979) has its roots in even earlier research (Schütz, 1967). This anticipatory capability is beneficial for imagining the playing out of future perfect states. If one is treating an event as if it is complete, one can think about how to achieve the outcome. The brain will naturally think of the steps necessary to accomplish the goal, think of possible ways to do it, and then it becomes more concrete and meaningful (Weick, 1979). The focus for leaders and for situation awareness thinking needs to be on this advanced level of situation awareness, not just a leader to be aware, but for being able to anticipate future events.

The military or law enforcement leader anticipating an attack from the enemy or a suspect, the fire fighter knowing that will happen at the next stage of the fire, all are indispensable capabilities. The capacity of any leader for future envisionment may be the difference between success and failure. Situation awareness, especially level 3, is a crucial area that cannot be ignored and one that needs focused training attention.

Mental Flexibility

Surprisingly, mental flexibility was negatively correlated to situation awareness for military participants in the third study. Due to the increasingly dynamic nature of today's life-threatening environments, adaptive responses would seem to be essential (Wong, 2004). The initial qualitative interviews disclosed that adaptability during life-threatening situations was crucial in adjusting to dynamic conditions. Some comments included:

> Everything's not gonna be spelled out for you. You have to be an adaptive thinker, flexible and agile to the point that if you get called, you can execute at any given point in time. And not expect that every situation or every scenario can be trained on. You can't do that. And you can train on a lot of things and prepare for a lot of things, but know that when you're in the moment, it's gonna go by fast. And you're just gonna – you have to – and that's why the better trained you are, the more time you have to react appropriately and not think about it. (I23)

The results, however, showed mental flexibility to have a "goldilocks effect;" some flexibility is necessary, as stated in the discourse above, but too much flexibility or adaptability could make one lose focus. Balance is fundamental; leaders need to be able to adjust from a plan, but too much malleability makes it easy to lose focus and explore too many alternatives. One suggestion from an Army combat leader was:

> Well, I mean, if you shape your training around those decisions that the junior leaders make, and less on the exact battle drill, then they'll be more flexible when they get in the theater. They will have a basic plan and can flex from there. (I28)

Cognitive flexibility has been deemed an essential life skills= even for children, though these skills are rarely taught (Diamond, Barnett, Thomas, & Munro, 2007). It is not creativity these leaders need; they do not have the luxury of coming up with multiple scenarios and then eliminating the ones that are not feasible. Teaching *in extremis* leaders mental flexibility then, may seem daunting; however, recent research has indicated certain types of video games, the first-person-shooter genre (FPS), have proven to help improve cognitive flexibility in young adults (Colzato, Van Leeuwen, van den Wildenberg, & Hommel, 2010), the primary recruits of the *in extremis* occupations. FPS games require the players to "develop a flexible mindset that allows them to engage in complex scenarios, to rapidly react to moving visual and sudden acoustic events, and to switch back and forth between different subtasks" (Colzato et al., 2010: 2). Today's

sophisticated simulators can be viewed as FPS games and may aid in teaching the delicate balance of mental flexibility. What these *in extremis* leaders need is a new type of training that allows them to practice by coming up with new, unscripted solutions to solve scenarios in a rapid manner. This type of learning does not follow the normal thought process, in which expertise is related to one's ability to generate effective responses. The science of cognitive flexibility or adaptability is growing (Zaccaro, Banks, Kiechel-Koles, Kemp, & Bader, 2009), but needs further refinement in the *in extremis* arena.

In Extremis Occupations

The final discussion area addresses the elusive motive for leaders entering life-threatening situations; the reasons individuals are in a perilous context is of consequence in understanding *in extremis* behavior. The majority of the *in extremis* literature, if discussing more than one occupation, categorizes all leaders in life-threatening situations together (Kolditz, 2007; Matthews, 2014; Sweeney et al., 2011). However, my studies, particularly the third, revealed the tenuousness of one classification and implied there should be distinctions within the classifications. Mission of the occupation does matter, as does the risk assessment for each occupation. Therefore, I have defined two fundamental groups for *in extremis* leaders: protectors and vanquishers. Law enforcement and firefighters are protectors, their main mission, while military personnel are vanquishers.

The research shows differences in the *in extremis* context; our society looks at the protectors and vanquishers differently. Examining how member deaths are processed within the different occupations provides revealing evidence on the contextual

differences between the vanquishers and the protectors. Police officers and fire fighters are protectors for the public. The police mission is to "protect lives and property" (Statistics, 2013), while fire fighters "control fires and respond to other emergencies…" (Statistics, 2013). These protector definitions conjure up dangerous and noble occupations, but do not necessarily evoke the thought of death. When a law enforcement official or a fire fighter dies, it is an abnormal expectation, and is "heartbreaking" or "tragic" (Fonseca & Dreier, 2013; Lowry, 2013).

Military deaths, especially since 9/11 and the Global War on Terror, are now more expected, and segments of the public generally view them as heroic (Bilu & Witztum, 2000; Cole, 2005; Lacquement Jr, 1997). Casualties are framed as the necessary evil as part of the military's job of "maintaining the national defense" (Statistics, 2013).

Fatalities are looked at differently for the occupations in one part because the risk versus the reward is different for protectors and vanquishers. Using fire fighters as an example of protectors, risk-reward has been studied since the Man Gulch fire disaster in 1949 (Maclean, 1992). In an evaluation of whether or not to fight a fire, "the safety and health of the firefighter must never be subordinated to other values" (Beaver, 2001: 10). As Beaver quotes Weick in his article about risk-reward and firefighting, "knowledge of a fire should be used not just to fight it, but also to decide how and when to walk away from it" (2001: 8). After the 1994 Storm King Mountain fire disaster, the USDA sponsored a firefighter's human factors workshop. One reason for the workshop stated: "Trees regrow, houses can be rebuilt, but the loss of a life is forever. What has unfolded

in the aftermath is a reaffirmation that people are first. All else is secondary in wildland firefighting" (Putnam, 1995: 4).

Similarly, in one of the largest counties in Florida, Hillsborough County, a twelve-year veteran from the sheriff's department explained that unless there was an "active shooter" involved, law enforcement, in general, will not enter or chase a suspected felon if it places additional lives at stake (Gross, 2014). These examples from the protector occupations categorically imply that human life is first and foremost; protectors can step back from situations if the risk is too high, vanquishers may not. Imagine the beaches of Normandy in World War II; the loss of life was catastrophic, leaders understood the consequences of the invasion and still proceeded with the plans.

Culturally, society perceives the reasons why these individuals are in their life threatening situations differently, how do the individuals themselves look at the reason for their willingness to put their life on the line? Those *in extremis* occupations are willing to die, as protectors and vanquishers, but for whom are they willing to die for? The self-sacrifice aspect is present for both protectors and vanquishers, but with differing motives.

This research presents another departure from prior studies in that differences were found in the underlying reasons that *in extremis* actors are willing to die. Protectors are usually risking their lives for civilians—their selfless service is for people they may or may not have a relationship with. The vanquisher's selfless service is to their team, they are putting their lives on the line for the people they work with every day. Based on these respondents' answers, fighting and dying for one's country is secondary to the

willingness to fight and die for one's comrades-in-arms (Wong et al., 2003). See Table 22 for more on the differences of protectors and vanquishers:

TABLE 22
Differences between Protectors and Vanquishers

Differences	Protectors	Vanquishers
Reason they are in the *in extremis* environment?	To protect	To serve the country and accomplish mission
Their deaths are seen by the public as?	Tragic	Heroic
Who willing to die for?	Civilians they are protecting	Comrades-in-arms
Loyalty if unionized?	Union	Each other and chain of command
Risk Reward?	Saving other people only	Mission accomplishment

This dissertation began by acknowledging the powerful and unique influence that the threat of death can have on human behavior. These results, however, suggest that it is not exclusively the threat of death that drives behavior, but how leaders comprehend and interpret perilous situations through their role identity (protector vs. vanquisher) that also matters. This research highlights the roles, perception, audience, and the reason for the selfless service or self-sacrifice of the individuals in *in extremis* environments. Although these groups have many similarities and can be studied together, differences exist that must be taken into account. These findings have implications for both theory and practice, which is addressed in the next chapter.

CHAPTER 7
IMPLICATIONS, CONTRIBUTIONS, LIMITATIONS AND FUTURE RESEARCH

Implications and Contributions

This dissertation's practical implications add more to the leadership field than purely theory or research advancement. This research has real-life practical implications as it expands understanding of the critical aspects of situation awareness training, and on recruiting practices. In addition, it stimulates future research on individual behavioral responses to *in extremis* situations, as well as the nature of behaviors of individuals in disparate *in extremis* occupations. Finally, it reorients the way to look at professions in *in extremis* occupations; different professions have different characteristics that were not intuitively obvious prior to this research.

The research suggests that situation awareness, critical to success in all the hazardous occupations, could improve with the right kind of training. The research distinguishes different motivations for individuals in *in extremis* occupations and sheds light on how training for different occupations should be considered. Training should not be solely classroom or book training, but must include experiential learning, replicating as close as possible the life-threatening experience with simulations for all occupations similar to flight simulators, live fires, etc. An enhancement to this individual training would be for the leader to complete the training with his/her team. Matthews (2014) postulated that training should be examined with a lens of realism to ensure that leaders receive its maximum effectiveness; this is consistent with my research findings.

The research also explored numerous antecedents to situation awareness. While a partial list, it is a critical start in identifying selected aptitudes for performance and could

help improve assessment for recruitment for all occupations. If leaders understand the factors that influence situation awareness, they will be better prepared to look for and screen for these factors, as well as enhance these factors in current incumbents.

The self-sacrifice aspect, or whom individuals are willing to die for may also have implications in recruiting. Fire fighters and police officers usually self-sacrifice for unknown innocent civilians they are trying to protect. A military member's strong ties to team members enable them to die for their "brothers," the unit.

Various *in extremis* occupations would benefit from further research comparing and contrasting their differences. This research may help stimulate future research to investigate the differences found here and to explore other differences and similarities.

This research utilizes the *in extremis* setting to distill core elements of leadership that emerge in this unique context signified by highly unstable conditions and personal danger. Of particular interest may be the *in extremis* dynamic of modern business executives. While they do not directly save or lose lives, they do control the livelihood of thousands in the organization and are under pressure due to financial obligations. An avenue for future research may then be to apply the insights from this study to the leaders or board members of large corporations, such as those in the Fortune 500.

Limitations

As with any research endeavor, limitations are always present. For the limitations I will discuss the constructs, the methods and the sample.

Constructs

For each of these studies, situation awareness was a key construct. There are a full range of antecedents for situation awareness, my study only selected a few to focus on.

There also may be other factors that are important in understanding other relationships during dangerous situations that I did not focus on or consider.

Methods

The methods of each study were a source of limitations. My personal *in extremis* experiences, thoughts and opinions as a retired army officer could have influenced the interpretation of interview data. However, data and findings were subject to careful review and oversight from a panel of advisers to offset personal biases and maintain objectivity.

To combat common issues of a qualitative study, care was taken to record each interview, have a professional company transcribe them, and then they were reviewed again. Each interview was hand coded at several levels such as open coding, and the categories were reduced by stages from 48 to 5 using Corbin and Strauss's (2008) methodology.

Quantitative studies also have limitations, and several procedures were followed to diminish problems with reliability and validity including composite reliability, average variance extracted and Cronbach's Alpha.

Sample

This qualitative sample was limited to Army leaders currently stationed at the United States Military Academy, West Point. Including other leaders who had also experienced *in extremis* situations from other geographical areas, may have produced different results. My approach required interviewees to recall past experiences and incidents—often emotional—and I understand the potential influence of retrospective biases. The research design did not include interviews with other personnel involved in

the actual *in extremis* situations reported by informants, including subordinates or superiors; these perspectives may also have affected the results.

Quantitative survey respondents were sourced from Facebook and Linked-in posts and from my acquaintances. This method of garnering respondents could generate some bias from those who are computer and social media savvy. Perhaps my acquaintances are also limited to a certain type of individual, so that may also be a bias.

Due to the difficulty of observation *of in extremis environments*, all data were collected through self-report processes. Respondents were relied on to complete the survey truthfully; to further prevent this social desirability bias no identifying information was collected to guarantee the anonymity of the respondents. Social desirability has been a concern for self-report studies for well over half a century; the concern is that individuals may contaminate the data trying to present themselves favorably.

Participants were relied on to remember the details of the *in extremis* situation unambiguously as well as their feelings at that time. Although people are capable of remembering stressful incidents very well (Christianson, 1992), there can still be issues regarding memory fidelity and social desirability.

Future Research

This research aimed to expand knowledge in the realm of *in extremis* leadership. With respect to future research, these findings suggest several promising paths, but some compelling areas this study highlights are: sense-making and sense-giving, situation awareness, and classification of *in extremis* occupations. Future research that expands upon these findings may lead to different and better ways of preparing leaders for *in extremis* experiences.

This research raised questions on the phasing of sense-making and sense-giving. While the majority of research finds that these two events are separate and distinct stages, this research into perilous situations found it occurring almost simultaneously; more research in other contexts would help to see if this axiom holds.

Numerous examples in the study illustrated, that when lives are at stake and the situation was chaotic and unclear, subordinates helped the leader make sense of the situation. Although little has been researched about sense-giving from subordinate to superior, expanding this idea in future research areas could benefit the theories on sense-giving to evolve. Further research on the role of subordinates in sense-making and sense-giving is necessary to corroborate my findings that occasionally others can give sense to the leader and help him/her with sense-making.

Situation awareness training is an extensive field. Examining different classifications of *in extremis* occupations for training could benefit those areas. Exploring additional antecedents of situation awareness would also be of value for future research.

Other research on the classifications of occupations in *in extremis* situations should include differences and similarities among the groups. My findings included the roles of protectors versus vanquishers, respective to the missions and their reasons for going into the situation. Another difference: law enforcement officers often work solo (with the ability to call for back up), while firefighters and military work in teams. Exploring this aspect of *in extremis* leadership would further add to the body of research on different classifications among the groups.

Three different *in extremis* occupations were studied here. Other dangerous fields such as mountain climbers and sky divers would not seem to fit into the two classifications I have devised. Additional research could help clarify other classifications.

APPENDIX A
Interview Protocol

05/07/11 *In Extremis* Leadership Interview Protocol

1. Introduction (Interviewer): "Hi (name). I just want to thank you for taking the time to meet with me today. If you will allow me, I'd just like to go over a few things before we begin.

2. LSI (Interviewer): I would invite you to fill out this learning style questionnaire while I am getting my papers together. It is designed to help identify your learning style. I will give you some time to fill it out prior to beginning our interview.

   Note to IRB: If the participant feels more comfortable the interviewer will leave the room for a few minutes while the participant fills out the LSI. Once the interviewee is finished we will move forward with the interview.

3. Purpose and Format for the Interview (Interviewer): "Our interview will be approximately one hour and I am interested in having a discussion on leadership in dangerous environments, situations where you were in charge of one or more soldiers and you felt that your lives were in peril. I'm going to ask you to describe recent incidents that you feel best answer the question — describing for me the situations and what you specifically did."

4. Confidentiality (Interviewer): "Everything you share in this interview will be kept in strictest confidence, and your comments will be transcribed anonymously — omitting your name and anyone else you refer to in this interview, as well as the responses that you provide to me."

5. Audio Taping (Interviewer): "To help me capture your responses without being overly distracted by taking notes, I would like to audio tape our conversation with your permission. Again, your responses will be kept confidential, however, if there is something you would like to share off the record, or not have recorded, please let me know-and I will be happy to turn off the recording device. May we begin?"

6. I'd like to start by learning about you – your early years, your career history and about you personally. Please tell me about yourself.

7. I asked if could prepare for our discussion by thinking about two instances during your deployment.

I asked you first to think of a time that stands out in your mind when you were in charge of one or more soldiers and suddenly your lives were in peril. In this instance, because you were in charge, the others relied upon you for direction. I'd like to understand everything about that situation – what it was, who was involved and what happened.

Could you describe that situation for me? Let's start with where you were, who you were with and what you were doing. Please describe the situation with as much detail as possible.

(Allow respondent to speak). Probe as necessary to elicit rich detail:

When did you first understand that you were in danger?
How would you describe what you felt at that moment?

How did you assess the situation?
What information did you use in making your assessment?
How and where did you get this information?
What did you do with the information?
Why did you decide to do what you did?
What let you know that this was the right thing to do?
How did you communicate your decision to the others?
What was the most important thing for them to understand?
What were your challenges in communicating this to them?
How did they respond? What did they do?

8. Now I'd like to ask you about another experience that stands out in your mind. Just like the last instance, in this one you were in charge of others, suddenly your lives were in danger and the others relied upon you for direction. The outcome in this case, however, was different than in the first situation. In this one the outcome was not as (positive/negative) as the last one. (if first story had positive outcome, ask about one less positive. If first had negative outcome, ask about a more positive one)

Could you describe that situation for me?

(Allow respondent to speak. Probe as necessary to elicit rich detail. Let's start with where you were, who you were with and what you were doing.

When did you first understand that you were in danger?
How would you describe what you felt at that moment?
How did you assess the situation?
What information did you use in making your assessment?
How and where did you get this information?
What did you do with the information?
Why did you decide to do what you did?
What let you know that this was the right thing to do?
How did you communicate your decision to the others?
What was the most important thing for them to understand?
What were your challenges in communicating this to them?
How did they respond? What did they do?
What happened next?
Tell me more……..
Is there anything I should have asked you and did not?
If I think of something later that I should have asked you, do you mind if I contact you again?

9. Close (Interviewer)

Thank participant.
Ask for any questions or concerns. Provide business card if there is any follow up needed by participant.

APPENDIX B
Major Article Literature Review

***In Extremis* Leadership**	**Study 1**	**Study 2**	**Study 3**
Baran, B., & Scott, C. 2010. Organizing ambiguity: A grounded theory of leadership and sensemaking within dangerous contexts. Military Psychology, 22(S1): S42–S69.	**X**	**X**	**X**
Hannah, S., Campbell, D., & Matthews, M. 2010. Advancing a research agenda for leadership in dangerous contexts. Military Psychology, 22(S1): S157–S189.	**X**	**X**	**X**
Hannah, S., Uhl-Bien, M., Avolio, B., & Cavarretta, F. 2009. A framework for examining leadership in extreme contexts. The Leadership Quarterly, 20(6): 897–919.	**X**	**X**	**X**
Kolditz, T. A., & Brazil, D. M. 2005. Authentic leadership in 'in extremis' settings: A concept for extraordinary leaders in exceptional situations. In W. L. Gardner, B. J. Avolio, & F. O. Walumbwa (Eds.), Authentic leadership theory and practice: Origins, effects and development: 345–356. Elsevier Ltd.	**X**	**X**	**X**
Kolditz, T. A. 2007. In extremis leadership (1st ed.). San Francisco: Jossey-Bass.	**X**	**X**	**X**
Sensemaking			
Weick, K. 1993. The collapse of sensemaking in organizations: The Mann Gulch Disaster. Administrative Science Quarterly, 38(4): 628–652.	**X**	**X**	**X**
Weick, K. 1995. Sensemaking in organizations. Thousand Oaks: Sage.	**X**	**X**	
Weick, K., & Roberts, K. 1993. Colllective mind in organizations: Heedful interrelating on flight decks. Administrative Science Quarterly, 38(3): 357–381.	**X**	**X**	
Weick, K., Sutcliffe, K. M., & Obstfeld, D. 2008. Organizing for high reliability: Processes of collective mindfulness. In A. Boin (Ed.), Crisis Management, vol. 3: 31–66.	**X**	**X**	
Sensegiving			
Gioia, D., & Chittipeddi, K. 1991. Sensemaking and sensegiving in strategic change initiation. Strategic Management Journal, 12(6): 433–448.	**X**		
Maitlis, S. 2005. The social processes of organizational sensemaking. Academy of management Journal, 48(1): 21–49.	**X**		
Maitlis, S., & Lawrence, T. 2007. Triggers and enablers of sensegiving in organizations. Academy of management Journal, 50(1): 57–84.	**X**		
Communication			
Lasswell, H. D. 1948. The structure and function of communication in society. In L. Bryson (Ed.), The communication of ideas: 37–51. New York: Harper and Brothers.	**X**		
Weaver, W. 1949. Recent contributions to the mathematical theory of communication. The Mathematical Theory of Communication, 1: 1–12.	**X**		
Presentation of Self / Sense of Duty			
Goffman, E. 1959. The presentation of self in everyday life. New York: Doubleday.	**X**		
Perry, J.L. (1996). Measuring public service motivation: An assessment of construct reliability and validity. Journal of public administration research and theory, 6(1), 5-22.			**X**
Smith, C., Organ, D.W., & Near, J.P. (1983). Organizational citizenship behavior: Its nature and antecedents. Journal of Applied Psychology; Journal of Applied Psychology, 68(4), 653.	**X**		
Situation Awareness			
Endsley, M. R. 1995a. Measurement of situation awareness in dynamic systems. Human Factors: The Journal of the Human Factors and Ergonomics Society, 37(1): 65–84.	**X**	**X**	**X**
Endsley, M. R. 1995b. Toward a theory of situation awareness in dynamic systems. Human Factors: The Journal of the Human Factors and Ergonomics Society, 37(1): 32–64.	**X**	**X**	**X**
Laurence, J. H., & Matthews, M. D. 2012. The Oxford handbook of military psychology. Oxford University Press.	**X**	**X**	**X**
Matthews, M. D., Shattuck, L. G., Graham, S. E., Weeks, J. L., Endsley, M. R., & Strater, L. D. 2001.		**X**	**X**
Matthews, Michael D. (2014). Head Strong: How Psychology is Revolutionizing War. New York: Oxford University Press			**X**
Self-Efficacy			
Bandura, A. 1982. Self efficacy mechanism in human agency. American Psychologist, 37(2): 122–147.		**X**	**X**
Bandura, A. 1997. Self-efficacy: The exercise of control. Worth Publishers.		**X**	**X**

Bandura, A., & Locke, E. A. 2003. Negative self-efficacy and goal effects revisited. Journal of Applied Psychology, 88(1): 87.		**X**	**X**
Stress Tolerance / Mental Flexibility			
Bar-On, R. 1996. Bar-On emotional quotient inventory. New York: Multi-Health Systems.		**X**	**X**
Bar-On, R. E., & Parker, J. D. A. 2000. The handbook of emotional intelligence: Theory, development, assessment, and application at home, school, and in the workplace. Jossey-Bass.		**X**	**X**
Self Esteem			
Rosenberg, M. (1965). Society and the Adolescent Self Image. : Princeton, NJ: Princeton University Press.			**X**
Fire Fighters			
Baran, B., & Scott, C. 2010. Organizing ambiguity: A grounded theory of leadership and sensemaking within dangerous contexts. Military Psychology, 22(S1): S42–S69.	**X**		**X**
Dow, Martha, Garis, Fire Chief Len, & Thomas, Deputy Chief Larry. (2013). Reframing Situational Awareness within the Fire Service Culture.			**X**
Klein, Gary A, Calderwood, Roberta, & Clinton-Cirocco, Anne. (1986). Rapid decision making on the fire ground. Paper presented at the Proceedings of the Human Factors and Ergonomics Society annual meeting.			**X**
Putnam, Ted. (1995). Findings from the wildland firefighters human factors workshop (pp. 76): USDA.			**X**
Law Enforcement			
Cowper, Thomas J. (2000). The myth of the "military model" of leadership in law enforcement. Police Quarterly, 3(3), 228-246.			**X**
Saus, Evelyn-Rose, Johnsen, Bjørn Helge, Eid, Jarle, Riisem, Per Ketil, Andersen, Rune, & Thayer, Julian F. (2006). The effect of brief situational awareness training in a police shooting simulator: An experimental study. Military Psychology, 18, S3-S21.			**X**
Shusta, Robert M, Levine, Deena R, Harris, Philip R, & Wong, Herbert Z. (2002). Multicultural law enforcement: Strategies for peacekeeping in a diverse society: Prentice Hall Upper Saddle River, NJ.			**X**
Military			
Kolditz, T.A. (2005). The in extremis leader. Leader to Leader, 2005, 6-18.	**X**	**X**	**X**
Kolditz, T.A. (2006). Research in In Extremis Settings. Armed Forces & Society (0095327X), 32(4), 655-658.	**X**	**X**	**X**
Matthews, Michael D. (2012). Cognitive and Non-Cognitive Factors in Soldier Performance. The Oxford Handbook of Military Psychology, 197.		**X**	**X**
Matthews, Michael D. (2014). Head Strong: How Psychology is Revolutionizing War. New York: Oxford University Press.			**X**

APPENDIX C
Summary of Original Measures

Construct	Definition	Items	Source
Self-Efficacy	Belief in personal capabilities to mobilize the motivation, resources, and courses of action needed to meet given situation.	Five-point Likert scale: Strongly disagree to strongly agree 1. I will be able to achieve most of the goals that I have set for myself. 2. When facing difficult tasks, I am certain that I will accomplish them.* 3. In general, I think that I can obtain outcomes that are important to me. 4. I believe I can succeed at most any endeavor to which I set my mind. 5. I will be able to successfully overcome many challenges. 6. I am confident that I can perform effectively on many different tasks** 7. Compared to other people, I can do most tasks very well* 8. Even when things are tough, I can perform quite well.**	adapted from the New General Self Efficacy Scale by Chen, Gully and Eden 2001
Situation Awareness	Being aware of what is happening in the vicinity to understand how information, events, and one's own actions will impact goals and objectives.	Five-point Likert scale: 1. It was likely that the situation could change suddenly** 2. There were many variables that required my attention. 3. The situation at the time was complex. 4. I was ready for the activity.** 5. I was overwhelmed by all the new things I had to think about.** 6. I was very focused on what was going on.** 7. There were several different things I had to focus on during this situation.	These questions were developed from the SART definition of SA (Endsley & Garland, 2000)
Situation Awareness (information)	See above	Five-point Likert scale: 1. I had a huge amount of relevant information coming in to me. 2. The information I had coming in to me was relevant. 3. I had been in a similar situation to this one prior.** 4. The information I had coming in to me was valuable.	Adapted from SART scale - information area (above)
Outcomes	How they felt about the outcome of the *in extremis* event in regards to mission accomplishment.	Five-point Likert scale: 1. At the conclusion of this dangerous event, I /my team accomplished the mission 2. I would judge the outcome of this event successful for me/my team 3. I would judge the outcome of this event successful for the organization 4. The morale of my team was improved by our actions during this event	Dixon, 2012
Total Training	How much training they received in preparation for deployment and what percentage of time they spent in schools for training.	1. How many times in the 18 months prior to this deployment did you go train for a week or more? None; one to three; four to six; more than six; N/A 2. What percentage of your time 18 months prior to your last deployment was spent training for deployment (sliding scale %)	Dixon, 2012

		3. What percentage of time in your entire career have you spent in schools for training? (Sliding scale %) 4. What non-mandatory schools have you attended in your career? (check all that apply) 5. Please write in other schools not mentioned above that could have contributed to your readiness for deployment	
Frequency of IE Experience	Experience of being deployed in a dangerous situation.	Prior to your last dangerous environment, how many times had you been deployed to a combat zone or been placed in a dangerous environment? This was my first deployment; 1 or two others; 3 or 4 deployments; 5 deployments; Over six deployments	Dixon, 2012
Team Leadership Experience	How much time they spent with a team in leadership position.	Five-point Likert scale: 1. I had led a team in a dangerous environment prior to this event. 2. I had led THIS team in a significant field training exercise prior to this event. 3. I had led ANY team in a significant field training exercise prior to this event.	Dixon, 2012
Stress Tolerance	Original scale: Response 0 = No Answer Response 1 = Very Seldom true or not true of me Response 2 = Seldom true of me Response 3 = Sometimes true of me Response 4 = Often true of me Response 5 = Very Often true of me	Five-Point Likert Scale: 1. I know how to deal with upsetting problems.** 2. I believe I can stay on top of tough situations**. 3. I can handle stress without getting too nervous. 4. I don't hold up well under stress.** 5. I feel that it's hard for me to control my anxiety. 6. I know how to keep calm in difficult situations. 7. It's hard for me to face unpleasant things.** 8. I believe in my ability to handle most upsetting problems. 9. I get anxious.**	Adapted from Bar-on EQI, 1997

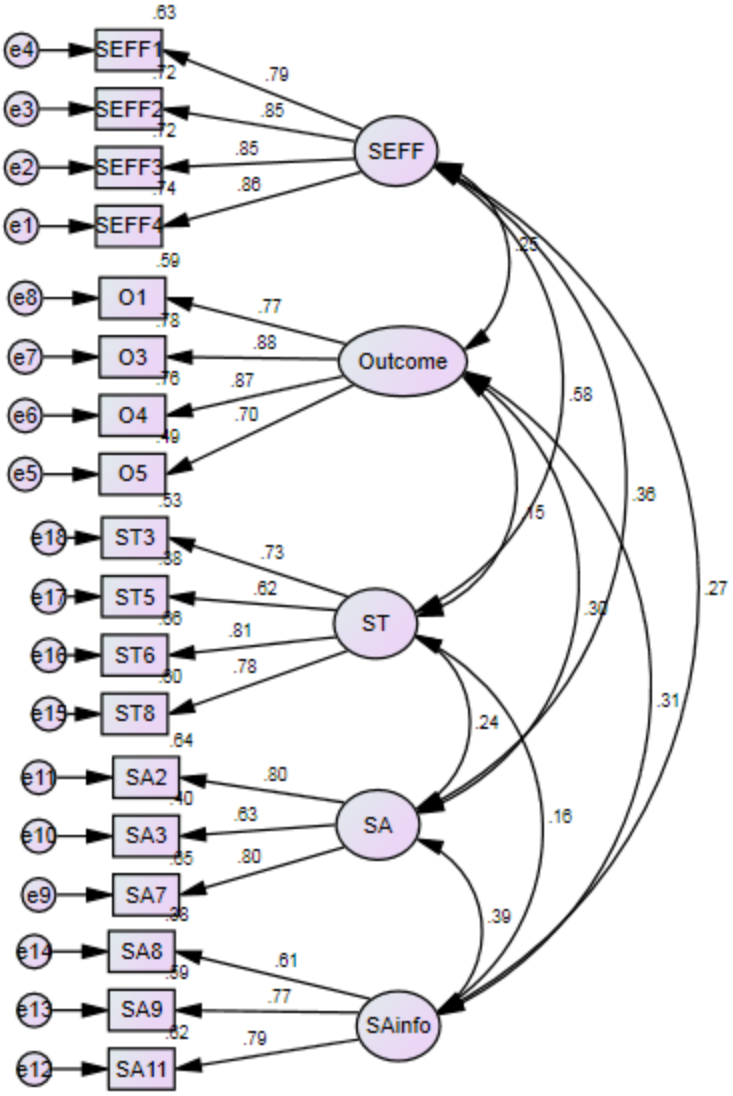
*Deleted based on pretest respondents ** Deleted for model fit

APPENDIX D
Factor Correlation Matrix

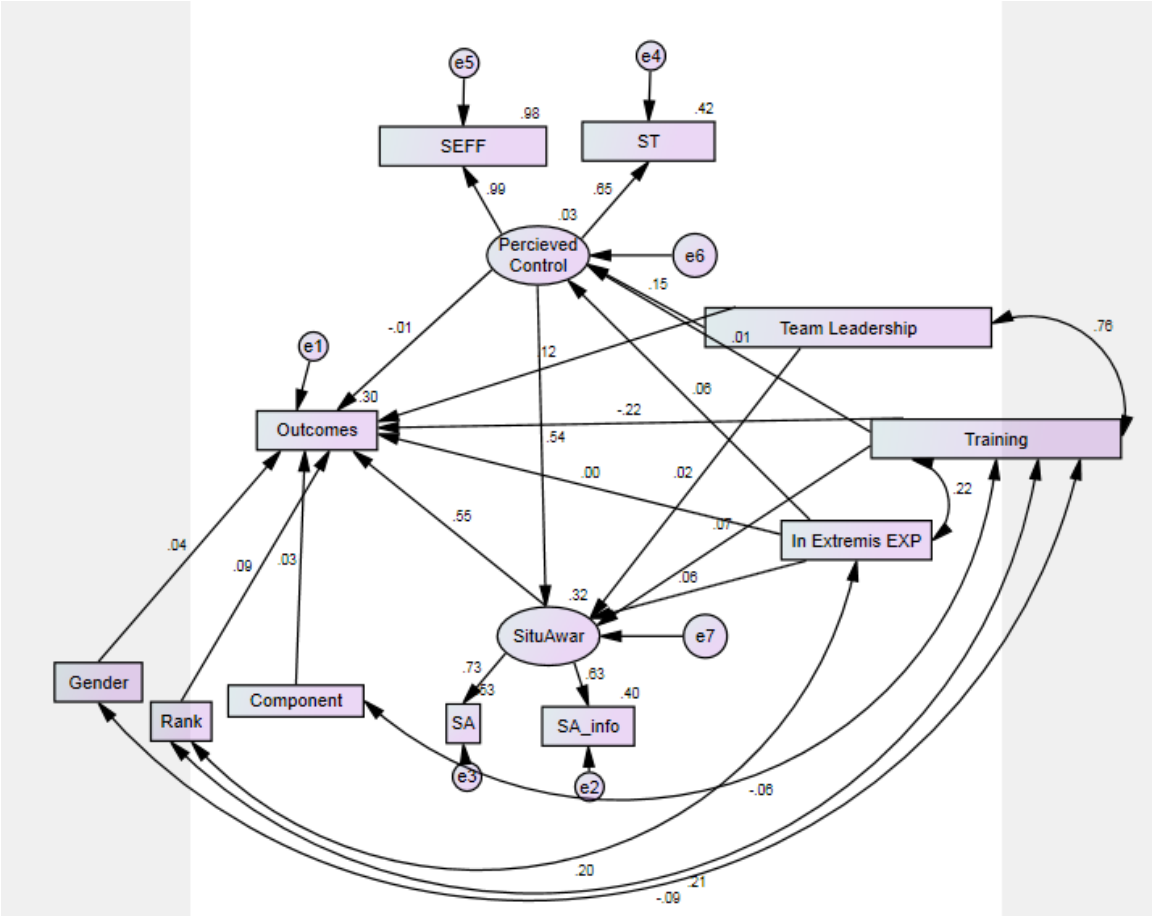
Factor Correlation Matrix with Cronbach's alpha on diagonal

	ST	SEFF	Team ldrshp	TRNG	EXP	Outcomes	SA_info	SA
ST	**.80**							
SEFF	.645	**.93**						
Team Ldrshp	.156	.158	-					
TRNG	.159	.138	.769	-				
EXP	.070	.067	.055	.264	-			
Outcomes	.181	.289	.035	-.024	.026	**.87**		
SA_info	.185	.317	.084	.092	.082	.365	**.75**	
SA	.276	.416	.135	.147	.089	.347	.462	**.78**

APPENDIX E
CFA



APPENDIX F
Model in AMOS

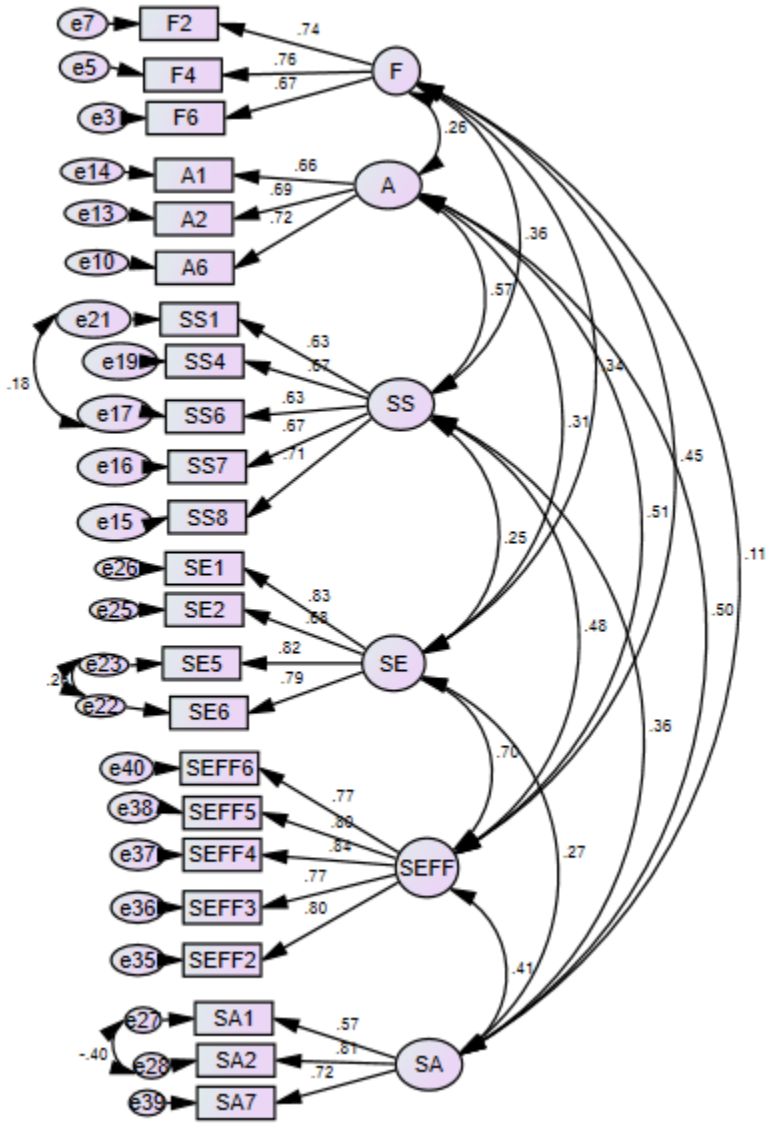


APPENDIX G
Summary of Original Measures

Construct	Definition	Items	Source
Self-Efficacy	Belief in personal capabilities to mobilize the motivation, resources, and courses of action needed to meet given situation.	Five-point Likert scale: Strongly disagree to strongly agree 9. I will be able to achieve most of the goals that I have set for myself.** 10. When facing difficult tasks, I am certain that I will accomplish them.* 11. In general, I think that I can obtain outcomes that are important to me.** 12. I believe I can succeed at most any endeavor to which I set my mind. 13. I will be able to successfully overcome many challenges. 14. I am confident that I can perform effectively on many different tasks** 15. Compared to other people, I can do most tasks very well* 16. Even when things are tough, I can perform quite well.	adapted from the New General Self Efficacy Scale by Chen, Gully and Eden, 2001
Situation Awareness	Being aware of what is happening in the vicinity to understand how information, events, and one's own actions will impact goals and objectives.	Five-point Likert scale: Strongly disagree to strongly agree 8. It was likely that the situation could change suddenly** 9. There were many variables that required my attention. 10. The situation at the time was complex.** 11. I was ready for the activity.* 12. I was overwhelmed by all the new things I had to think about.* 13. I was very focused on what was going on.** 14. There were several different things I had to focus on during this situation.	These questions were developed from the SART definition of SA (Endsley & Garland, 2000)
Flexibility	Ability of respondents to adjust their emotions, thoughts and behaviors to changing situations and conditions	Five-point Likert scale: Strongly disagree to strongly agree 5. It's easy for me to begin new things.** 6. It's easy for me to make adjustments in general. 7. It's easy for me to change my opinion about things.** 8. It's easy for me to adjust to new conditions easily. 9. I'm able to change old habits.** 10. It's generally easy for me to make changes in my daily life. 11. It's easy for me to change my ways.** 12. It would be easy for me to adjust if I were forced to leave my home.**	Adapted from Bar-on EQI, 1997
Altruism	Willingness to be helpful to others.	Five-point Likert scale: Strongly disagree to strongly agree It's just like me to: 1. Help push a stranger's car out of the snow. 2. Give directions to a stranger. 3. Donate goods or clothes to a charity.** 4. Do volunteer work for a charity. ** 5. Point out a clerk's error when the error was in my favor.** 6. Help someone (not a friend) with a task when my ability/knowledge was great than his/hers. 7. Give up my seat to a stranger who was standing.** 8. Help an acquaintance to move households. **	Adapted from Smith, Organ and Near, 1983
Self-Sacrifice	Focuses on their willingness to sacrifice themselves for public service.	Five-point Likert scale: Strongly disagree to strongly agree 1. Making a difference in society means more to me than personal achievements. 2. I believe in putting duty before self. 3. Doing well financially is definitely more important to me than doing good deeds.** 4. Much of what I do is for a cause bigger than myself. 5. Serving citizens would give me a good feeling even if no one paid me for it. ** 6. I feel people should give back to society more than they get from it. ** 7. I am one of those people who would risk personal loss to help someone else. 8. I am prepared to make enormous sacrifices for the good of society.	Adapted from Altruism scale Perry, 1996
Self Esteem	Original scale: Response 0 = No Answer Response 1 = not true Response 2 = Seldom true Response 3=Sometimes true Response 4 = Often true Response 5 = Very Often true	Five-point Likert scale: Strongly disagree to strongly agree 10. I feel like I am a person of worth. 11. All in all, I am inclined to feel that I am a failure.** 12. I am able to do things as well as most people.** 13. I feel I do not have much to be proud of. ** 14. I take a positive attitude toward myself. 15. On the whole, I am satisfied with myself.	Adapted from Self-Esteem Scale Rosenberg, 1965
Frequency of IE Experience	Experience of being deployed in a dangerous situation.	Prior to your last dangerous environment, how many times had you been deployed to a combat zone or been placed in a dangerous environment? This was my first deployment; 1 or two others; 3 or 4 deployments; 5 deployments; Over six deployments	Dixon 2012

*Deleted based on pretest respondents ** Deleted for model fit

APPENDIX H
CFA



APPENDIX I
Cronbach's Alpha and Factor Correlation Matrix

Factor	Cronbach's alpha	Number of Items	Specification
SA	.68	3	Reflective
SEFF	.83	3	Reflective
FLEX	.76	3	Reflective
SE	.87	3	Reflective
SS	.80	5	Reflective
ALT	.73	3	Reflective

Factor Correlation Matrix

Factor	SE	SS	Flex	SA	ALT	SEFF
SE	1.000	.228	.332	.233	.297	.597
SS	.228	1.000	.322	.313	.535	.467
Flex	.332	.322	1.000	.107	.229	.402
SA	.233	.313	.107	1.000	.467	.373
ALT	.297	.535	.229	.467	1.000	.505
SEFF	.597	.467	.402	.373	.505	1.000

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.

APPENDIX J
Model Fit and Occupation SEM

FIGURE J1
Military SEM

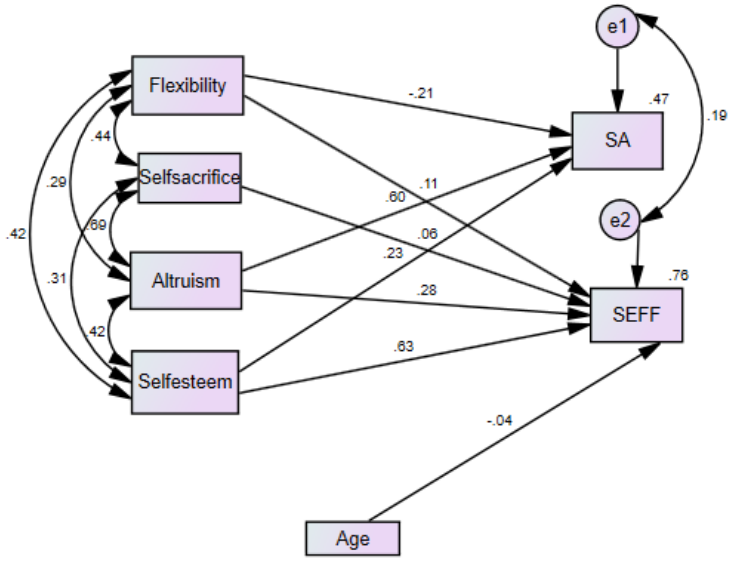


FIGURE J2
Fire Fighter SEM

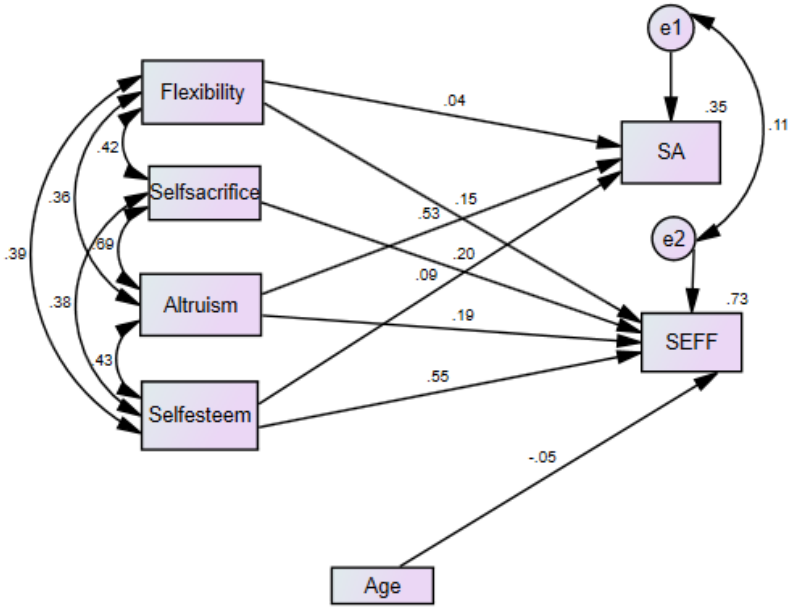
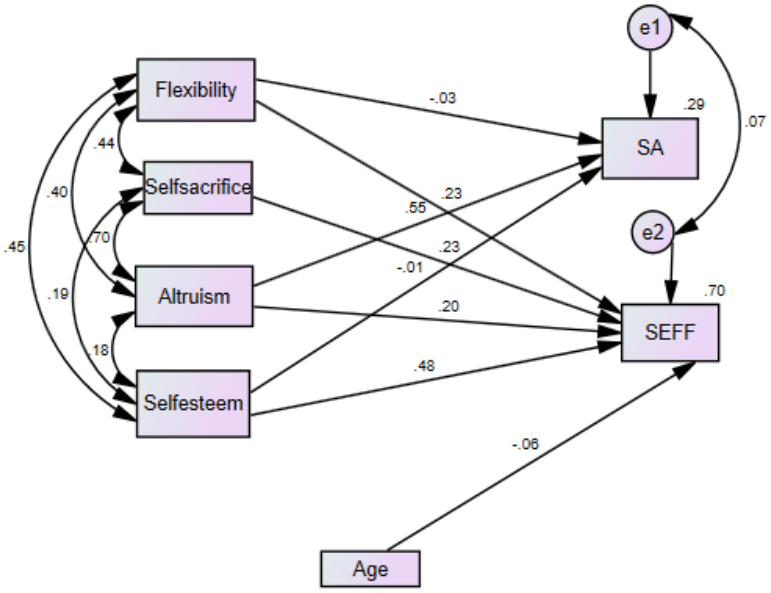


FIGURE J3
Law Enforcement SEM



APPENDIX K
Validity and Reliability of Latent Constructs

	CR	AVE	MSV	ASV	SEFF	F	A	SS	SA	SE
SEFF	0.896	0.632	0.484	0.270	**0.795**					
F	0.767	0.524	0.202	0.105	0.449	**0.724**				
A	0.732	0.476	0.327	0.201	0.514	0.256	**0.690**			
SS	0.796	0.438	0.327	0.176	0.482	0.360	0.572	**0.662**		
SA	0.745	0.498	0.255	0.128	0.411	0.112	0.505	0.360	**0.706**	
SE	0.861	0.608	0.484	0.166	0.696	0.342	0.307	0.252	0.270	**0.780**

APPENDIX L
Adequacy Statistics

Name	Value
KMO	.874
Bartlett's test of Sphericity	0.0
Communalities	Average value .58
Non-Redundant Residuals	4 or 1%
Total Variance Explained	54%

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