Team Adaptation in Uncertain Environments: A Descriptive Case Study of Dynamic Instability in Navy SEAL Units

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In times of war or uncertainty there is a special breed of warrior

ready to answer our Nation's call.

~US Navy SEAL recruitment website

Dedication

This dissertation is dedicated to my wife, Elisa, and our children who give me the support, love, and inspiration to fight the good fight and finish the race.

And in loving memory of David G. Livingston, my father, and the man I aspire to become.

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I will be forever grateful for the Executive Leadership Program and its impact on my life. It was within the ELP that I found my passion and my voice. My personal transformation was a direct result of the support I regularly received from the faculty, my cohort, and my family. I continuously praise God for this experience and the strength to see it through to completion.

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brought me perspective on what was truly important. Heidi, I am so grateful for your encouragement, as well as your editorial assistance. John, I could not have asked for a greater friend to carry me along. Judy and Fernando, you are tremendous role models and I am proud to call you my parents. Mom, I can't find the words to thank you enough. I am forever grateful for the unending support and love you and Dad showered upon me.

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Abstract of the Dissertation

Team Adaptation in Uncertain Environments:
A Descriptive Case Study of Dynamic Instability in Navy SEAL Units

The United States increasingly calls upon elite teams of Special Operations Forces, like the Navy SEALs, to respond to the evolving asymmetric threats posed by terrorists and extremists. These teams must have the capacity to adapt as a collective unit in the most dynamic circumstance. This research explored the nature of collective adaptation by these exceptional action teams using a qualitative case study methodology and a lens of complexity theory. Specifically, data gathered from official documents and interviews with retired Navy SEALs expanded the understanding of dynamic instability as it relates to team adaptation in uncertain environments. A greater understanding of this phenomenon contributed to the scholarly literature by identifying and describing the critical factors used by teams to promote adaptive capacity through the appropriate usage of structure and innovative flexibility in a dynamically changing situation. The study produced the following conclusions:

Conclusions
Individuals in an action team mentally reference a combination of general simple rules and situation-specific simple rules when they adapt in an uncertain environment. • **Varying application of different types of simple rules correspond with different levels of environmental uncertainty.** • **Simple rules provide the basis for a shared cognitive structure that enables greater collective adaptation.**
Previous experience plays an important role in the adaptive capacity of an action team. **Experience provides an individual with context to determine how simple rules can and should be applied.** **Experience strengthens the relationship (trust and familiarity) between team members which allows them to adapt more quickly and effectively as a collective.**

Relationships between team members, grounded in previous experience and a shared culture, play an important role in the adaptive capacity of an action team. • **Trust between team members gives each individual the freedom and permission to take initiative and adapt as necessary.** • **Familiarity between team members enables the action team to collectively adapt more quickly and effectively because they can predict how another teammate will react given a specific set of parameters without the need for extensive communication.**
The ability of individual team members to control emotions, slow and simplify reactions, and focus communication promotes more effective adaptation by an action team in an uncertain environment. • **Individual decision-making is enhanced when individuals are able to control their reactions and react calmly in the midst of an uncertain environment.** • **As environmental uncertainty increases, individuals who react by slowing down and simplifying their actions are capable of more effective adaptation.** • **In an uncertain environment, action teams that focus communication, reduce potential distractions for team members. This reduced, but effective communication is possible because of trust and familiarity between team members.**
An action team's ability to adapt is dependent upon its dynamic instability (the interplay between morphostatic and morphogenetic factors). • **Morphostatic factors that promote structure include simple rules, selection of team members, familiarity between team members, and perpetuation of a structured culture that regulates behavior.** • **Morphogenetic factors that promote flexibility include previous experience, distributed leadership, trust between team members, and perpetuation of a permissive culture that encourages innovation.**

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Chapter 1:

INTRODUCTION

Introduction

One significant upward trend dramatically impacting the global community of the twenty-first century has provided the impetus for this particular study. This trend is an unprecedented increase in nontraditional and asymmetric threats against the United States and the civilized world as a whole (Johnson, 2006). The military must still prepare for traditional combat scenarios where two sovereign nations engage in warfare; however, unconventional threats from groups outside of official governmental structures, such as drug traffickers, religious extremists, ethnocentric radicals, and terrorists, have steadily been on the rise over the last thirty years. The threat posed by these groups has become even more apparent since the terrorist attacks on September 11, 2001. To meet this increasingly varied challenge, the United States military has placed a greater focus and emphasis on the utilization of Special Operations Forces (hereafter referred to as "SOFs") (Johnson, 2006). Dougherty (2001) details these forces' unique capabilities in the citation of joint doctrine, which states, "Special operations rely on adaptation, improvisation, innovation, and self-reliance" (p. 28). A prototypical SOF that has been utilized with ever-increasing regularity and effectiveness are the members of the US Naval Special Warfare Community known as Navy SEALs.

The Navy SEALs' unique capability for adaptation was clearly evidenced during the raid on Osama bin Laden's compound in 2011. From the initial helicopter crash to the unknown layout of the terrorist's compound, the Navy SEALs had to constantly adjust their behavior to account for new variables. The flexibility displayed by SOF units, such as the Navy SEALs, is a complex group characteristic, dependent upon a multitude of individual and collective factors.

Complicating the process is the fact that ongoing collective adaptation never takes place in a vacuum. A number of formal and informal socially derived factors all impact the process. In regards to Navy SEALs, formal rules and relationships, informal social norms, lines of communication, training exercises, organizational structure, previous experiences, and historical accounts all serve as boundaries and reference points that need to be taken into account to satisfactorily understand the unit's actions.

Despite the focused nature of this research, the contributions of this study extend beyond military units operating in combat situations. In all facets of society, teams have become a cornerstone of organizations due to their flexibility, innovative capacity, and ability to respond to complex challenges without substantial micromanagement (Cannon-Bowers & Salas, 1998). They have simply become the organizational unit of choice to engage with today's ever-changing and uncertain landscape. In particular, action teams have the greatest potential to profit from the findings of this study. Navy SEAL units (hereafter referred to as "SEAL units" to represent various tactical formations including platoons, squads, and fire teams) fall within the category of action teams, as do emergency response teams, medical teams, athletic teams, performance groups, and any other team that routinely operates in unique environments that require an enhanced level of coordinated flexibility, specialized training, and skill by team members (Levi, 2007). These types of highly functional units are becoming increasingly utilized to deal with the volatile world stage; therefore, a greater understanding of their functioning has potentially widespread benefits.

This chapter (a) states the purpose of the study and describes the significance of this research in relation to theory development and practical application, (b) presents the

overarching and sub-research questions, (c) provides the conceptual framework used as a foundation for this study, (d) discusses the assumptions and limitations intrinsic to this work, and (e) defines key terms utilized throughout this study.

Purpose of the Study

The field of biological sciences has produced a majority of the most substantial theoretical advances in the realm of adaptation (Kauffman, 1995). The perpetual dance between entity and environment has been embraced and explored at the individual and collective levels by a number of prominent theorists including, most famously, Charles Darwin. Social systems theorists who based their research on Talcott Parsons' work also integrated adaptive principles; however a theoretical chasm existed between the two disciplines for a number of decades. Much of the divide in the area of adaptation was a result of the definition itself. Adaptation in the biological realm was understood as an aligning of the organism with environmental demands (Goodwin, 1994), whereas social science described adaptation as a responsiveness to environmental conditions (Parsons, 1951) without taking its alignment into consideration. Some theorists (Aldrich, 1979; Tushman & Romanelli, 1985) attempted to bridge the gap, but the fissure remained until the development of complexity theory. Complexity theory has adopted biology's obsession with adaptation and attempted to place this principle in the context of multiple kinds of systems.

One particularly useful concept embraced by complexity theory is that of dynamic instability. Effective systems exist at a tenuous position where emergent behavior can produce nonlinear effects as agents of the system interact within a set boundary of behavior. It is at this tenuous position, known as the edge of chaos (Lewin, 1999), where

systems successfully adapt to a changing and uncertain environment. Existence at the edge of chaos is maintained by damping and amplifying feedback loops that keep a system operating within certain parameters, while simultaneously allowing great variance of behavior within those parameters (Pascale, Millemann, & Gioja, 2000).

Despite the theoretical contributions of complexity theory, particularly in the realm of system adaptation, the perspective is significantly lacking in functionality and application in social systems (Uhl-Bien, Marion, & McKelvey, 2007). In regards to social systems, operationalizing complexity theory, and more specifically the concept of dynamic instability, requires a greater focus on the human elements of the system. The parameters that bound the social system must be defined and understood as they exist in real-world scenarios (Tu, Wang, &Tseng, 2009). Stacey (1995) suggests lawful rules and relationships form the parameters that bound a social system, providing a structure within which social activities take place in a collectively beneficial form. Davis, Eisenhardt, and Bingham (2009) describes these social system parameters as simple rules. These simple rules may be codified and formalized, or they may exist as informal cultural norms and mores that guide behavior, but regardless of their form, the function of these underlying parameters is a critical element of social system adaptation that requires exploration to develop a greater understanding of the adaptive process.

Based on the aforementioned shortcomings, the objective of this qualitative study is to understand Navy SEAL adaptation in response to an unexpected critical incident during an operation or training exercise. Specifically, this dissertation research sought to describe the dynamic instability of an action team in uncertain environments by exploring the types of simple rules (heuristics) used by a SEAL unit in response to a surprising

event as perceived and recollected by a retired Navy SEAL. Exploration of the adaptive process utilized by exemplary action teams, such as SEAL units, not only furthered the theoretical conversation on system functioning, but also practically informed collective adaptation by a team operating in an uncertain environment. This increased understanding of dynamic instability may enable other action teams to develop more effective training and practices that promote adaptation during periods of environmental uncertainty. As highlighted by Smith and Graetz (2006), no training can ever fully prepare an action team for inherent uncertainty, but the proper understanding of adaptive factors may allow an action team to reach its maximum potential for adaptation.

Methods

The plethora of variables involved in action team adaptation during real-world situations required research methods that were uniquely capable of capturing relevant data to inform the research. Even routine operations involve an exorbitant number of variables that must be taken into account. Due to this inherent complexity and the subtle, occasionally subconscious, social processes at work, it was necessary to employ a qualitative approach utilizing multiple data collection methods in a supplementary fashion (Woodside & Wilson, 2003).

Past research on aspects of complexity theory, such as dynamic instability, has been primarily relegated to the world of computer simulations. Computer-based models examine the interaction of dozens of variables simultaneously and have been used effectively in studying large-scale living and nonliving systems, such as global volcanic activity, stock market fluctuations, and herd behavior (Kauffman, 1993; Anderson, 1999; Lewin, 1999; Lansing, 2003). However, these models have had significantly less success

with social systems where individual behavior based on emotion, logic, and possible future ramifications have a potentially greater and more immediate impact on the entirety of the system (Mainzer, 2009). Additionally, much of the research on team performance has been narrowly focused either on descriptions of effective team characteristics or collective training used to establish protocols and systemized actions (Salas, Dickinson, Converse, & Tannenbaum, 1992; Levi & Slem, 1995; Cannon-Bowers & Salas, 1998). There are significant studies that explicitly explore team dynamics and performance, but its relationship to adaptation has been largely ignored. The traditional paradigms and models typically used in both areas of study are simply not appropriate when examining complex social systems (teams) operating in uncertain environments.

To move beyond these typical techniques, the researcher utilized a case study in concert with a qualitative approach and social constructivist perspective. Case studies are widely applicable, used by a plethora of disciplines in a multitude of settings (Merriam, 1998). The case study methodology was particularly appropriate due to the study's unique design; an examination of a team-level phenomena through individual-level perspectives.

Data collection methods were intentionally designed to capture individual cognition rather than collective cognition. Phase I of data collection grounded the study through an examination of static sources of data in officially sanctioned documents. Phase II included a beta test where retired Navy SEALs were interviewed. The researcher and committee reviewed results from the interviews to ensure interview techniques and the interview protocol were producing the intended results. The final phase included individual interviews with other retired Navy SEALs to retrospectively

explore the adaptive behavior used during unexpected critical incidents during an operation or training exercise.

A deductive data analysis technique was employed where codes were initially developed from previous theory and research. These codes were then revised and expanded based on the document reviews. The new list of codes was then used to examine the individual interview transcripts. Each participant described a unique even and unique team; therefore, each account was considered a separate case. Using a rigorous and iterative process of within-case and cross-case analysis, the list of codes was further refined. Finally, the researcher utilized a pattern-coding method to identify emerging themes (Miles, Huberman & Saldana, 2014). Conclusions derived from these emergent themes were focused at the individual level of analysis. Ultimately, these conclusions, produced through rigorous data collection and analysis techniques, furthered scholarly understanding in the areas of complexity theory and team performance.

Research Question and Conceptual Framework

This expansion of existing understanding required an answer to the overarching question: *what is the nature of the types of simple rules (heuristics) used by a Navy SEAL unit in response to an unexpected critical incident characterized by environmental uncertainty?* By placing this inquiry in the specific context of an action team operating in an uncertain environment, potentially beneficial insights and applications were obtained for organizational entities faced with the dynamism of today's society.

Complexity theory offers an ideal lens with which to examine the role of simple rules in SEAL units operating amidst uncertain environments. The conceptual framework portraying the constructs, context, and overall relationships are depicted in

Figure 1-1. The subsequent portions of this section provide a brief overview of the constructs used as a practical model to guide research methods and describe the context of the study.

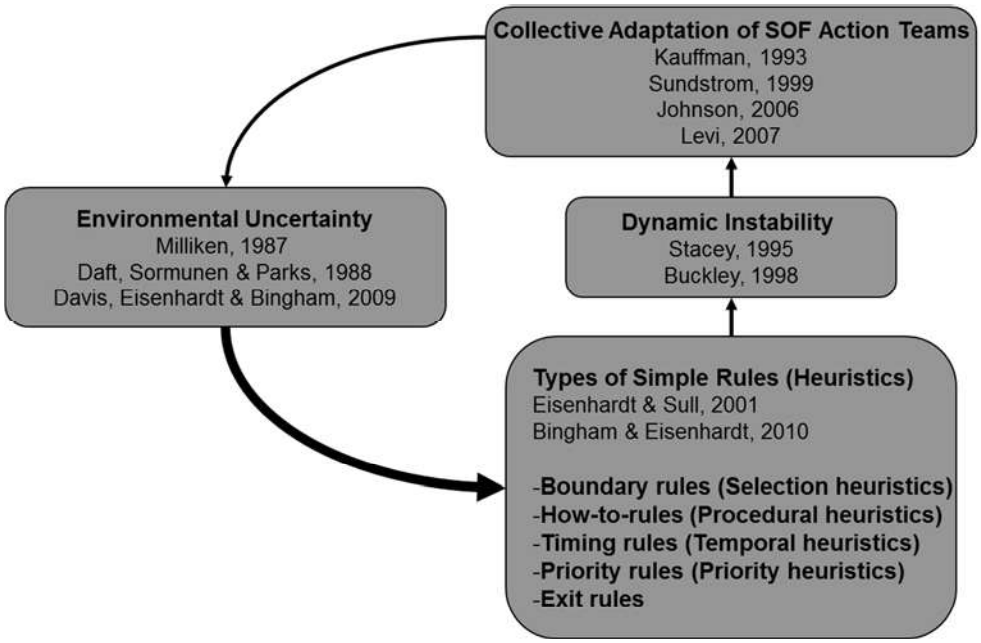

Figure 1-1 Conceptual Framework

Collective Adaptation

The world is incredibly complex with those entities that inhabit it being exposed to unique circumstances on a continual basis. These entities only maintain their existence through utilization of the resources provided by the environment (Parsons, 1951). Social systems are a specific type of cooperative entity created by humans to enable individuals and collectives to reach situation-specific goals despite environmental pressures. As the environment is in a perpetual state of flux, systems that operate within it must be similarly flexible to survive (Parsons, 1951). Each unique circumstance presents a dizzying array of limited resources that must be properly identified and utilized for a system to move up the fitness peak, thereby improving its possibility of long-term

survivability (Kauffman, 1995). There is no final end state for a system because the environment is perpetually transforming. A system must constantly adapt if it hopes to survive this shifting landscape.

Collective adaptation refers to the appropriate response of a system to environmental pressures through the employment of both novel and existing techniques (Eisenhardt & Tabrizi, 1995). These concurrent actions enable the system to operate at the edge of chaos in its most adaptive and potentially most enduring form. Early adherents of March's (1991) theory of exploration/exploitation tradeoff conceptualized the two processes as existing on the same continuum. More recent literature has leaned toward the existence of two continuums at work within complex systems that utilize and employ paradoxical dualities to maintain their position at the edge of chaos (Smith & Graetz, 2006). Buckley (1998) describes these two continuums as, morphostatic (stabilizing) and morphogenetic (destabilizing). The mechanisms operate simultaneously in tension, allowing the system to adjust its behavior to mitigate risk and make the most of the unique resources provided by the environment at a given moment in time (Buckley, 1998).

Dynamic Instability

Actions, behaviors, rules, and relationships that preserve a system's current form or state can be described as morphostatic. These established relational and structural boundaries guide information exchange and resource utilization. The boundaries established by morphostatic processes absorb environmental fluctuations, stabilizing the system by providing a constant, collectively-established reference point from which to take action (Buckley, 1998). Morphogenetic processes promote the destabilization of

established system features so that novel structures and behaviors may be employed in response to environmental changes. These transformative processes are particularly vital when the rate or magnitude of environmental change is so extreme that utilization of existing structures will not allow the system to remain viable. It would initially appear these two types of processes described by Buckley would be at odds; however, Kauffman (1993) suggests system adaptation is at its greatest when these processes are concurrently employed. Rather than a balancing of the two processes, it is a concurrent usage of both processes in a complementary fashion such that tension is maintained (Pascale et al., 2000). The morphostatic processes limit the possible innovations that arise during the system's exploratory activities, filtering novel actions and structures to limit system changes to only those forms that align with existing structural features and increase the probability of beneficial outcomes (Holland, 1995). Additionally, the emergence of novel structures through morphogenetic processes requires the constant reassessment of exploitive activities to guarantee the system is utilizing the most appropriate structures and procedures for a particular environment. Within living systems, the paradoxical existence of these two types of processes is known as bounded instability (Stacey, 1995). More broadly in the realm of complexity theory, the concept is described as dynamic instability.

In social systems, the morphostatic bounds are established by rules that are collectively adhered to, while the group's diversity of perspectives, background, and training guide the application of those rules, providing morphogenetic, destabilizing creativity (Jackson, 1992). The rules may be formal or informal and are often evidenced by organizational routines (Lengnik-Hall & Beck, 2005), while the creativity is both the

production of novel forms and ideas and the end product of a recombination of existing elements through the social interactions of interdependent agents (Holland, 1995). It is the existence of collectively adhered to rules and the varying application of those rules that produce dynamic instability and generate collective novelty within acceptable behavioral bounds, allowing the system to remain adaptable despite varying situations (Levi, 2007). Simple rules provide sufficient structure to guide a system's actions while not being so rigid to inhibit novel behavior. They are enabling edifices that promote, rather than inhibit action. Eisenhardt and Sull (2001) describe five types of simple rules that bound and guide the system's action: (1) boundary rules which determine what system actions are feasible, (2) priority rules which rank opportunities and risks, (3) how-to-rules which guide implementation, (4) timing rules which control the rate of implementation, and (5) exit rules which determine when actions should be terminated. A subsequent case study by Bingham and Eisenhardt (2011) found evidence to support the usage of four types of simple rules (boundary rules, priority rules, how-to-rules, and timing rules) by entrepreneurial firms in the information technology industry. Results showed the firms utilized these simple rules (described as heuristics by the researchers) to build a cognitive framework, guiding strategic action and allowing the social system to adapt to environmental conditions.

Improvisation takes place when agents within a system collectively rework existing elements and available resources based on predetermined rules of practice and collaboration (Berliner, 1994). This minimally structured process produces outcomes that are fundamentally different from previous creations. The process and subsequent outcomes are heavily dependent upon the past experiences of the agents within the

system, the capabilities and characteristics of the systems, the interactions taking place between actors, and the local conditions the system encounters (Weick, 1998; Vera & Crossan, 2005). When social systems, such as medical teams, sports teams, jazz bands, and military units, engage in improvisation, they are combining the pre-composed with the spontaneous to adaptively respond to dynamic environments in a new and flexible manner.

Although this process may be aptly described as spontaneous, this spontaneity overlays a framework of simple rules that coordinates group interactions, guides practiced responses, and establishes lines of communication (Weick, 1998). The skills needed by agents to appropriately engage in collective improvisation must be cultivated and refined both individually and at the group level (Vera & Crossan, 2005). Weick (1998) suggests the spontaneous act requires intense preparation and needs significant time and resource allocation for the collective to develop and promote those traits that characterize a group adept at improvisation. Simple rules must be firmly established and the group must learn to effectively utilize those rules in a collective sense if it hopes to take appropriate action and survive in an uncertain environment.

Context

The ever-increasing number of uncertain environments that pervade the twenty-first century society requires distribution of tasks to relatively autonomous units of individuals working interdependently. The study of teams is becoming increasingly important to understand the nature and function of these social systems that are playing an essential part in most organizations (Cannon-Bowers & Salas, 1998). The importance

of teams, specifically action teams, is becoming even more apparent in today's military, which faces an unprecedented degree of nontraditional threats.

The circumstances in which SOF action teams, such as SEAL units, function are dangerous, perplexing, and can only be aptly described as volatile (Hunsaker, 2007; Taber, Plumb, & Jolemore, 2008). This environmental dynamism can be understood as a multi-dimensional construct, rather than a singular characteristic. According to Davis et al. (2009), environmental dynamism can be categorized along four separate continuums of velocity, complexity, unpredictability, and ambiguity. Despite the existence of these separate dimensions, their simulation-based findings indicated organizational effectiveness, in relation to simple rules and organizational structure, was most significantly impacted by the degree of environmental unpredictability. In consideration of these findings, it is the unpredictability of environments that becomes the critical factor. Davis et al. (2009) specifically define unpredictability as high levels of "disorder or turbulence in the flow of opportunities such that there is less consistent similarity or pattern" (p. 420). A number of studies use the term "uncertainty" to describe this environmental characteristic (Daft, Sormunen, & Parks, 1988; Ebrahimi, 2000; Stewart, May & Kalia, 2008) or they include the degree of unpredictability as a component of uncertainty (Boynton, Gales & Blackburn, 1994; Boyd & Fulk, 1996). Quoting Milliken (1987), Buchko (1994) defines uncertainty as the "'individual's perceived inability to predict [an organization's environment] accurately' because of a 'lack… of information' or 'an inability to discriminate between relevant and irrelevant data.'" (p. 411). The researcher used the term "uncertainty" in this study as it is used more frequently in the academic literature.

Successful operation in such uncertain environments requires a military team with unique qualities, and SOF action teams have quickly emerged as the unit of choice (Johnson, 2006). The structure of SEAL units is uniquely configured to operate effectively in the perpetual turbulence of the global ecosystem. They are characterized by a significant degree of autonomy and use collective responsibility to meet task demands without the need for external control (de Leede, Nijhof, & Fisscher, 1999). Furthermore, they utilize extensive training, bounded by governing principles and a relational structure that promotes innovative tactics and improvisation (Dougherty, 2001). These units are well-equipped and well-trained through simulated and repetitive exercises, but they also possess a collective structure which provides them with the ability to match the complexity of the environmental challenges and take action in uncertain situations; as such, they were an ideal subset of action teams to examine.

Assumptions / Limitations

Assumptions held by the researcher and inherent limitations of the study should be disclosed to orient the reader, focus application of findings, and guide future research. The following assumptions were foundational to this particular research study:

- Systems are more than the sum of their parts (Parsons, 1951)
- A social constructionist worldview is a valid perspective (Cresswell, 2007)
- Simple rules employed by the collective are identifiable and play a major role in action team functioning (Pina e Cunha & Vieira da Cunha, 2006)
- Retrospective accounts in which a participant is interviewed about a previous event is a valid form of data collection despite the limited perspective of a single participant

The following limitations were inherent to this study:

- As the research was a bounded case study, the transferability of the findings and conclusions is limited and may not be appropriately extended to other types of action teams (Yin, 2009)
- Social interactions could not be further informed by classified documents and personal background of subjects due to security concerns (Johnson, 2006)
- The qualitative nature of the study relied on the interpretation of events through the biased lens of both researcher and participant, necessarily introducing a degree of bias to findings and conclusions (Ratcliffe, 1983)
- Utilizing a lens of complexity focused attention on interactions between action team members and important variables at the individual or organizational level may have been unintentionally underemphasized or ignored (Carroll & Burton, 2000)

Definition of Key Terms

Action Team – An action team is an exclusive group of people that works toward a common objective and repeatedly performs operations in unique environments, relying on interdependencies between members of the group to achieve goals of the collective (Sundstrom, 1999).

Collective Adaptation – Collective adaptation refers to a system's effective altering of its behavior and/or structure such that it matches the complexity of the environment (Boisot & Child, 1999; LePine, 2005). It is the ongoing movement and robust transformation by an interrelated collective toward a structure that is considered favorable by the environment as it presently exists (Orr, 2005; Lengnick-Hall & Beck, 2005).

Complex Adaptive Systems – Complex adaptive systems "consist of aggregates of interacting subunits, or agents, which together produce complex and adaptive behavior patterns" (Boal & Schultz, 2007, p. 413). "Some of the characteristics of complex adaptive systems include: (1) they are made up of many agents who act and interact with each other in unpredictable ways, (2) they are sensitive to changes in initial conditions, (3) they adjust their behavior in the aggregate to their environment in unpredictable ways, (4) they oscillate between stability and instability, and (5) they produce emergent actions when approaching disequilibrium. Additionally, complex systems are dynamic and non-linear, and can be rarely explained by simple cause-effect relationships" (Plowman, Solansky, Beck, Baker, Kulkarni, & Travis, 2007, p. 342-343).

Complexity Theory – Complexity theory is primarily concerned with the collective properties of systems that emanate from the interactions of their interconnected parts (Carroll & Burton, 2000; Uh-Bien et al., 2007). The theory suggests systems are not reducible to their individual components and are sensitive to initial conditions (Buckley, 1998; Stacey, 1995). Systems' futures are determinant, but unpredictable due to innumerable interactions and their unforeseen effect on the totality of the systems through small perturbations (Dooley & Van de Ven, 1999; Lorenz, 1993; Stacey, 1995). The theory rejects linear causality and suggests behavior of systems is emergent, derived from the interactions of heterogeneous agents and the environment (Prigogine, 1997).

Dynamic Instability – Dynamic instability is the paradoxical behavior of a system whereby the system exists in a state of tension through the concurrent usage of damping (morphostatic) and amplifying (morphogenetic) mechanisms (Buckley, 1998; Pascale et al., 2000). Simple rules governing agents' actions are morphostatic in nature while the

diversity of the agents' experiences and the way they apply those rules is morphogenetic. The state of tension by the usage of damping and amplifying mechanisms allows the system to more readily adapt as environmental pressures require transition for survival. In social systems literature, this behavior is also referred to as bounded instability (Stacey, 1995).

Edge of Chaos – Edge of chaos refers to a "transition zone between stable equilibrium points and complete randomness" that provides a broad set of constraints on overall behavior that still allows a system to develop and adapt (Boal & Schultz, 2007, p. 413). This region is characterized by nonlinearity where small internal or external changes may either be absorbed by the system or magnified into a transformative avalanche.

Environmental Uncertainty – Environmental uncertainty is a situation characterized by an "individual's perceived inability to predict [an organization's environment] accurately' because of a lack… of information or an inability to discriminate between relevant and irrelevant data." (Buchko, 1994, p. 411).

Improvisation – Improvisation is a creative process in which an entity reworks existing materials using pre-established rules and routines to address unanticipated situations and variables (Berliner, 1994; Vera & Crossan, 2005). The result of improvisation is qualitatively different than the initial components, such that the product should be considered a new creation. The creative process of improvisation takes place in real time and is heavily influenced by the entity's capabilities, the entity's past experiences, and local conditions (Weick, 1998).

Simple Rules (Heuristics) – Simple rules are local organizational structures that regulate actions of organizational members without excessive constraint or automation. They

"provide space for discovery and stimulate the improvisational approaches necessary to deal with the unpredictability of highly dynamic [environments]" (Pina e Cunha & Vieira da Cunha, 2006, p. 844). These simple rules are heuristics, or shared cognitive shortcuts that provide a common structure for action in response to a range of similar problems without excessively detailed prescriptions (Bingham & Eisenhardt, 2011).

Special Operation Forces (SOFs) – SOFs are highly trained, nonconventional military teams used by all branches of the United States military to engage in "unconventional warfare, foreign internal defense, special reconnaissance, direct action, and civic action" (Simons, 1998, p. 118). "At present, SOFs are considered the force of choice to confront a broad spectrum of irregular threats that dominate the current security environment" (Johnson, 2006, p. 273). The SOFs utilized in this study were SEAL (Sea, Air and Land) units who are composed of highly trained members of the US Naval Special Warfare community.

Chapter 2:

LITERATURE REVIEW

Introduction and Overview

This chapter presents pertinent research studies and theoretical contributions from those areas of study that inform the research questions posed in the preceding chapter. The literature review in this chapter is organized into two sections. Section One considers the collective adaptation of social systems using a lens of complexity theory. Using a Parsonian foundation, this section defines adaptation and presents literature on this critical characteristic as it relates to collective survival. The role of simple rules in maintaining a system's dynamic instability is specifically addressed. Section Two contextualizes the study with a discussion on the unique organizational system and the uncertain environment in which the research took place. The second section explores literature on the nature of teams and concludes with a discussion on environmental uncertainty and its unique role in this study.

The researcher examined applicable literature from scholarly and peer-reviewed sources, including books, journals, and theses. This examination was restricted to literary sources published in the last 30 years, except for earlier sources deemed seminal works in the field.

Much of the literature on system adaptation was based on Parsons' seminal works and supplemented with more recent complexity literature that centers on complex adaptive systems and their innate ability to thrive in dynamic or uncertain environments by balancing at the edge of chaos. Location at the edge of chaos is achieved through the dynamic instability of the system (Lewin, 1999). The bounds of a social system are constructed by simple rules (Pina e Cunha & Vieira da Cunha, 2006) and held together and reinforced by communication between agents within the system (Taylor & Van

Every, 2000). The literature review specifically targeted the areas of complexity theory and team adaptation. In conjunction with the aforementioned areas of study, a literature review on teams and environments provided a contextual background for the study. It specifically examined purposeful work teams, known as action teams, who were considered organizational units unto themselves, as well as the unique environments in which they exist. The literature on teams deemed relevant to this study focused on the intra-group dynamics and interactions between individuals rather than the individual actors within the collective. This literary focus married nicely with complexity theory with its emphasis on interactions between agents in a system.

Section 1 – Collective Adaptation

Adaptation

The world in which we exist is now widely accepted as one of continual change. Magnitude of change oscillates between minor perturbations to dramatic shifts, but the alteration of reality is a continual process (Ashby, 1958; Gersick, 1991; Hackman, 2002). The term "adapt" was often misconstrued as "change" in much of the biological literature (Kauffman, 1995); however, this simplified definition did not adequately incorporate the facet of alignment in the process. For the purposes of this study, adaptive systems are those collectives capable of significantly altering their behavior and/or structure such that it matches the complexity of the environment (Boisot & Child, 1999; LePine, 2005). The important implication in this definition is that adaptive systems do not strictly embrace chaotic change. They respond to environmental pressures through the employment of an appropriate balance of novel and existing techniques (Eisenhardt & Tabrizi, 1995).

Adaptation refers to the system's ongoing ability to remain adaptive in a beneficial way such that the system may survive and thrive in the continually-changing environment.

Systems do not move toward a final end state (Goodwin, 1994). Rather, they continually modify their form as the environment dynamically changes over time. According to Aldrich (1979), the driving force for adaptation is the not the alteration of the environment itself, but what the environment provides. It is the shifting of resources that presents the impetus for systems to change strategies and subsequent behaviors. Adaptation is the positioning of a system for maximum utilization of a resource.

The concept of adaptation emerged in the field of biology beginning with the inception of the theory of natural selection presented in *On the Origin of Species by Natural Selection* (Darwin, 1878). However, the notion of collective adaptation was greatly refined and promulgated by Fisher in 1930. This work was considered groundbreaking for its linkage between Darwin's conviction that individual micro mutations combine to produce shifts in the population and the work on genetics theorized by Gregor Mendel (Orr, 2005). For the purposes of this study, the importance of Fisher's work lies in his mathematical evidence that suggests adaptation is characterized by a collective's movement toward a structure that is considered favorable by the environment as it presently exists.

Over the next five decades after Fisher's findings, empirical research studies led to greater support of micro mutations. Underlying this work was the notion that small changes in the genome led to small changes in the population, portraying adaptation as a slow and sluggish process based on a linear relationship. The field of biology underwent a paradigmatic shift in the 1980s when new empirical research techniques demonstrated

that small mutations may have dramatic, non-linear effects on phenotypic expression, leading to adaptation (Orr, 2005). This transformation, embracing non-linear emergence, provided the framework for complexity theory and Kauffman's (1995) work on system adaptation. Kauffman's work was one of the first and most influential pieces of literature bridging adaptation as understood in the biological realm and adaptation in the social systems literature. Kauffman's work will be discussed later in greater detail; however, to fully understand the importance of his work, the concept of adaptation in the social system literature must first be explored.

Much like Darwin in the biological realm, Talcott Parsons took the preeminent role in social systems theory. His first theoretical work, *The Structure of Social Action* (1937) laid the groundwork for the field of systems in the twentieth century by combining the most notable social theories of his day into one overarching theory of action. He proposed that a social system was fundamentally an interactive network of relationships (Bluth, 1982) and it was upon this basic proposition that much of his groundbreaking work was constructed.

To grasp the relationships between actors that make up the network, Parsons (1951) implies a higher level of analysis must be utilized where actions of individuals are not as critical as the collective actions of the group. The actions of the group are not arbitrary, but take place in a specific situation with an end goal in mind. It is this combination of actor, purpose, and environment that provided the framework for the concept of adaptation in the social sciences.

Social systems operating in an environment of continuous change must similarly be capable of perpetual change to deal with the resource demands required for survival

(Parsons, 1951). As depicted in **Figure 2-1**, Parsons conceives of a system being composed of four interdependent subsystems. It is the adaption subsystem that deals with the patterns of interchange with the external world and the opportunities and risks it provides (Bluth, 1982). This subsystem is responsible for producing outputs in response to environmental pressures, so as to enable the system to remain viable. Parsons (1951) suggests the adaption subsystem is wholly responsible for not only producing outputs, but also packaging and delivering them in such a way as to be received by the environment. This output may be material, but often times it takes the form of information in social systems. In this sense, adaptation in social systems refers to the scanning, sifting, and spreading of information such that all other subsystems may take appropriate action in light of environmental pressures.

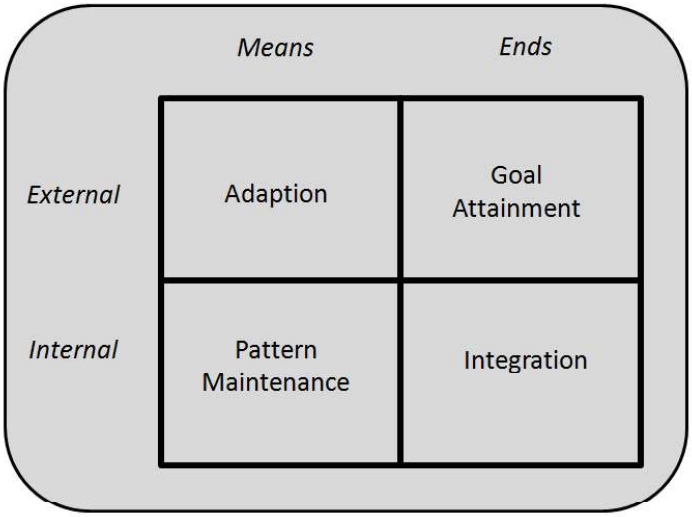

Figure 2-1 Four Subsystems of Parsons' General Theory of Action

Using models based on Boolean systems, Kauffman (1993) explored the nature of biological system adaptation, employing the same systems thinking utilized by Parsons (1951). Rather than examining the population as a multitude of individuals acting on

their own behalf, Kauffman views the collective as an entity in its own right. It is this systems paradigm that found joint applicability in the biological and social sciences, providing a foundation for complexity theory.

Armed with this lens, Kauffman suggests that systems exist within a bounded space of behavior referred to as an attractor. This attractor is formed by a combination of internal variables that must be maintained at certain levels and conditions of the external environment. If the external environment is shifted to such a degree that the internal variables can no longer be maintained within acceptable levels, the system must be altered to remain viable. The system will react to this crisis in one of three ways: it will fail to significantly change resulting in the variables not being maintained within acceptable levels and eventual system death; it will shift chaotically such that the acceptable levels are overshot resulting in system death; or, it will appropriately shift by embracing novel changes restrained by existing boundaries. When this third possibility takes place, the system will exist in a new attractor, completing the process of adaptation.

Kauffman (1995) clarifies that the process of adaptation does not imply that only one correct form is possible for success. To elaborate on this principle, he utilizes the concept of fitness peaks. Any given environment presents a unique combination of potential opportunities and potential risks. This combination can be visually depicted as a mountainous landscape with the peaks representing opportunities that systems may seize to increase their viability and valleys representing hazards that systems may experience, resulting in decreased survivability. The ever-changing environment results in a perpetually changing fitness landscape. Systems alter their structure and behavior according to the fitness landscape they encounter in order to move further up localized

peaks. These alterations in response to environmental pressures are the aforementioned collective adaptations of the system. Environments produce peaks of varying height, representing greater opportunities, but there is no single highest peak for every system; hence the variety of the natural world. All systems adapt, but it is the interaction between the potential of the environment and the system's ability to exploit that potential that enables some systems to achieve sustainable success regardless of environmental dynamism (Goodwin, 1994). Kauffman's (1993) simulations indicate the most adaptable systems are those that exist within fitness landscapes exhibiting rugged characteristics (a combination of simple and complex traits) and match those same rugged characteristics.

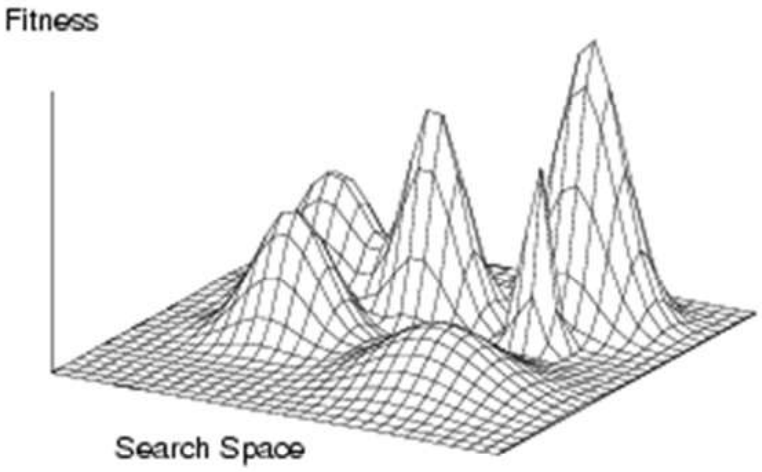

Figure 2-2 Fitness Peaks Presenting Varying Degrees of Risk and Opportunities

To illuminate the process of adaptation further, Kauffman (1993) has developed a conceptual model. Kauffman believes a complex system, such as an action team, is composed of an interacting network of components. These organizational components may include basic assumptions, values, beliefs, processes, language, or virtually any other artifact. Most of these components exist in a constant state, exhibiting little, if any,

variation. These components are referred to as the frozen core. The frozen core is a vast ocean of constancy with occasional islands of "unfrozen" components existing in a state of flux. These unfrozen components are typically isolated from each other by the frozen core that seeks to retain a stable structure. The variations exhibited in the unfrozen components are isolated from other unfrozen components and, therefore, do not spread throughout the network. No dynamic alteration takes place in the system.

However, on occasion, components normally existing in the frozen state may begin to "melt" due to environmental pressures, resulting in a greater connectivity between the islands of unfrozen components. When this occurs the variations produced by these newly linked components are amplified, spreading quickly throughout the entire system. Once the environmental pressures dissipate or take on a new form, the melted components will once again refreeze, isolating the unfrozen components and reestablishing the order of the system.

Kauffman's premise is evident in an organizational example from Intel. According to Burgelman (1991), the tech company Intel was initially considered an electronic storage (memory) company. Its processes, values, culture, and identity (the organization's frozen components) stabilized the organization despite fluctuations in both the external and internal environments. Small, autonomous pockets in the company began diversifying in the early 1980s, moving away from information storage with one specific group focusing on microprocessors. These unfrozen components remained relatively isolated and the organization continued in its stabilized state of being a storage-based company. Environmental pressures increased as competitors began making greater technological and financial strides in the mid-1980s, moving the storage technologies of

Intel toward obsolescence. As natural selection forces and strain on the existing order increased, some of the frozen components of Intel began to melt, reducing the isolation of the unfrozen components. The unfrozen group experimenting with microprocessors introduced a particularly beneficial variation to the organization that sent reverberations throughout the system. This variation was so beneficial in light of the environmental situation, that it caused a complete system adaptation. Burgelman (1991) states, "From an evolutionary point of view, only after it has become reasonably certain that an autonomous initiative is viable can it legitimately become part of the organizational strategy" (p. 247). In the case of Intel, once the adaptation was firmly established and determined to be beneficial, a new frozen core was created such that the organization was no longer an electronic storage-based company, but was now the leader in microprocessor technology.

Buckley (1998) suggests systems engage in a combination of morphostasis and morphogenesis processes during a period of adaptation. Morphostasis refers to actions that preserve a system's current form or state. Established interactions and relationships are maintained, allowing processing of information and products to be conducted at a much higher and efficient rate. Morphostatic processes intentionally absorb environmental fluctuations through the establishment of the frozen core previously described by Kauffman (1993). The basic premise of morphostasis is echoed by March (1991) who describes this behavior as exploitation and by Schwandt (1997) who refers to the concept as performing. Conversely, morphogenesis promotes destabilization of existing system features so that novel structural and procedural forms may be examined in response to environmental changes. Morphogenetic processes encourage the

utilization of innovative creativity to dramatically transform the overall system. March denotes this behavior as exploration and Schwandt identifies it as learning.

It would initially appear these two types of processes described by Buckley (1998) would be at odds; however, Kauffman (1993) suggests system adaptation is at its greatest when these processes are concurrently employed. Morphostatic processes limit the possible innovations that arise during the system's exploratory activities. It is a type of filter that limits novelty to only those forms that most closely compliment, or align with existing structural features, thereby increasing the probability that the innovations produced during exploration will be beneficial. Additionally, morphogenetic processes require the constant reassessment of exploitive activities to ensure the most efficient structures are installed. It is the combination of these two processes that allows a social system, such as an action team, to remain adaptable amidst a continually shifting environment and reach the highest localized fitness peak (Kauffman, 1995; Holland, 1995). This dynamic balancing act is best portrayed through complexity theory.

Complexity Theory

As described by Carroll and Burton (2000), complexity theory is concerned with the collective properties of systems that emanate from the interactions of their interconnected parts. Complexity theory suggests systems are not reducible to their individual components and are sensitive to initial conditions (Buckley, 1998; Stacey, 1995). Systems' futures are determinant but unpredictable due to innumerable interactions and their unforeseen effect on the totality of the systems through small perturbations (Dooley and Van de Ven, 1999; Lorenz, 1993; Stacey, 1995). Complexity

theory denies linear causality and suggests behavior of systems is emergent, derived from the interactions of heterogeneous agents and the environment (Prigogine 1997).

Uhl-Bien et al. (2007) summarize complexity theory as, "a science of mechanisms and interactions… embedded in context" (p. 304). It is a lens that focuses on the dynamic processes of a system while taking into account historical precedents, existing structure, and the external environment (Stacey, 1995). Buckley (1998) suggests that concurrent consideration of multiple components is required to properly conduct social research. He notes,

> Only the modern systems approach promises to get at the full complexity of the interacting phenomena – to see not only the causes acting on the phenomena under study, the possible consequences of the phenomena, and the possible mutual interactions of some of these factors, but also to see the total emergent processes as a function of possible positive and/or negative feedbacks mediated by the selective decisions or 'choices' of the individuals and groups directly or indirectly involved. No less complex an approach can be expected to get at the complexity of the phenomena studied. (p. 58)

While complexity theory is not a panacea that explains all social phenomena, it is a particularly useful perspective to explore collectives operating in unpredictable and uncertain environments. Collectives, such as action teams, who exist and thrive in such uncertainty may arguably be described as complex adaptive systems (CAS).

CAS are defined as collectives made of interacting, heterogeneous agents that work cooperatively for a common purpose (Uhl-Bien et al., 2007). These systems are more than just the fundamental unit of analysis in complexity theory. CAS provide a framework on which to build a further understanding of the ability of collectives to operate in ever-changing environments.

First and foremost, CAS are complex. They consist of interdependent agents whose interactions are so intricate and varied that the collective behavior of the system

cannot be understood through linear, cause and effect models. "So many variables are at work in the system that its over-all behavior can only be understood as an emergent consequence of the holistic sum of the myriad behaviors embedded within" (Levy, 1992, p. 7). The behavior of the collective will often form predictable patterns, but small changes to the interactions between agents may produce cataclysmic effects for the system as a whole and radically change the behavior of the group or the small changes may not impact the system whatsoever (Anderson, 1999). CAS are fundamentally characterized by this unpredictable emergence (Holland, 1995).

The term "adaptive" in CAS describes a sensitivity to environmental fluctuations and an ability to adjust the system in response to these fluctuations (Lewin, 1999). CAS are open systems, allowing an exchange of energy and information between the system and the environment (Brown & Eisenhardt, 1998). For social CAS, the exchange of information between the system and the environment is far more important than exchange of energy or physical resources in the adaptive process (Boisot & Child, 1999). The constant flow of information between the system and the environment allows the system to detect and assess environmental conditions that may provide beneficial opportunities or potentially damaging results (Katz & Kahn, 1978).

Finally, CAS are systems; they are constructed of components that exist in interdependent relationships (Buckley, 1998). This interdependency is potentially present at multiple levels and varying degrees, accounting for the uniqueness of each system (Parsons, 1951). The interdependency of the system is mediated by the flow of information between components through the use of feedback and feedforward mechanisms (Senge, 1990; Morel & Ramanujam, 1999). It is this transfer of information

that provides CAS with a flexible capacity to shift and adjust according to the requirements posed by the environment.

Dynamic Instability

It should be noted the CAS described henceforth are strictly social CAS, such as action teams. They are purposeful systems whose actors are willful agents that act according to a larger and more complex set of laws than simple, natural systems (Boisot & Child, 1999). These social CAS have an overarching common purpose that provides a framework for cooperative utilization of diverse skills and stores of information (Lansing, 2003). The interacting components allow the system to readily adapt to internal or external fluctuations by increasing the system's resource diversification (Holland, 1995). Ashby's (1958) law of requisite variety maintains that a system's survival is dependent upon its ability to possess a level of dynamic variation that minimally equals the variation existing in the environment. Heightened environmental uncertainty requires CAS to possess particularly flexible capabilities whereby diversified resources are appropriately utilized.

In regards to social collectives, Jackson (1992) notes that collective diversity of perspectives, background, and training increases creative capacity of the system. Using a complexity perspective, it can be seen this creativity is not merely the production of novel forms and ideas, but it is the end product of a recombination of existing elements through the interactions of interdependent agents (Holland, 1995). The creativity produced by diverse interactions is the driving force that generates collective novelty used by the collective to adapt to varying situations (Levi, 2007). They are the unfrozen components of the system (Kauffman, 1993). It is the action team's creative capacity and

its ability to utilize this creativity effectively that enables it to respond appropriately to constant environmental flux. Creativity is the result of a mixture of divergence and convergence between agents in the CAS as they interact within a set boundary of behavioral constraints (Van Gundy, 1987). Complexity theory is particularly useful in exploring the adaptation of action teams due to its strong focus on the convergent (morphostatic) and divergent (morphogenetic) interactions that enable creativity and new forms of order. It is a philosophical move away from a singular concentration on the agents within a team, toward an acknowledgement of the importance of interactions in collective adaptation (Levi, 2007).

Complexity theorists have highlighted the need to incorporate both structure and flexibility if a system is to remain adaptable (Lewin, 1999; Buckley, 1998; Brown & Eisenhardt, 1998). The underlying principle suggests that overly structured systems are too constrained and unable to sufficiently adjust to environmental fluctuations while systems that lack adequate structure are inefficient and may shift chaotically when exposed to perturbations from the environment (Miller, 1990). This basic relationship results in a parabolic function where optimal performance of the system is a combination of both stability-based exploitive behavior and flexibility-based explorative behavior (March, 1991; Stacey, 1995). Qualitative studies by Brown and Eisenhardt (1998) provide comparative data between various organizations in differing environments, strengthening the basic "inverse-U" relationship and the need for social systems to employ stabilizing and flexibility-producing behavior. McKelvey (1999) echoes these findings, confirming that retardation of adaptation and learning occurs within systems that demonstrate excessive complexity. Stabilizing, morphostatic behavior increases a

system's efficiency and produces systems that are tightly coupled. Flexibility-producing, morphogenetic behavior encourages innovation and produces systems that are loosely coupled (Carroll & Burton, 2000). When both morphostatic and morphogenetic behavior is concurrently employed by a system, the system is able to exist in a narrow zone of behavior known as the edge of chaos. When residing in this zone, social systems are able to adapt and successfully surf the waves of environmental pressures.

Norman Packard coined the phrase "edge of chaos" when describing the narrow region of behavior between stagnant rigidity and inefficient chaos (Lewin, 1999). This region is characterized by nonlinearity where small internal or external changes may either be absorbed by the system or magnified into a transformative avalanche (Boal & Schultz, 2007). It is at this tenuous position where information processing is at its peak, resulting in the greatest potential for maximizing both innovative exploration and efficient exploitation (Lewin, 1999).

The dizzying interplay between the two processes at the edge of chaos must be guided by the collection of information. This function of information collection is beyond the cognitive capabilities of any individual (Stacey, 1995). Strategy theorists, such as Mintzberg (1978), argue that strategic or adaptive change is only achieved through the guidance of a leader who mediates between opposing forces. Even some complexity theorists embrace this enabling role of leadership (Uhl-Bien et al., 2007); however, the mere existence of interacting oppositional forces created by agents within a social system produces a self-organizing characteristic that enables an entity to demonstrate exceptional adaptation (Kauffman, 1993). The interacting agents produce a shared "collective mind." The collective mind refers to a process of interrelation between

group members who are able to readily access each other's skills and information repositories (Weick & Roberts, 1993). The collective mind is far more capable of intelligent action than individuals acting alone in the face of environmental uncertainty. Klein (2006) describes the following advantages of a collective mind:

1. They have a wider range of attention, allowing them to monitor more information channels. This provides an enormous advantage in being able to detect early signs of trouble.
2. They can have a much broader range of expertise than individuals, enabling teams to detect more signals and patterns, and appreciate the significance of more types of events.
3. They have built-in variability. Whereas an individual can become fixated on an interpretation of a situation, a team is likely to have members who are not locked into the first interpretation and are able to represent alternative perspectives.
4. They have a greater capability for reorganizing their activities. Thus, during periods of high alert, teams can shift resources to monitoring information channels. During periods of confusion about events, teams can create analysis cells to examine trends. Teams can dedicate individuals to monitoring communication links, free of other workload considerations. Teams can assign a person the job of assembling and maintaining situation awareness.
5. They can work in parallel, so that some members are acting on a current situational interpretation while others are engaging in sensemaking and still others are seeking information. (p. 228-229)

A social system that utilizes such a collective mind must operate within certain parameters to balance at the edge of chaos and adapt appropriately to environmental fluctuations. These parameters provide a boundary within which interactions between agents take place. These boundaries fence in behavior and install restrictions on what type of interactions may take place for the betterment of the entire system (Wilkinson & Young, 2002). Goldstein (2008) refers to these bounds as containers, stating, "Some of the orderliness of what emerges can be traced to the orderliness of the containers in which self-organization takes place" (p. 40). The plethora of available frameworks is significantly narrowed by the overarching direction of the group. Meyer (1982) suggests

reactions to environmental jolts are necessarily shaped and constrained by ideologies and structures. In groups, collective objectives and the means for achieving those objectives act as these shaping and constraining items, whether they are codified or not. These formal or informal "rules" increase the plausibility for appropriate action (Thurow & Mills, 2009). The elegance of a system's self-organized interactions is a product of both the system restraints constructed by simple rules and the emergence generated by the freedom of agent interactions within those restraints.

The combination of interactions and social pressures in the form of rules and values not only aid in creation of the internalized frameworks, but they also continue to guide the further development, refinement, and application of these frameworks in contemporary situations (Taylor & Van Every, 2000; Schwandt, 2005). They form preexisting tools that focus attention and narrow the range of appropriate interpretations in the final component of meaning ascription (Thurow & Mills, 2009). Regardless if the tools exist as formalized rules or social norms within organizational narratives, they form the script that lays out the blueprint for appropriate action.

Historical information possessed by the system or the system's actors becomes the framework on which simple laws are constructed that enables an efficient, well-learned response for future circumstances (Starbuck & Milliken, 1988). Eisenhardt and Sull (2001) suggest there are five types of simple rules that bound and guide the system's action to seize opportunities and avoid risk: how-to-rules, boundary rules, priority rules, timing rules, and exit rules. The following table summarizes Eisenhardt and Sull's simple rules:

Type	Purpose
How-to rules	They spell out key features of how a process is executed – "What makes our process unique?"
Boundary rules	They focus managers on which opportunities can be pursued and which are outside the pale.
Priority rules	They help managers rank the accepted opportunities
Timing rules	They synchronize managers with the pace of emerging opportunities and other parts of the company
Exit rules	They help managers decide when to pull out of yesterday's opportunities

Table 2-1 Simple Rules

These simple rules are not a "step-by-step" recipe, but rather a strategic frame on which systems can base future action in response to environmental stimuli (Eisenhardt & Sull, 2001). These minimal structures clearly define levels of responsibilities, priorities and procedures, but allow for extensive flexibility in agents' actions as long as those actions align with the simple rules (Kamoche & Pina e Cunha, 2001). "These rules… produce ample freedom without limiting the existence of coordination, and they combine strategic intention with managerial foresight: they manage the future by creating an action space that prevents the organization from being trapped by the disorientation caused by purely opportunistic decisions" (Pina e Cunha & Vieira da Cunha, 2006, p. 844).

The simple rules employed by a group in pursuit of improved fitness cannot be understood as a linear framework employed once during an event. Rather, they are heuristics, or "unique rules of thumb that guide organizational processes" (Bingham & Eisenhardt, 2011, p. 1438). The utilization of heuristics is particularly advantageous in

dynamic environments. When environmental cues are fleeting and complex, heuristics allow agents to rely upon a simplified cognitive decision-making process that is simple, fast, and often highly accurate because local information is utilized by local agents to address a local problem (Bingham & Eisenhardt, 2011).

To examine the use of heuristics in fledgling organizations, Bingham and Eisenhardt (2011) conducted a multiple-case study of entrepreneurial firms from the information technology industry. Results of the case study confirmed the presence of four types of simple rules proposed by Eisenhardt and Sull (2001):

1. *Selection heuristics* (corresponding to *boundary rules*) - "Rules of thumb for guiding which sets of product or market opportunities to pursue (and which to ignore)" (p. 1448).
2. *Procedural heuristics* (corresponding to *how-to-rules*) - "Rules of thumb for guiding the execution of a selected opportunity" (p. 1448).
3. *Temporal heuristics* (corresponding to *timing rules*) - "Rules of thumb for opportunity capture that relate to time" (p. 1450).
4. *Priority heuristics* (corresponding to *priority rules*) - "Rules of thumb that rank opportunities" (p. 1450).

Selection and procedural heuristics were initially used by the firms as they entered the market with temporal and priority heuristics playing a role later in the evolution of the entrepreneurial firms (p. 1450). Only "exit rules" did not find a corresponding match amongst the observed heuristics; however, this lack of correspondence may have been an artifact of the young age of the organizations and not clear evidence against the inclusion of this type of simple rule. Based on this proposition, "exit rules" is still considered to be a valid type of simple rule and heuristic used by collectives.

As the firms continued to evolve and develop, they engaged in "simplification cycling" where outdated heuristics were refined or replaced by more strategic, abstract, and precise heuristics (Bingham & Eisenhardt, 2011). This perpetual evolution did not

eliminate the initial type of heuristics, but rather refined them such that all four heuristics were actively employed by the organization to guide strategic action. It is expected that mature and successful organizations would continue to utilize all the categories of heuristics, but with greater effectiveness. Bingham and Eisenhardt (2011) suggest this simplification cycling produces a small, but high-quality set of heuristics that allows systems to capture opportunities, avoid catastrophic calamities, and maintain their tenuous position at the edge of chaos.

It is important to note that these heuristics are distinct from routines that provide a semi-automatic response to specifically anticipated issues expected to occur (Bingham & Eisenhardt, 2011). Heuristics provide a common structure on which the collective can base action, but provide few details, thereby allowing and encouraging unique solutions from local actors who are intimately aware of local environmental factors that may impact success.

Improvisation

Dynamic instability is the product of formal stabilizing forces and informal destabilizing forces. The formal stabilizing forces come in the form of organizational rules and structured relationships between agents. The informal destabilizing forces come in the form of individualized actions by agents and the interactions between agents (Stacey, 1995). This paradoxical behavior of a system perpetuates nonlinear positive or negative feedback loops through the establishment of simple laws that bound agent's activity, but are not so restrictive as to eliminate freedom of choice by individual agents. These opposing, but concurrent forces form the framework which guides agents' interactions with the environment and with each other. It is the structure agents utilize

when choosing appropriate adaptive actions to seize opportunities and mitigate risk, thereby increasing the fitness of the collective. This complex behavior in which simple structure, in combination with interactive agents, produces great variety and responsive adaptation is described as "improvisation" when it exists within social systems.

Collective improvisation is a creative, social act dependent upon the nonlinear interactions of the entire system (McDaniel, 2007). It is the paradoxical nature of the interactions themselves that allow for the creative process to arise and produce appropriate results that align with environmental process. Interactions are highly contingent upon dynamic relationships within the system and contextual factors that emit high variability. However, these flexible and dynamic interactions are guided and constricted by a defined structure made of formalized social rules, informal mores and norms, and communication pathways.

Kamoche, Pina e Cunha & Vieira da Cunha (2003) broadly define improvisation as, "the conception of action as it unfolds, drawing on available cognitive, affective, social, and material resources" (p. 2024). The frequently used example of a jazz band (Berliner, 1994) exhibits an idealized form of improvisation. Well-rehearsed musicians use established melodies and note patterns in conjunction with recognized communication patterns to engage in real-time composure of uniquely distinct songs. The song produced by the jazz band is spontaneous, but the preparation required to produce such a song is not. Vera and Crossan (2005) note that human infrastructure in the form of rehearsed performance, acquired expertise and specialized skill, and knowledge of collaborative rules impact the quality of improvisation. The agents of the system, or musicians in a jazz band, cooperatively establish a collective mind where

information necessary to perform a task is shared across a network, but accessible through established conduits (Weick & Roberts, 1993). Citing Mangham and Pye (1991), Weick (1998) clarifies the components required for successful jazz improvisation are shared by other organizational groups such as medical teams, sports teams, and military units. These components include "simultaneous reflection and action, simultaneous rule creation and rule following, patterns of mutually expected responses akin to musicians moving through a melody together, action informed by melodies in the form of codes, continuous mixing of the expected with the novel, and the feature of a heavy reliance on intuitive grasp and imagination" (p. 549). Despite the potential benefits of improvisation, it is not an appropriate process in many environments. Deliberate improvisation requires extensive preparatory time and resources. It also becomes significantly more challenging as the group gets larger, the context becomes more complex, and efficiency is of paramount importance (Weick, 1998). However, despite its limitations, when employed in the appropriate context, it is a highly adaptive and valuable function.

Improvisation is most effective when utilized by smaller groups engaged in a dynamic environment that encourages creative and spontaneous behavior to achieve clear-cut goals (Vera & Crossan, 2005). It is the recommended choice when engaging an environment characterized by urgency, ambiguity, and uncertainty (Crossan, Pina e Cunha, Vera, & Vieira da Cunha, 2005). Achievement of goals in this type of environment is not a result of detailed, declarative methods, but rather, a result of the aforementioned simple and non-prescriptive rules of action and heuristics. Action teams capable of operating in this fashion have distinct characteristics and features. Weick

(1998) provides a list of such traits that describe a team capable of successful improvisation:

1. Willingness to forego planning and rehearsing in favor of acting in real time;
2. Well-developed understanding of internal resources and the materials that are at hand;
3. Proficient without blueprints and diagnosis;
4. Able to identify or agree on minimal structures for embellishing;
5. Open to reassembly of and departures from routines;
6. Rich and meaningful set of themes, fragments, or phrases on which to draw for ongoing lines of action;
7. Predisposed to recognize partial relevance of previous experience to present novelty;
8. High confidence in skill to deal with nonroutine events;
9. Presence of associates similarly committed to and competent at impromptu making to;
10. Skillful at paying attention to performance of others and building on it in order to keep the interaction going and to set up interesting possibilities for one another;
11. Able to maintain the pace and tempo at which others are extemporizing;
12. Focused on coordination here and now and not distracted by memories or anticipation;
13. Preference for and comfort with process rather than structure, which makes it easier to work with ongoing development, restructuring, and realization of outcomes, and easier to postpone the question, *what will it have amounted to?* (p. 552)

Collectives that exhibit these traits are able to utilize minimal structures composed of simple rules (heuristics) that allow for significant freedom by individual actors to produce a highly adaptive, yet effective social system capable of seizing opportunities and avoiding risk despite operating in the most challenging environments.

Section 2 – Teams and Environmental Uncertainty

Teams

According to Parsons (1951), the world is incredibly complex, unique, and in a constant state of change. Social systems existing in such a world are human creations that enable individuals and collectives to reach situation-specific goals in light of

environmental pressures. Teams are a specific type of structured group that seek to accomplish defined, common goals through the coordinated interactions of its members. These social systems are typically composed of four to twenty people who have direct interactions with each other (Levi, 2007). Teams are characterized by a degree of autonomy and collective responsibility for meeting task demands without the need for external control (de Leede et al., 1999). The team structure is uniquely configured to operate effectively in today's fast-moving and complex society.

The increased speed and complexity of society requires distribution of tasks to relatively autonomous units of individuals working interdependently. The study of teams is becoming increasingly important to understand the nature and function of these social systems that are playing an increasingly essential part in most organizations (Cannon-Bowers & Salas, 1998). They have become the social laboratories where creative collaboration and group problem solving proliferate (Paulus, 2000). They provide the all-important link between the individual and the larger organization, affording individuals with the opportunity to collectively pool knowledge and resources to affect change (Levi, 2007). Teams have emerged as a fundamental social system meeting the needs of those who are part of such a group, as well as serving unique and vital functions in the larger society.

Sundstom (1999) categorizes teams into six groups based on their functions. This study focused on action or performing teams, which include sports teams, entertainment groups, surgery teams, and military units, amongst others. These types of teams repeatedly perform their operations in unique environments, relying on interdependencies between team members to achieve goals of the collective. The interdependency may be

based on pre-determined structure and relationships between actors, but the dynamism intrinsic to the environments in which they operate requires the actors to interact with a degree of collective improvisation (Brown & Eisenhardt, 1998). To reach such a level of coordinated flexibility, specialized training and skill are required that enhance individual capabilities, communication, and group harmonization. The stringent requirements necessary to achieve sustainable success in such dynamic environments necessarily results in the exclusive nature of action teams (Levi, 2007). They are inimitable collectives that engage in three distinct phases of operation that require varied information collection.

The planning or preparedness stage refers to the initial phase of preparation where an action team develops its collective skill set through practical implementation of those skills in simulated scenarios (Petak, 1985). This stage is non time-critical and the collective is able to unhurriedly develop a routine response to anticipated future scenarios. However, these scripted responses are not solely sufficient as all situations are unique and emergent, producing circumstance that never fully align with practiced simulations (Simpson & Hancock, 2009). To supplement the routine, an action team also uses this phase to construct communication linkages and establish relational roles that aid in accomplishing specific tasks when the action team is called to action.

When the action team is engaged in a situation where their specific skill set is required to accomplish specific goals, they have now entered the response phase. This phase takes place in a uniquely dynamic circumstance where environmental uncertainty is the norm rather than the exception (Petak, 1985). Rapid action by the action team based on limited knowledge is required in order to react in a timely manner (Tierney,

1985). To compensate for these challenges, various protocols or systems are implemented. These systems provide a loose structure to guide action teams toward a beneficial end. Apt improvisation is the key to action team success in this stage.

The final stage for action teams is that of recovery where the collective transitions from the chaotic response to a stage similar to the planning stage, but with the added benefit of new information obtained during the previous action. It is a time of collective development that can only be achieved during a period of relative, un-heightened normalcy (Petak, 2005). Reflection on the action that has just taken place is a key component to action team development (Schon, 1983).

The measure of success for an action team varies with each stage as requirements are shifted. Action or performing teams exist for a prescribed purpose and are therefore required to achieve sustainable success in each stage. In the literature on teams this sustainable success is referred to as team effectiveness. The effectiveness of an action team can be assessed using three criteria: collective task completion in accordance with predetermined goals, increased group capabilities to meet future requirements placed on the collective, and individual fulfillment through increased development of skills and meaningful accomplishment (Hackman, 2002). Levi (2007) suggests the proper way to measure such team effectiveness, or success, is to determine if the output of the team is acceptable to the customer (tasks were accomplished), owner (team has increased capabilities), and team members (individuals have increased personal and professional development).

The environment in which an action team operates has a dramatic impact on their performance. Uncertain environments pose particular challenges in regard to identifying

useful patterns to guide collective action. These environments often seem "senseless" because actors are unable to adjust their behavior in a meaningful way to avoid risks and capitalize on opportunities. Weick (1993) suggests this uncertainty leads to higher individual and collective stress as the actors seek to make sense of the situation. This uncertainty requires action teams operating in this atmosphere to endure a high degree of stress (Serfaty, Entin, & Johnston, 1998). The external environmental stress, and subsequent internal stress, influences both team output and interpersonal relationships within the action team itself. Research on teams often examines the external environment independently from the internal status of the team, including team dynamics. Action teams are open systems, and as such, their internal state cannot be separated from external situations (Parsons, 1951; Parks & Sanna, 1999).

Collective success is dependent upon adaptation of the action team, and the dynamic interactions between action team members play a critical role in that adaptation. Dynamic interactions guide and enable assessment of internal and external environmental conditions, as well as collective structuring in response to those conditions (McIntyre & Salas, 1995). This adaptation becomes all the more critical in uncertain environments where action team successes or failures are magnified. There is far more riding on the task accomplishment of action teams operating in such environments, and so, a greater understanding of the underlying, foundational interactions within a structured framework is needed to increase the probability of collective success (Weick, 1993).

Uncertain Environments

Fluctuation is an inherent characteristic of all environments (Bigley & Roberts, 2001; Sornette, 2002). The magnitude of flux may vary between minor perturbations to

fundamental transformation, but the shifting nature of environments is a given (Weick & Quinn, 1999). Some environments are uniquely dynamic and do not tend toward a new equilibrium and may display characteristics that are inherently volatile (Eisenhardt & Tabrizi, 1995; Lengnick-Hall & Beck, 2005). Taber et al. (2008) describe these environments as producing multiple artifacts vying for the attention of the collective while being "physically dangerous, emotionally tumultuous, and highly unpredictable" (p. 273). To accurately classify this type of an environment and examine its effect on organizational performance Davis et al. (2009) utilized a multi-dimensional construct, including dimensions such as velocity, complexity, ambiguity, and unpredictability.

As part of their research, Davis et al. (2009) conducted simulations on different levels of organizational structure across the four varying dimensions of environments. Velocity describes the rate of environmental fluctuation in regards to demand, competition, technology, and regulation (Eisenhardt & Bourgeois III, 1988). It is the speed, or rate of change. Riolli-Saltzman and Luthans (2001) suggest quick environmental shifts may likely be accompanied by instability and high risk. The complexity of an environment can be understood as the number of elements that must be considered concurrently by the organization (Anderson, 1999). These elements may be distinctly separate or interrelated, but they all must be taken into account because they will all impact the eventual outcome whether in the short term or long term. Ambiguity or lack of situational clarity and definition is a measure of opaqueness. Opportunities and risks are obscured as the system is clouded by excessive factors, vague conditions, and uncertain causalities (March & Olsen, 1976). Unpredictability is often described with complexity-based overtones (Pulakos, Arad, Donovan & Plamondon, 2000), but the key

difference is that unpredictability implies a lack of discernible pattern. This lack of pattern creates an overarching disorder where events and their subsequent repercussions cannot be deduced, hindering actions in the present. It is a future-oriented dimension that has an impact in the present (Davis et al., 2009)

The research findings of Davis et al. (2009) confirmed organizational structure did impact organizational performance depending on environmental factors. This conclusion was not novel; previous research indicated that performance gradually declines with excessive structure, but dramatically decreases with too little structure. Their contribution was centered on the conclusion that minimum structure in the form of simple rules was robust and useful across a diverse range of environments and allowed the organization to maintain a position at the edge of chaos, but they were absolutely essential in environments displaying high levels of unpredictability. Based on these findings, the unpredictability of an environment is the critical dimension addressed by the utilization of simple rules by action teams.

A number of studies use the term "uncertainty" to describe this environmental characteristic (Daft et al., 1988; Ebrahimi, 2000; Stewart et al., 2008), or they include the degree of unpredictability as a component of uncertainty (Boynton et al., 1994; Boyd & Fulk, 1996). The impact of uncertainty, the inability to predict future outcomes, has been acknowledged for the better part of a century. Barnard attempted to develop a conceptualization of uncertainty as early as 1938 and examined how environmental uncertainty affected organizational strategies. Despite early explorations into environmental uncertainty, substantial disagreements over the very concept remained for decades. Milliken (1987) suggests the confusion is due to the term being used to both

describe the state of an organizational environment and the state of an individual who perceives they possess an inadequate degree of information concerning the environment. Although attempts were made to measure this environmental uncertainty objectively and apart from the organizational members, the socially constructed concept of environmental uncertainty necessitates an inclusion of subjective interpretation by those individuals and groups operating in the environment (Zhang, Majid, & Foo, 2011). With this limitation in mind, Milliken defined environmental uncertainty as an individual's perceived inability to predict something accurately because he/she is unable to discriminate between relevant data and irrelevant data emanating from the environment external to the organization.

Milliken's (1987) definition is based on Duncan's (1972) earlier work in which he advocates for the characterization of environmental uncertainty in terms of the perceptions of organizational members. Through qualitative interviews, Duncan identifies three core components of environmental uncertainty:

> (1) the lack of information regarding the environmental factors associated with a given decision making situation, (2) not knowing the outcomes of a specific decision in terms of how much the organization would lose if the decision were incorrect, and (3) inability to assign probabilities with any degree of confidence with regard to how environmental factors are going to affect the success or failure of the decision unit in performing its function. (p. 318)

Armed with this definition, Duncan suggests two dimensions of environmental uncertainty could be inferred: a simple-complex dimension (degree of complexity) and a static-dynamic dimension (frequency of change).

Levi (2007) states, "Many modern environments (e.g., political, business, technological) have substantial levels of change and uncertainty. The rapidity of change

creates a need to stay alert and prepare for future problems, while the level of uncertainty makes this more difficult to do" (p. 189). Uncertainty is becoming increasingly prevalent in modern organizational environments, such as the battlefield, where dynamically changing conditions alter situational patterns and obscure future implications (Hitt, 1998). Despite the increasing frequency of environments marked by uncertainty, researchers and theorists alike have had limited success in the exploration of this phenomena when it comes to action teams.

One qualitative study conducted by Tu et al. (2009) did successfully take the complex variables of team interactions and environmental uncertainty into account. The study examined a navigation team and the self-organization characteristics of the dynamic adaptation process as the team innovated and changed spontaneously to successfully navigate a vessel into port when all electrical (and therefore, positional instrumentation) systems failed. Dissipative structure theory (Prigogine & Stengers, 1984) was used as a foundation for the study. A qualitative system dynamics model was created based on the case study to explain the distributed cognition properties and mechanisms necessary for the sustainability of a social system. The model depicted the construction of a shared (cognitive) structure emerging from continuous interaction and socialization amongst members of the navigation team. This model was characterized by multiple feedback and feedforward mechanisms operating simultaneously within and between individual actors. Local innovations were initially disruptive to the functioning of the group until the remaining actors could adequately adopt and utilize a shared structure (mental map) that made sense of the newly devised local innovation. Once this

shared structure was instilled, self-referencing loops were employed to check behavior and external conditions.

The article authored by Tu et al. (2009) has many striking similarities to the dissertation study proposed herein: the authors used a combination of existing theory and research findings to successfully develop and model the variety of feedback structures and variables that play fundamental roles in the process of adaptation; the researchers embraced a lens of complexity through which to examine the phenomenon; a systems-based conceptual framework was employed; and the researchers examined a small team operating in an uncertain environment that required adaptive techniques not typically utilized during training. The study by Tu et al. primarily focuses on the self-referential, self-organizing processes involved in adaptation, but suggests such an exploration of the underlying rules that allow for team transformation in uncertain environments is critical in developing a greater understanding of the adaptive process. This study performed such an exploration, examining the factors (including simple rules) that contributed to an action team's dynamic instability, allowing an adaptive response in an uncertain environment.

Chapter 3:

METHODS

Introduction and Overview

This chapter presents the research methodology and design utilized for this descriptive case study. The methodology and design were selected to provide insight into the overarching research question: *what is the nature of the types of simple rules (heuristics) used by a Navy SEAL unit in response to an unexpected critical incident characterized by environmental uncertainty?* Examination of an action team's dynamic instability using qualitative case study was a novel strategy that demonstrated complexity theory's utility in the real world while also informing action team functioning in dynamic environments that are becoming far more frequent in the contemporary climate.

The dynamism associated with SEAL unit adaptation in uncertain environments required research methods that were uniquely capable of capturing relevant data to inform the research. A qualitative approach was applied due to the inherent complexity of the process and the need to explore this complexity at a deeper level that provides thicker descriptions than surficial data (Lichtman, 2010). Simple comparative or statistical data associated with quantitative approaches could not have satisfactorily addressed the plethora of interdependent variables (Merriam, 2009). An epistemological perspective of social constructivism was applied to inform the overarching research question. The fundamental tenet of social constructivism is that humans create meaning as they interact with reality. It acknowledges the existence of a material world apart from humans, but claims that world has no inherent meaning apart from what humans have given it (Crotty, 1998). The constructivist worldview is concerned with exploring the process whereby humans construct meaning and take action based on that meaning. This exploration was particularly appropriate for this study as the use of simple rules to guide

adaptation is a social process where individuals and the collective concurrently determine appropriate actions based on the application of those rules. In line with a constructivist view, the phenomena was explored through the eyes of the participants by presenting them with broad questions that were malleable in the hands of the research subjects (Cresswell, 2007). The study used the individual-level perspective of the participants to explore the collective-level phenomena of team adaptation. There was no attempt to discover an objective truth apart from human participants. Instead, the study provided a deeper understanding of the participants' experience of reality as they interacted with others and the environment (Crotty, 1998).

A case study methodology was utilized, which aligns with a qualitative methods approach and a social constructivism perspective. Case studies are extremely flexible, and used by a plethora of disciplines in a multitude of settings. Any number of data collection methods, including document reviews and semi-structured interviews, may be employed within the case study methodology (Merriam, 1998). However, the one defining feature of this methodology is its bounded nature (Merriam, 1998; Lichtman, 2010). It examines a specific group or phenomenon that exists in a particular context. Multiple cases may be examined in one research study, but each case will similarly be bounded in a related context. Yin (2009) states, "A case study is an empirical inquiry that (1) investigates a contemporary phenomenon in depth and within its real-life context, especially when (2) the boundaries between phenomenon and context are not clearly evident" (p. 18). Based on Yin's definition, it is clear that a case study was the optimal choice for examining SEAL units operating in uncertain environments.

Following Bloomberg and Volpe's (2008) roadmap, this chapter (a) provides a detailed description of participant qualifications and research context delineating the research sample, (b) presents an overarching summary of the type of information required to satisfactorily answer the research question, (c) conveys an overview of the research design, (d) describes specific data collection and data analysis methods utilized during the study, (d) addresses issues of research trustworthiness, and (e) discusses ethical ramifications of the study.

Research Sample

Participants selected for this research study had formerly served on a SEAL unit, which meets the requirements of an action or performing team (Sundstrom, 1999). The SEAL units were characterized by multiple interdependencies between members who relied on each other's performance for accomplishment of the overarching collective goals. Due to this interdependence, the units had relatively stable membership who regularly trained together to enhance communication and perform effectively in a variety of dynamic environments. The safety and survival of the men who were part of these units depended on the team's collective ability to adapt (Tierney, 1985).

As Lichtman (2010) suggests, a case may be selected due to its commonly held and representative characteristics, its exemplary characteristics such that it acts as an exemplar of ideals, or its unique characteristics that separate it from mundane groups or phenomena. In this study, it was the exemplary case that was chosen to explore the collective adaptation of an action team. SEAL units were specifically targeted because they met Hackman's (2002) criteria for an effective team, perform at a high level of autonomy (Simmons, 1998), and maintain an extraordinary adaptive capacity

(Dougherty, 2001). It should be noted that using an exclusive population introduced a significant selection bias to the study. Participants' operational roles and combat experience varied considerably, but they did share a number of basic experiential and demographic similarities. They were all American males who were between the ages of 25 and 50. Furthermore, they had all undergone significant cultural indoctrination through the United States Navy and the Navy SEAL community.

The selection of particular retired Navy SEALs was dependent upon practical research demands, such as willingness, availability, and accessibility. Additionally, participation was restricted to those Navy SEALs who had recently retired (between 2007 and 2014). This restriction provided multiple benefits. First, it ensured all participants were exposed to similar operations and utilized similar adaptive techniques. Second, it increased the likelihood of accurate recollection by the participants. The accounts of participants are often distorted over time due to imperfect recollection. By examining only recent retirees, the researcher reduced the likelihood of significant distortion.

To provide the most advantageous opportunity for data collection and ensure the highest degree of protectiveness for both participant and researcher, retired Navy SEALs retrospectively described a previous critical incident that occurred during training or an actual military operation. The latitude for participants to describe either a training operation or a real-world operation was granted to encourage participants to openly discuss a critical incident with less concern that classified information may be inadvertently shared. Much of Navy SEAL training has the inherent potential for bodily harm or death. This real potential would suggest that training and real-world operations would elicit qualitatively-similar responses by action teams. To further guarantee the

data from the varying cases were analogous, the researcher specifically requested the participants only describe accounts of training exercises that simulated real-world operations.

Ultimately, all of the critical incidents discussed during individual interviews could be classified as displaying heightened levels of environmental uncertainty, whether they were actual military operations or training exercises (Milliken, 1987). The researcher could therefore conclude that the data produced from all the interviews provided unique, but comparable first-hand perspectives on the dynamic instability of high-functioning action teams.

Overview of Information Needed

The overarching research question guiding this research study was as follows: *what is the nature of the types of simple rules (heuristics) used by a Navy SEAL unit in response to an unexpected critical incident characterized by environmental uncertainty?* Contextual, demographic, perceptual, and theoretical data were obtained to satisfactorily answer the research question (Bloomberg & Volpe, 2008).

Contextual information refers to those pieces of data that describe the culture and setting in which the participants operate. As described by Bloomberg and Volpe (2008), Lewin's (1935) fundamental proposition is that human behavior is a function of interaction with the environment. As such, a greater understanding of behavior requires a greater understanding of the environment and those cultural mechanisms that guide a person's interactions with that environment. Data pertaining to the Navy SEAL's utilization of simple rules fell within the category of contextual information. This information provided critical insight into how simple rules served as behavioral

boundaries and guidelines that directed the SEAL units as they interacted with their environment (Stacey, 1995).

Demographic information was highly restricted. Navy SEALs operate covertly and the disclosure of potentially identifying personal information could prove harmful. Although this information may have further illuminated some of the research findings, it was not crucial in this particular study. Information was restricted to size of action teams, general organizational structure, and basic core functions of the SEAL unit and its members. Despite the lack of specific demographic data, the general data still provided important information, clarifying the overarching goals of the action teams' adaptive responses and informing the nature of social interactions during training exercises and missions.

Bloomberg and Volpe (2008) suggest perceptual information may be the most critical kind of data in qualitative research and define it as a "participant's perceptions related to the particular subject… of inquiry" (p. 70). It is the information garnered from participants themselves as they understand the environment and their own actions. Perceptual information was vitally important to this study due to the social constructivist nature of collective adaptation. This information could not be obtained through formal accounts, but only harvested through the subjective viewpoint of the participants.

Finally, theoretical information is critical to guiding the collection and interpretation of the contextual, demographic, and perceptual data. To answer the research question, the researcher weaved together existing literature on dynamic instability, collective adaptation, action teams, and dynamic environments characterized by uncertainty. Specifically, this data narrowed document reviews and focused interview

questions on those pieces of data critical to the study. The researcher also used this information to develop codes and identify emergent themes during data analysis.

Research Design Overview

The types of information described in the preceding section were most accessible and appropriately explored using a case study methodology. Cresswell (2007) describes case study as a qualitative approach in which an investigator examines a bounded system in a particular context through in-depth data collection by utilizing multiple exploratory methods. Yin (2009) provides a particularly illuminating definition of case study. His description of the chosen methodology is as follows:

> A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident… The case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as a result benefits from the prior development of theoretical propositions to guide data collection and analysis. (p. 18)

This case study cultivated an extensive understanding of a particular phenomenon (collective adaptation) within a particular context (action team operating in an uncertain environment). This understanding was then extrapolated to develop generalized principles that further informed complexity theory and team functioning (Merriam, 1998; Woodside & Wilson, 2003).

Utilization of this methodology was particularly important because of the complex nature of the phenomena and context. Human systems are necessarily complex, incorporating countless variables and factors interacting to produce both individual and collective results. A statistical quantification could not have possibly captured the complex reality; however, a qualitative case study readily accepts the omnipresence of

multiple, interdependent variables in social phenomena. It does not attempt to inappropriately simplify social systems through the blatant disregard of variables or the establishment of controlled conditions (Yin, 2009). It accepts a "broad view of causation that permits getting at the many forces in the world and human minds that together influence behavior in much more complex ways than any experiment will uncover" (Shadish, Cook, & Campbell, 2002, p. 500). Although direct causation could not be obtained due to the presence of innumerable factors, the concreteness of case study provided a much richer depiction of system functioning in the real world.

The bounded nature of the study also allowed the research to remain focused despite a large number of variables. The conclusions reached during the study were rooted firmly in a particular context. Rather than inhibiting generalized conclusions, the contextual nature of the case study actually supported the development of general conclusions that could be transferred more appropriately to other, similar contexts. According to Erickson (1986), general abstractions can only be found through an examination of context-specific details. Admittedly, the generalization provided by a case study is limited in scope but the study still produced meaningful conclusions that could contribute to theory, research, and practice.

Specifically, a descriptive case study design was used for this study (Merriam, 1998). Data collected from document reviews and interviews were applied to further theory development. Woodside and Wilson (2003) agree with this utilization, indicating case study research is appropriate for theory testing. This study explored dynamic instability, a fundamental aspect of complexity theory (Stacey, 1995) that provided the framework through which to examine the adaptation of the action team, in accordance

with Yin's (2009) embedded design framework. The combination of document reviews and individual interviews was utilized to assist in triangulation (Woodside & Wilson, 2003; Lichtman, 2010) and develop a more comprehensive understanding of the complex phenomenon. An overview of the methods can be found in **Appendix A**.

Data Collection and Analysis

Case studies are extremely flexible methodologies, potentially incorporating a number of different qualitative methods. Conclusions reached by the subjective researcher are strengthened when data from multiple methods convergence (Yin, 2009). **Table 3-1** provides a summary of the data collection process. Methods are discussed in sequential order of usage during the study.

Phase	Data Collection Method	Purpose	Outcome
Phase I – Ground the Research	Document Review	Establish preliminary set of codes and familiarize the researcher with language used by Navy SEALs	Codes associated with collective adaptation identified within written documents were used in creation of the coding sheet and thematic development
Phase II – Refine the Research Techniques	Semi-structured Individual Interview Beta Test – Retired Navy SEALs	Pilot individual interview protocol to ensure appropriate language usage and examine the type of responses elicited by interview questions	Individual interview protocol elicited applicable research data and no revisions to the protocol were needed
Phase III – Inform the Research	Semi-structured Individual Interview – Retired Navy SEALs	Explore the collective adaptation of SEAL units in response to an unexpected critical incident during training or a mission	Codes associated with collective adaptation were identified and described through the retrospective accounts of retired Navy SEALs and used to identify emergent themes leading to research conclusions

Table 3-1 Data Collection Methods

Phase I – Ground the Research

A document review initially grounded the study, providing static sources to identify relevant codes and increase the researcher's familiarity with the language of

Navy SEALs. The researcher only utilized documents that were officially sanctioned by the Navy SEALs or documents that had been authored/co-authored by a retired Navy SEAL. The researcher contacted Navy SEALs and contacts within the SOF community to obtain resources. The researcher also conducted online and library searches in which websites, mission/vision statements, and historical reports were examined. A number of books authored/co-authored by retired Navy SEALs were available, but few officially-sanctioned documents were accessible due to the sensitive nature of Navy SEAL training and operations. The researcher evaluated the authenticity of all documents using Guba and Lincoln's (1981) list of inquiries based on Clark's (1967) considerations for document authenticity:

- What is the history of the document?
- How did it come into my hands?
- What guarantee is there that it is what it pretends to be?
- Is the document complete, as originally constructed?
- Has it been tampered with or edited?
- If the document is genuine, under what circumstances and for what purposes was it produced?
- Who was/is the author?
- What was he trying to accomplish? For whom was the document intended?
- What were the maker's sources of information? Does the document represent an eyewitness account, a secondhand account, a reconstruction of an event long prior to the writing, an interpretation?
- What was or is the maker's bias?
- To what extent was the writer likely to want to tell the truth?
- Do other documents exist that might shed additional light on the same story, event, project, program, context? If so, are they available, accessible?

Based on these considerations, the researcher decided to utilize only officially-sanctioned documents to develop codes. The researcher only used books authored or co-authored by retired Navy SEALs to become familiar with the language used by the participants. Without a clear knowledge of what specific content was created by a Navy SEAL (as

opposed to a co-author or editor), the researcher deemed these books as unusable data sources. References to the officially-sanctioned documents used to produce codes and identify themes during data analysis are provided in **Appendix F**.

Phase II – Refine the Research Techniques

The researcher identified potential participants for the interview portion of data collection through personal acquaintances and social media (LinkedIn). Per Navy regulations, all participants were male and American citizens. Only individuals who publically acknowledged they were Navy SEALs and who had retired in the last seven years were contacted. These potential participants were provided with the informed consent and informational email presented in **Appendix C** and **Appendix D**, respectively. Through electronic correspondence (email), the researcher clarified the purpose of the study and confirmed that the participant had indeed served as an active-duty operator with real world experience. Through this correspondence, seven participants agreed to be interviewed by the researcher. The first two individual interviews conducted by the researcher were designated as beta tests.

Beta tests were used to provide the researcher with an opportunity to test and revise the semi-structured interview protocol and refine data collection techniques (Merriam, 2009). These small-scale practice sessions were also valuable for preparing the researcher to correctly use the exclusive vernacular of the Navy SEAL community during individual interviews (Levi, 2007). The beta test interviews were conducted over the phone with retired Navy SEALs who met the previously-established criteria. Recordings of the interviews were transcribed and provided to the research committee members for review.

The beta test results were examined to determine if the researcher's techniques and interview protocol were producing satisfactory data. Based on results from the beta tests, the researcher and committee agreed that no additional revisions were needed to the interview technique or protocol. It was decided that since the same technique and protocol were used in the following phase, the data collected during the beta test interviews could be used in the cumulative data set with which the researcher developed codes and identified emergent themes.

Phase III – Inform the Research

The semi-structured interview format and process used during the beta tests was also employed for subsequent individual interviews. The researcher used a line of questioning that promoted a free-flowing dialogue while still addressing the research question (Yin, 2009). This method encouraged participants to express their personal interpretations of the phenomenon, but still guided the conversation in a satisfactory direction (Rubin & Rubin, 1995). Interview questions primarily focused on the individual's perceptions of adaptation by the Navy SEALs in general and the individual's specific account of a critical incident and the subsequent adaptive actions taken by his SEAL unit. Due to the inherent secrecy of the participants' work, rapport-building questions were kept to a minimum and only basic demographic data were collected. The interview protocol by the researcher is provided in **Appendix B**.

Each participant was only interviewed once and the researcher used an audio recorder during the phone interviews to accurately capture the data provided by the participants. The researcher transcribed each interview himself using a verbatim transcription method to increase familiarity with the data set. All audio recordings were

erased after interview transcription was completed to ensure the anonymity of the participants. Finally, each participant was provided with the transcript and asked to review the document, thereby ensuring data had been accurately captured by the researcher and no sensitive information would inadvertently be released to the public.

Data Analysis

The researcher followed a deductive analysis design, employing the 3-stage process recommended by Miles et al. (2014). In the first stage, "pre-specified codes" were developed based on the research question, sampling plan, and existing theory (Merriam, 2009). These broad categories were then used as a starting point to conduct the first round of coding for the document review. ATLAS ti software was utilized to extract phrases that related to or informed the pre-specified codes. Data mined during this initial round refined the categories of codes, producing a more evolved coding scheme (Miles & Huberman, 1994).

Armed with the coding scheme, the research reviewed each transcript, identifying and developing additional codes in a process similar to the document review. The researcher performed a within-case analysis during the first round of coding, examining each transcript as a separate case study. The first round produced a total of 276 coded phrases grouped into 39 different codes. The researcher then produced a vignette for each interview, concisely summarizing the most critical themes from each transcript. These vignettes are available in **Appendix G**.

In the second stage, the researcher reread and recoded the officially-sanctioned documents and the individual interviews. The researcher identified a total of 436 coded phrases organized into 49 different codes using a cross-case analysis (Miles et al., 2014).

These codes were then clustered and collapsed into 16 topical areas using a pattern-coding method assisted by Microsoft Excel software (Miles & Huberman, 1994). The topical areas were based on the frequency of codes between cases and the importance ascribed to a code by a participant. This analytic method allowed the researcher to clearly determine when data saturation had been achieved.

In the final stage, the researcher examined the initial findings identified in Stage 2 for patterns and compared them against existing research to corroborate findings and potentially inform gaps in the literature. The researcher's movement toward a higher level of abstraction during this stage resulted in the identification of four fundamental themes leading to five significant conclusions. The researcher also identified eleven sub-conclusions for greater elaboration.

Issues of Trustworthiness

The researcher utilized Lincoln and Guba's (1985) criteria for trustworthiness in a qualitative study to ensure the highest degree of research integrity. These criteria were derived from objective standards of rigor traditionally used to evaluate quantitative studies. Lincoln and Guba replaced the criteria of internal validity, external validity, reliability, and objectivity with credibility, transferability, dependability, and confirmability. Taking measures to assure these four criteria were met guaranteed the qualitative conclusions drawn from the data were reasonable and sound.

Credibility

Credibility refers to the appropriateness of data collected and conclusions drawn from multiple lines of evidence. Credibility requires that data originating with different streams of data are supplemental and corroborative (Merriam, 2009). Furthermore, the

novel interpretations and conclusions based on this data should align with the participants' basic understandings of reality.

This study employed triangulation and member checks to attain a high level of credibility (Lincoln & Guba, 1985; Merriam, 2009). Triangulation involves cross-checking data between different data sources. During the development of codes, the researcher compared findings from each individual interview against the results from the document reviews and the other interviews to identify supporting and conflicting codes. When a potential contradiction was identified, the researcher re-read the context in which the statement was made to ensure interpretative accuracy. The few contradicting statements that were identified were a result of individual perspective and not a result of poor data collection technique. Once initial findings were developed, the researcher shared the findings with the participants via email and requested they reflect on the findings and assess the accuracy and validity of the information. Responses from the participants are presented in **Appendix H**. The study maintained a high degree of credibility as evidenced by the high degree of corroboration between data sources and the universal agreement by the participants that initial findings were accurate.

Transferability

Transferability is the capacity of the study to be utilized by other researchers in different contexts. Transferability requires a clear account of the methodology utilized so that others may test conclusions through the conductance of a similar study. This is a particularly difficult criterion for case studies to meet as each case study is unique and can never be truly replicated. The most effective technique a researcher can use to establish a degree of transferability is providing an adequately thick description (Lincoln

& Guba, 1985). The researcher provided all references for officially-sanctioned documents used during the document review in **Appendix F** and summaries for each individual interview in **Appendix G**.

Dependability

Dependability is a measure of processional rigor (Lincoln & Guba, 1985). The research design was based upon qualitative research theory and principles established in the academic body of literature (Lichtman, 2010). As evidence that these theoretical guidelines were correctly followed, a detailed description of the data collection and analysis process was described in the preceding section and the interview protocol is available in **Appendix B**. Additionally, the aforementioned interview summaries are available in **Appendix G** and resulting data codes and associated themes are located in **Appendix E**.

Confirmability

Confirmability refers to the appropriateness of the conclusions based on data available to the researcher. Confirmability is an assessment of the conclusions themselves rather than the process used to develop those conclusions (Lincoln & Guba, 1985). The vast interpretations involved in a qualitative case study prohibit the establishment of a benchmark to establish a clear measure of reliability when it comes to evaluating conclusions (Merriam, 2009). However, even without an absolute measuring rod, case study research can still attain a level of confirmability. First, the researcher provided preliminary conclusions from data analysis to the participants via email. The participants were asked to respond back with their assessment whether or not the conclusions reached by the researcher resonated with their personal experiences. Six of

the seven participants responded to this request and each respondent confirmed the results aligned with their perceptions of reality. The preliminary conclusions sent to the participants and the member-check responses can be found in **Appendix H**. Second, as part of the doctoral research process, the researcher identified a committee of three experts in related fields who routinely evaluated the researcher's methods and conclusions. This doctoral committee served as an ongoing theoretical confirmation source. Finally, two outside readers were also utilized in the final steps of the process to ensure conclusions reached by the study attained an appropriate level of confirmability.

Ethical Considerations

The researcher took measures to maintain a symmetrical relationship between researcher and participant in respect to power, preserve anonymity for the individuals, and control the disclosure of sensitive material that could have had potentially damaging effects on personal wellbeing and professional performance (Cresswell, 1998). The researcher provided potential participants with the informed consent and informational email presented in **Appendix C** and **Appendix D**, respectively. Through email exchanges, the researcher intentionally clarified that the individual had complete freedom to participate or be excused, even after the interview began. The identities of participants remained confidential through the utilization of general pseudonyms by the researcher. Furthermore, only the researcher, who holds a security clearance, transcribed the auditory recordings of the individual interviews. Following transcription, the recordings were immediately destroyed to make certain no identifying speech patterns were retained. Finally, the researcher was ready to provide contact information for a mental health professional if requested by the participants.

The research protocol established by the researcher ensured that the researcher remained within the parameters of the study. The researcher presented this protocol, which included the aforementioned precautions, to the George Washington University Institutional Review Board (IRB) for review. The IRB reviewed and approved the protocol prior to data collection. These measures provided the greatest possible protection for participants while allotting a significant degree of flexibility for the exploration and incorporation of unforeseen data points.

Summary

The case study was the best-suited and most appropriate methodology with which to explore dynamic instability of a SEAL unit. It properly aligned with the basic ontological, epistemological, and theoretical principles discussed in previous chapters and held by the researcher. The methods used by the researcher successfully examined the complexity of a SEAL unit's adaptation without an arbitrary reduction of variables. Finally, the proper utilization of these methods, in concert with measures taken to ensure trustworthiness and ethical adherence, produced important contributions to theory, research, and practice.

Chapter 4:

RESULTS

Introduction and Overview

This chapter presents results from the qualitative case study. To provide greater insight into the area of team adaptation in uncertain environments, the researcher examined the elite Naval Special Warfare combat unit known as Navy SEALs. The findings contained in this chapter are a product of data collected through a combination of document reviews and individual interviews with retired members of the Navy SEAL Teams. The researcher performed data collection from June 2014 through August 2014. This chapter (a) presents an overview of the Navy SEAL organization and a general description of the retired Navy SEALs who participated in the study, (b) provides a brief summary of the data collection process, and (c) discusses the emergent themes identified through data analysis.

Participants - Navy SEALs

SEAL Team 1 and SEAL Team 2 were first formed in 1962 by President John F. Kennedy to further expand the United States' unconventional warfare capability. These naval units were the direct descendants of the Scouts and Raiders, Naval Combat Demolition Units, Office of Strategic Services Operational Swimmers, and the Underwater Demolition Teams who performed maritime and riverine operations throughout the twentieth century (www.sealswcc.com). This historic legacy is frequently referenced in the official Navy SEAL recruitment webpage and was also cited by a number of the retired Navy SEALs who were interviewed. The experiential knowledge that was passed on by these forerunners formed the foundational pillars of the present-day Navy SEAL Teams.

The selection process utilized by the Navy SEAL Teams is one of the most demanding in the United States military with a dropout rate of over 80% (www.sealswcc.com). Candidates must pass six stages of developmental training during an 18-month trial period:

- Stage 1: Naval Special Warfare Preparatory School
- Stage 2: Naval Special Warfare Orientation
- Stage 3: First Phase – Basic Conditioning
- Stage 4: Second Phase – Combat Diving
- Stage 5: Third Phase – Land Warfare Training
- Stage 6: SEAL Qualification Training – Mastery of SEAL Skills

Each of the six stages are led by senior Navy SEALs who have previously served as active-duty operators. These senior members of the SEAL community design and oversee the selection process to act as "coaches" and "gatekeepers," ensuring only qualified candidates are admitted into the "fraternity." If the candidates successfully complete all stages, they will "earn their Trident," becoming full-fledged Navy SEALs who are then assigned to one of the SEAL Teams stationed in Coronado, California or Virginia Beach, Virginia (www.sealswcc.com). Even after admittance into a SEAL Team, the men are required to regularly train as individuals and units in preparation for deployment to a theatre of war. Training may involve a range of activities from physical exercise regimens to highly technical battle simulations; however, they are all intended to increase the warfare capability of the Navy SEALs while creating a cohesive unit.

Navy SEALs are separated into nine active "Teams" (and two reserve "Teams"). Each "Team" is a command unit consisting of numerous officers, operators, and supporting staff. Within each SEAL Team there are multiple operational units known as "troops" that contain approximately thirty Navy SEALs. These units are further divided into platoons, which are typically comprised of approximately thirteen personnel who

have specialized roles within the platoon. Depending on operational requirements, platoons may be further subdivided into squads (approximately seven personnel), fire teams (approximately four personnel) or sniper teams (approximately two personnel). As mentioned previously, platoons, squads, and fire teams meet the required criteria for "action teams" as described by Levi (2007) and are referred to as "SEAL units" in this study to differentiate them from the larger "SEAL Team" organization.

Although originally created to address unconventional threats in maritime and riverine environments, utilization of the SEAL units has expanded since the Vietnam War to include jungle, arctic, desert, forest, mountain, and urban environments. Even the name of "SEAL" (Sea, Air, Land) reflects this flexible capacity to operate in a variety of conditions. Typical missions given to the Navy SEALs may include, but are not limited to: capture/kill missions in which a targeted individual is apprehended or killed; reconnaissance missions in which information is collected covertly; security missions in which a high-value asset or person is protected; search and seizure missions in which a vehicle is boarded and controlled; hostage rescue missions in which individuals held by an enemy force are freed and brought to a safe location; and military support missions in which conventional military forces are provided assistance to achieve a specific military objective. In all cases, these missions require Navy SEALs to operate in environments characterized by significant levels of uncertainty as they often involve dynamic situations, civilian populations, foreign territories, and enemy combatants.

Since the War on Terror commenced in 2001, the Navy SEALs have been assigned an even greater variety of missions. Although still viewed as the premiere force to address maritime threats, they now play a much greater role in land-based warfare and

are frequently seen as the preferred SOF to be tasked with challenging missions, as evidenced by the operation that killed Osama bin Laden. Although many factors play a role in the success of the Navy SEALs during the War on Terror, one of the primary contributors is their ability to collectively adapt as a team. The fifth line of the SEAL Code specifically calls out this critical characteristic:

- Loyalty to country, team and teammate
- Serve with honor and integrity on and off the battlefield
- Ready to lead, ready to follow, never quit
- Take responsibility for your actions and the actions of your teammates
- *Excel as warriors through discipline and innovation*
- Train for war, fight to win, defeat our nation's enemies
- Earn your Trident every day

It is this collective, innovative capacity that led the researcher to select Navy SEALs as an exceptional research population for this case study (Yin, 2009).

Due to operational security concerns and challenges associated with gaining access to active-duty personnel, the researcher interviewed only retired Navy SEALs for this study. Furthermore, research participants had to have retired in the last seven years. As mentioned above, the War on Terror that began in 2001 required a significant evolution of Navy SEAL training and tactics to deal with novel missions in Iraq, Afghanistan, and other areas of the Middle East and North Africa. By enforcing a retirement time restriction on participant selection, it ensured all participants minimally had some degree of shared experiential background. The participants did vary widely when it came to combat roles (operators, noncommissioned officers, and commissioned officers) and combat experience (no experience in a live fire combat situation to experiencing dozens of live fire combat situations). Despite these significant differences,

the seven participants provided remarkably consistent responses during the semi-structured interviews.

Data Collection

Phase 1 of data collection began with a document review of officially-sanctioned Navy SEAL documents. The objectives of the document review was to examine a stable source of data, develop initial codes for use in the analysis of individual interviews, and familiarize the researcher with terminology and language used by the participants. As anticipated, a very small number of documents were available to the public and those documents primarily focused on historical, declassified accounts of Navy SEAL missions and general value statements presented in the SEAL Code and the SEAL Credo (**Appendix F**). The researcher analyzed and coded the documents based on the literature review presented in Chapter 2 of this research paper and used those results to further develop codes in Phase 2 and Phase 3 of data collection.

To increase the researcher's familiarity with Navy SEAL terminology, expressions, and acronyms, the researcher also read a number of non-fiction accounts of Navy SEAL operations and activities that were either authored or co-authored by retired Navy SEALs. The researcher examined the following books listed in **Table 4-1**.

Reference
Couch, D. (2006). *Down Range: Navy SEALs in the War on Terrorism*. Random House LLC.
Denver, R. (2013). *Damn Few: Making the Modern SEAL Warrior*. Random House.
Kyle, C. (2012). *American Sniper: The Autobiography of the Most Lethal Sniper in US Military History*. Simon and Schuster.
Luttrell, M. (2007). *Lone Survivor: The Eyewitness Account of Operation Redwing and the Lost Heroes of SEAL Team 10*. Hachette Digital, Inc.
McEwen, S., & Miniter, R. (2014). *Eyes on Target: Inside Stories from the Brotherhood of the US Navy SEALs*. Hachette Digital, Inc.
Owen, M., & Maurer, K. (2012). *No Easy Day: The Only First-hand Account of the Navy Seal Mission that Killed Osama Bin Laden*. Penguin UK.
Redman, J., & Bruning, J. (2013). *The Trident: The Forging and Reforging of a Navy SEAL Leader*. HarperCollins.
Wasdin, H. E., & Templin, S. (2012). *SEAL Team Six*. Boekerij.
Wentz, G. (1993). *Men in Green Faces*. Macmillan.

Table 4-1 Unofficial Navy SEAL literature

It should be noted that the researcher did not use these books to develop codes as they did not fit the criteria of being officially sanctioned by the Navy SEAL organization.

Following the document review, the researcher conducted individual interviews with the aforementioned retired Navy SEALs. The first two interviews were designated as beta tests to ensure the interview protocol was producing data that informed the research question. The researcher provided transcripts from the Beta Test to the research committee who reviewed the results and evaluated the effectiveness of the interview protocol. The researcher and committee determined the interview protocol was successfully producing usable data and required no additional changes. As the same interview protocol was used for both the Beta Test participants and the remaining participants, the researcher included the resulting data from all seven interviews in the analysis. Summaries of each interview are located in **Appendix G**.

Data analysis included an iterative coding process whereby the researcher coded documents and interview transcripts multiple times. This iterative process allowed codes

to be revised, refined, added, or removed as the researcher's familiarity with the collective body of data increased. Examination of the data using the qualitative data analysis program, ATLAS.ti, produced a total of 49 codes. **Appendix E** provides the complete list of codes and the associated number of occurrences in the data sources.

Emergent Themes

Four general themes were based on the identified codes.

1. Use of fundamental rules vs. mission-specific rules (as they relate to the five types of simple rules)
2. Role of experience in the process of individual and team adaptation
3. Role of trust, team familiarity, and distributed leadership in the process of team adaptation
4. Team response (including communication) in an environment characterized by uncertainty

This section expounds on these themes as they relate to the research question: *what is the nature of the types of simple rules (heuristics) used by a Navy SEAL unit in response to an unexpected critical incident characterized by environmental uncertainty?*

Theme 1 – Simple Rules

Navy SEALs operate in a paradoxical state between structure and chaos. They must adhere to strict rules and protocol while still adapting in the midst of turbulent environments filled with uncertainty. One participant described this paradox as follows,

> They [Navy SEALs] pick the right people that can be disciplined and be structured, but when everything is thrown out, can still improvise and improvise safely, and quite ingeniously at times. What it all comes down to is that the BUD/S training structure is designed to weed out those who cannot live in both worlds—live in chaos and live in structure.

One way in which they perform this balancing act is through the utilization of simple rules. These fundamental tools provide various social and cognitive benefits that allow the SEAL units to adapt appropriately to a plethora of situations. Furthermore, these

rules come in a variety of different forms whose usage shifts with the degree of uncertainty in the environment.

Use of simple rules

Despite substantial planning before every mission, the Navy SEALs "expect innovation" to be necessary (SEAL Credo). As one participant replied, "We didn't plan to snatch a vehicle. That wasn't in the plan. But it's called 'reevaluate and reengage' and that's what we did." Performing the basic function of "reevaluating and reengaging" requires a predetermined set of heuristics that can be utilized as needed. Furthermore, a coordinated response of "reevaluating and reengaging" requires a collective understanding and agreement on those heuristics. Whether they are codified by the organization or just fundamental norms accepted by all Navy SEALs, simple rules form the foundation of those heuristics. Another participant stated,

> I think operationally we just get to a point of having a kind of boiler plate with a certain percentage of things that are done the same way every time and then leaving room for flexibility thereafter.

Simple rules provide a structure on which to establish a decision-making framework that is flexible enough to remain relevant despite varying circumstances. One participant noted, "There are rules of the road that apply universally to any mission and you certainly have that governing your thinking." These rules serve as a stable reference point that cognitively grounds a Navy SEAL regardless of the volatility he may be experiencing.

Application of simple rules is a Navy SEALs' last line of defense against a purely chaotic environment. One participant suggested, "Fortunately, it doesn't matter what curveball is thrown at you... there are certain laws that will always be true that you can rely upon," and another noted, "If anything happened to foil that plan, it would have been

total improvisation at that point... but I knew I had that [simple rules]." However, it should be noted that there does not appear to be a major cognitive separation between conducting an operation according to a pre-mission plan and the application of more general simple rules. The Navy SEALs seem to seamlessly flow between mission-specific rules established for a particular scenario and broad-based "rules of the road." One participant commented, "We try to plan one or two contingencies in advance, but our status is read and react." The seamless flow is a product of this constant readiness to improvise and take adaptive action based on their ingrained heuristics.

It is notable that the last quote used the plural possessive pronoun "our," indicating the maintenance of a "read and react" status is a collective state of mind. The simple rules employed by the Navy SEALs form a foundational and shared cognitive framework that enables quick and coordinated responses by the unit. One participant clarified, "You have that same cognitive foundation and so does the guy on your right and the guy on your left." The shared cognitive foundation increases the speed and accuracy with which the SEAL unit may collectively respond; "Everybody was able to very quickly morph that template and adjust to what we had and the situation as the way it was."

The shared, simple rules begin to be embedded at the earliest stages of training, before a candidate has even "earned their Trident" and become a Navy SEAL. One method used to embed the most critical and fundamental rules is to repetitively use "little mottos" and "catchy lines" that can be applied as needed. Participants were asked to name some of the most commonly used adages that may be cognitively referenced to

guide their actions in an uncertain environment. Their responses are captured below in Table 4-2.

Participant	Slow is smooth and smooth is fast	Shoot, move and communicate	Two is one and one is none	The mission, the men, then me	Win the gunfight	Why plan when you can react
Navy SEAL Alpha				●	●	
Navy SEAL Beta		●	●			
Navy SEAL Gamma					●	
Navy SEAL Delta					●	
Navy SEAL Epsilon	●		●			
Navy SEAL Zeta						
Navy SEAL Eta	●	●				●

Table 4-2 Common Navy SEAL Adages

Types of simple rules

In addition to the general, codified, simple rules described in Table 4-2, the participants mentioned other mission-specific rules referenced in the midst of operations. All of these rules, general or mission-specific, fell within the simple rules taxonomy identified by Eisenhardt and Sull (2001). The taxonomy is separated into the following five types of simple rules:

- Boundary rules – determine what system actions are feasible
- Priority rules – rank opportunities and risks
- How-to-rules – guide implementation
- Timing rules – control the rate of implementation
- Exit rules – determine when actions should be terminated

All five types were identified during the individual interviews and all five played a guiding role in mission execution; however, the importance of specific types of rules shifted as the degree of uncertainty changed through the course of the mission. When the participants referenced timing rules and exit rules, they were primarily mission-specific decisions. Boundary rules were used in mission-specific decisions as well, but they also

provided more fundamental guidance when environmental uncertainty and dynamism increased to such a degree that the mission-specific rules no longer applied. Finally, priority and how-to rules provided the most fundamental, action-oriented guidance that was applicable in every situation regardless of the degree of environmental uncertainty and dynamism.

A number of the participants indicated timing rules were critical for mission execution. Most missions conducted by Navy SEALs are executed at night, under the cover of darkness. Working in darkness provides them with the tactically-valuable element of surprise and allows them to utilize sophisticated technology to increase their advantage over enemy combatants. To take timing into account, "Each phase of the mission... has what's called a drop dead time... if you don't make it there by that time, then it's over." These predetermined timelines are set into place during the planning phase and are highly mission-specific. As one participant explained, "There's infil, insert, time on target, exfil, extract. So those timelines are based on the likelihood we'll be encountering personnel, the extract vehicle, the infiltration vehicle... that type of thing."

The mission-specific, timing rules are tied closely to the exit rules that determine when a mission should be aborted. Before a mission begins, "predetermined abort criteria" are established to help determine whether accomplishing a mission is still feasible in the midst of evolving situations. In addition to "drop dead times," there are also "minimum force" requirements that indicate how many Navy SEALs are needed to safely execute the mission. These abort criteria, as well as others, provide the officers

with a clear heuristic to measure risk to the mission and to the men under their command. As described by one participant who served as a commissioned officer,

> And so it's constantly weighing: one, what's the risk to the mission right now; is it still even achievable, can we accomplish it given everything that's happening, and then two, what's the risk to the force? What is it going to cost us, if anything to get it done?

The simple exit rules that are determined prior to the mission provide multiple opportunities to conduct very rapid "cost-benefit analysis." As one participant noted, they are the "go-no go decision points that you are processing... those are some of the basics and everything kind of becomes secondary to that." Both the timing and exit rules are in the forefront of a Navy SEAL's mind as long as the mission falls within an acceptable range of uncertainty and dynamism, such that mission objectives can still potentially be accomplished.

Boundary rules and priority rules offer mission-specific guidance, but with greater general applicability than the timing and exit rules. These rules provide a structured template that guides action in a number of different scenarios, while still being highly context-dependent in their application. Most frequently, the participants cited "the rules of engagement," a type of boundary rule. This set of rules clarifies "how, when, and in what manner you can engage the enemy depending on what the operation is." They are defined for every theatre of war so that the Navy SEALs have clear guidelines as to when they may use deadly force. With the increasing embedment of enemy combatants in the civilian population, the rules of engagement have become even more critical as a referential guide. This special type of boundary rule provides definitive directives, but allows a great deal of flexibility to apply the rules as the situation dictates. One

participant commented, “The threat escalates instantly the second you get on target when there’s an exchange of gunfire. Instantly the rules of engagement... change a little bit.”

It should be noted that the context-specific rules of engagement are bracketed by even more generalized boundary rules. As one participant pointed out, “There are cardinal sins that any SEAL can commit.” These “sins” are committed when an individual breaks the fundamental boundary rules adopted by the Navy SEAL community. For example, the SEAL Credo states, “The execution of my duties will be swift and violent when required yet guided by the very principles that I serve to defend.” A Navy SEAL must be willing to use force as a means to an end, but that force must be applied with a clear moral code. These more general boundary rules guide the application of the flexible rules of engagement, providing a context-specific, but broadly applicable, heuristic.

As described by the participants, priority rules provide the Navy SEALs with a clear ordering heuristic. One priority rule that was mentioned provided guidance for higher-order decision-making during a “go-no go” decision point. The phrase “the mission, the men, and then me” was one example of a codified priority rule that guided the risk analysis of every Navy SEAL officer during a mission. Two other priority rules repeatedly mentioned by the participants were far more basic and action-oriented. The priority rules, “win the gunfight first” and “address the primary threat,” are fundamental, but flexible directives that allow the Navy SEALs to prioritize their actions in the midst of uncertainty.

As uncertainty and dynamism increase, foundational rules are used far more frequently and may actually supersede some of the higher-order rules that fall into the

categories of timing rules, exit rules, boundary rules and priority rules. How-to rules receive primacy when the context-specific heuristics developed during planning periods are no longer applicable. Most of the common SEAL adages listed in **Table 4-2** fall into the category of how-to rules or priority rules that can be generally applied regardless of the specific mission parameters. Some how-to rules are not necessarily codified into "catchy phrases," but may be referenced when making tactical decisions in moderately dynamic or uncertain environments. For example, some how-to rules referenced by the participants included, "approach from an area that personnel on the target would least expect," and "if I'm on the high ground, I have the advantage."

In extreme dynamism and uncertainty, the nature of applying the how-to rules appears to devolve further. The higher-level cognitive processing that occurs while missions are "under control" is eclipsed by automated responses when the environment becomes increasingly chaotic. One participant described the SEALs reaction in this type of situation,

> When it goes well beyond any contingency you've planned for, then you're getting into your fundamentals. Shoot, move, and communicate with the guys nearby, try to get some outside support and try to work your way back to the outside support... just general fundamentals of 'shoot, move, and communicate.'

The Navy SEALs are still mentally referencing how-to rules, but they are now reacting instinctually, accessing basic instructions embedded during extensive training. One Navy SEAL stated, "We practice so much we get to a point where we automate the responses. Some guys call it 'muscle memory' or stuff like that." Another mentioned, "It's almost practically all muscle memory and communication." However, these automated responses are not "unconscious" reactions. One participant clarified that he is not "going blank" in that moment. Instead, the participant cognitively operates on multiple levels

when faced with uncertainty; "There's a lot going on all at the same time between the muscle memory of it and then... dealing with the evolving situation." This multi-level processing is possible through the use of how-to rules embedded during training exercises. Another participant reiterated this concept, stating,

> With that practice you get to a point where it's almost intuitive or instinctive responses. That enables us to... our conscious attention is not focused on how do I cover fire, which frees our consciousness to focus on what is the enemy doing and evaluating the situation.

The SEAL unit is able to deal with the immediate situation in a coordinated fashion because they are all referencing the same basic rules developed, embraced, and embedded during training and previous missions.

Theme 2 – Role of Experience

The participants clearly indicated that simple rules played an important role in providing individual Navy SEALs and SEAL units with guidance during a range of missions. However, it was clear that these rules, and their application, were inextricably tied to previous experience. One participant responded, "The rules, so to speak, are just a function of our training in preparation for how we behave on a mission as we're executing." Previous experience in training exercises and missions provides a flexible template that clarifies when and how simple rules should be applied in a variety of context.

In addition to acting as a type of lens that cognitively focuses simple rule development and application, experience also has emotion-based benefits that increases the capability of SEAL units to adapt. Experience provides the men with a substantial comfort level when it comes to embracing innovation. As one participant expressed, "It seemed very natural to just go and flex."

Previous experience not only embeds the aforementioned simple rules, but it also creates a structured template that can be utilized in a moment of uncertainty. One participant described this template as follows,

> You have a myriad of experience from all the different types of training and the different situations you've gotten yourself in and that has given you some kind of blank slate or some type of template to work with as different situations arise.

Experience serves as a reference point that can be leveraged to decide if a particular action is appropriate given a set of certain parameters. One participant noted that during an unexpected event, such as a firefight, "Your mind is referencing hours and hours and hours and hours and hours of doing the same thing, practicing every possible contingency over and over and over." Although every situation is different, there are fundamental patterns that a Navy SEAL can recognize from past experience that allows them to make a rapid decision. One participant responded,

> I think the best backup is just the volume of training you do and all the different scenarios you put yourself in because then there's something you can recall that is similar enough that you can run with it and you don't have to be completely creative in the moment.

The rapid decision is possible because the template provides a cognitive head-start such that the Navy SEAL can base adaptive actions on previous actions that have proven successful; "The best case scenario is when you have been in a situation very much like this, a little like this, or kind of like this before in training or in previous missions." These context-laden examples provide personalized heuristics that direct decision-making in the midst of a mission.

All seven participants noted that their ability to adapt was a direct result of their experiential knowledge developed through training and previous missions. **Table 4-3** presents some of the representative comments made by the participants.

Participant	Participant Quote
Navy SEAL Alpha	It was really situation specific and my approach to training in the past that drove how I made those decisions.
Navy SEAL Beta	What it boils down to is, 'I have been here before,' in varying degrees of likeness to a scenario you worked... in training.
Navy SEAL Gamma	So instantly you have to adapt and fall back on your training and things you pick up as you go along.
Navy SEAL Delta	You've already played out these scenarios in training.
Navy SEAL Epsilon	You are trying out something you've seen before; some adaptation that some other team has come up with.
Navy SEAL Zeta	In the training, they throw monkey wrenches at you to get you sideways and that's what helps you when it comes down to the real world action
Navy SEAL Eta	So that conditioning and that training, especially at the special operations level, that's what allows our guys to stay smooth and be more accurate and be more responsive.

Table 4-3 Quotes Concerning Experience and Adaptation

The participants' consistent responses clearly indicate experience serves a critical role in the process of adaptation.

Additionally, experience appears to work in partnership with simple rule application. One participant provided insight into this relationship between experience and simple rules. The participant noted that when entering a new theatre of war there was significant hesitancy to conduct certain missions due to lack of experiential knowledge.

> So you'd get this information and we'd look at it and say, 'No. No. No. No. There's no way we can pull that off. The target is too big.' And it's because you didn't have enough experiential knowledge; you didn't have as many points of reference to understand the true risk. So for each mission, you'd apply those general kind of rules and broad-based assumptions, and as you got better at what you did, you realized and looked back now, and thought, 'Oh my God.' Those missions you thought were intimidating or you thought the risk could not be managed, it could easily be managed.

This passage indicates the Navy SEAL relied heavily on simple rules when applicable experience was lacking, but as experience was gained, the simple rules were adjusted to fit future scenarios more accurately. Two of the participants specifically mentioned that

one way Navy SEALs increase experience and improve simple rule application is through the development of a cognitive "playbook" during pre-deployment training.

A playbook is created through multiple training exercises where a SEAL unit practices adapting to a variety of different situations that may take place during an actual mission. One participant noted,

> We practice immediate action drills underwater, on the surface of water in the boats, parachuting, all that kind of stuff... we practice different contingencies and we practice for failure so that when we make a plan we have a general sense of what the plan is going to be, but we're able to quickly adapt and make adjustments.

The exercise "does go awry because of the construction of the scenario" which requires the SEAL unit to collectively adapt, thereby establishing templates that can be utilized during deployment to a theatre of war. Another participant responded,

> So you develop this playbook that is pretty comprehensive and it's really impressive to the degree to which you come back from these missions and can say, 'Our playbook handled every craziness that occurred.'

It should be noted that Navy SEAL preparation for adaptation as a unit does not end with developing a playbook prior to deployment.

SEAL units will develop contingency plans and then rehearse both the mission-specific primary plan and contingency plans prior to conducting a mission. The development and rehearsal of contingency plans is not intended to address every possible situation that could arise during a mission. Rather, the rehearsals increase the preparedness of both the individual and the SEAL unit to react appropriately during heightened uncertainty and dynamism. One participant clarified,

> It's all about preparation. You can have the best laid plan in the world for your assault or raid or whatever you're going to do, but as soon as bullets start flying, typically you're falling back to your contingency plans or simply your training and the team adapts.

Additionally, rehearsals of primary plans and contingency plans provide shared experiences that produce shared decision-making templates for use during the future mission. Another participant commented,

> Obviously, you can't anticipate everything, so you don't have a contingency for everything, but you have some general contingencies... kind of rules that you establish for that particular mission and then you walk through them and rehearse them so that everybody understands what the audibles are.

Finally, rehearsal gives the Navy SEALs an opportunity to develop a thorough understanding of their teammates' responsibilities in case one of the men become disabled during a mission. Armed with this knowledge, each individual in the unit can react immediately "in case somebody goes down and the plan has to change."

The experiences generated from general training during the Navy SEAL selection process and pre-deployment, as well as the mission-specific training conducted before an operation, clearly establish a cognitive template that can be referenced for quick and accurate decision-making. These experiences also play a role in refining and applying simple rules in the proper context. Finally, the experiences develop a shared set of heuristics that can be utilized for collective adaptation as a unit. However, experience also produces emotional byproducts that are favorable for a SEAL unit operating in uncertain and dynamic environments.

Navy SEALs not only expect innovation to be required, but they are also very comfortable with continuous adaptation. Multiple participants suggested this comfort is a combined result of selecting individuals who are comfortable in dynamic situations requiring innovative tactics, and the extreme training every Navy SEAL experiences. As one participant explained,

> Everyone I had the fortune of working with was uber-professional, calm, cool, and collected. I think there are two dimensions of that. One is you screen and select certain types of people. There is a self-selection. The guy who makes it through training is probably predisposed to those qualities. That's certainly true. But it's also subjecting those individuals to obscene physical trauma and psychological trauma and emotional trauma in training to the point where it's going to be very challenging to push that type of person into a place where they're uncomfortable or they are paralyzed or where they are panicky and emotional.

Individuals who are already predisposed to "excel as warriors through discipline and innovation" (SEAL Code) develop an additional level of comfort with adaptation through exposure to extreme experiences. The extreme experiences serve as a constant reminder that "I can do it because I have done it." At the individual level, a track record of success provides a level of confidence and cognitive permission to take appropriate risks. At the collective level, a track record of success establishes a fortified sense of trust and familiarity between teammates.

Theme 3 – Trust, Familiarity, and Distributed Leadership

Trust and familiarity between Navy SEALs also plays a role in the collective adaptive capacity of a SEAL unit. These critical ingredients are created in much the same way that comfort with adaptation is forged through the selection process and extreme training. Since every Navy SEAL is held to the same high standard, regardless of rank, there is a natural trust that each individual will make appropriate decisions and accomplish the task at hand. This culture of trust enables an effective degree of distributed leadership where each Navy SEAL has the "internal and external sources of authority to be innovative."

Role of trust in adaptation

The general trust exhibited by Navy SEALs is broadly shared by all members of the community. This type of trust is a direct result of the selection process and related

training. The highly selective process ensures that only a certain type of individual who has the capability to adapt may enter the community. One participant explained, "The people who don't have that ability don't make it into the Teams. From a mindset perspective, you are all cut from the same or a similar mold. You have that cognitive ability to make quick decisions under pressure." This exclusivity is "guarded by those who are in the community... it gives permission to innovate." Even if Navy SEALs do not have direct relationships as a result of shared experience, they can still trust each other's adaptive decisions and actions because of the existence of this "gate to the community."

This general level of trust is amplified when Navy SEALs have shared experience that strengthens the bond between members of the same SEAL unit. One participant provided the following example,

> And I distinctly remember multiple times on training trips hearing rounds crack 10 yards in front of me by my own guys 200 yards away or 100 yards away and saying, 'Go ahead and shift your fire' and being as calm as a cucumber, or as cool as a cucumber, knowing that they were going to do exactly that and they weren't going to shoot me.

This level of trust enhances adaptive capability in multiple ways. First, it enables each Navy SEAL to act decisively without fear slowing response time or factoring into the decision process. As one participant expressed, "Having that trust leads us to innovate in that moment without asking for another opinion or worrying what the repercussions are going to be." The men in the SEAL unit, as well as the commanding officers, give their collective permission to each individual to take all necessary action when responding to an uncertain environment. This culture of empowerment provides a freedom to experiment and take chances to find the best solution. As one participant described,

> When you're 12 years old, everybody... for the most part... knows about innovating and adapting. You just grab sticks and see what you can build. There was a kind of freeness to the world and this idea that it could be molded and bent to whatever it is that you want to accomplish. Because of the culture we create once you walk through the gate, we enable that mentality to continue.

Second, the trust allows each Navy SEAL to singularly focus on his immediate environment. They can "continue to focus on solving the problem" rather than being distracted by emotions of worry or concern for their teammates. As one participant mentioned, "That's where the other guys come in... you lay your complete trust, your life's trust in them. You don't worry about that, you know? Because you know that they'd do the same." Each Navy SEAL may devote nearly all of his cognitive energy to adapting to the evolving situation because they are comfortable relying on each man to make appropriate decisions for himself and the unit.

Role of familiarity in adaptation

Shared experience not only produces trust that enhances individual adaptation, but it also produces familiarity between teammates which positively impacts a SEAL unit's adaptive capacity. Navy SEALs who make up troops, platoons, squads, or fire teams become intimately familiar with each other's behavioral patterns and decision-making tendencies. One participant described this familiarity as follows,

> We know each other so well and know how each other think... because I may say, '_____, is going to run from Point A to Point B like this in this type building,' or '_____, I know he is going to do this if we don't do this. He'll wait for so long and then turn around.' You know those thoughts and that's just from years of working with each other.

Another participant noted,

> You ramp it up through very high intensity training so that you know what every guy looks like in the dark even without night vision. Walking, you can tell out of 45 guys who each individual is by the way they walk, their gear; how they wear their gear.

The SEAL unit is capable of a very quick adaptive response as a result of the familiarity that is produced through hundreds or thousands of hours of shared experience. This familiarity produces a predictive knowledge of each teammate's likely response. This foreknowledge enables the Navy SEALs to collectively react as a single entity with minimal discussion or explanation. Another participant commented, "You know each other so well that if something goes wrong... the other guys can see that and figure it out when there's not communication." The importance of a shared cognitive framework was echoed by all of the participants as noted in **Table 4-4**.

Participant	Participant Quote
Navy SEAL Alpha	And I knew that even with all the things going on they would still execute that because that was the greatest danger to them; whatever was in that building.
Navy SEAL Beta	So we were familiar with each other in how we think, how we operate, what our strong points were, what our weak points were.
Navy SEAL Gamma	Because you've been doing that with that person or with that team so many times that you know how they think, how they move.
Navy SEAL Delta	Everyone in that situation immediately knows what their job is.
Navy SEAL Epsilon	I know that guy is going to make that decision in the purpose of the overall objective because of where we've come from, all the time we've spent together, all the training. You just know those guys are going to make very similar decisions you'd make, or at least the best decision they are able to make in that given moment.
Navy SEAL Zeta	You almost know each other's thoughts. You know those guys better than you know your own family because you know how they move, you know how they think, you know how they are going to react.
Navy SEAL Eta	You get to know who's capable of doing what.

Table 4-4 Quotes Concerning a Shared Cognitive Framework

A shared cognitive framework becomes more critical when the opportunity to plan is restricted. Rather than relying on a detailed plan to dictate individual actions, the SEALs "put a lot of weight rather on the SOPs, or standard operating procedures, and the team dynamic... understanding what the guys on the left and right were going to do." The experience-based familiarity further informs an individual Navy SEAL's decisions

because he can accurately assume his teammates are utilizing similar heuristics, "Even if there are variations, it's still going to be similar to how you would move and think." This familiarity, in conjunction with the aforementioned trust, pervades the SEAL community and fosters a culture that embraces distributed leadership.

Distributed leadership

The SEAL Code states, "Ready to lead. Ready to follow," and the Navy SEAL recruiting website echoes this sentiment, "We expect to lead and be led. In the absence of orders I will take charge, lead my teammates and accomplish the mission." The freedom and responsibility to lead, when the situation dictates, is a unique feature of the Navy SEALs. One participant commented, "Each person has the wherewithal and the freedom to make decisions and innovate." The highest ranking officer on a mission still retains the right to make a decision for the group, but the Navy SEAL culture encourages the officers to engage the group in the decision-making process or defer to the individual who may have the greatest experience. Two of the participants described accounts where the patrol officer requested input from all members of the squad before deciding on a course of action. Furthermore, one participant indicated this collective decision-making is not uncommon in the midst of a mission. This process allows innovative ideas to emerge from any team member and provides an opportunity for the best ideas to be collectively evaluated before a decision is made.

This honest and open dynamic is also evident during mission planning. It is an open environment where every Navy SEAL has the responsibility to evaluate and question every phase of the mission. One participant described this process as follows,

> Once the plan is developed, the platoon or squad opens it up and goes, 'What's wrong with this? How can we break it? Let's fix it if it is broken. What's our weakest link?' Exposing the plan to flaws so that everybody can attack it and look at it from different points of view saying, 'This could screw us here. This could mess us up here.'

The best plans and contingency plans can be formed in advance by using the collective experience, knowledge, and insight of the entire team.

The concept of distributed leadership is even prevalent in the middle of a mission when the level of uncertainty and dynamism of a situation will not allow the team to "huddle up." One participant noted, "Every member of the platoon is a leader. You must be ready to command at any given moment." A number of participants indicated that during a firefight, the point man, or whoever has the best visual perspective, will actually dispatch orders to the group rather than the highest-ranking officer. The dynamic flow of leadership and authority through the SEAL unit can match the dynamism of the environment, thereby enabling a more effective and adaptive response by the team.

Theme 4 – Team Response to Uncertainty

The Navy SEALs' actions and communication patterns in the midst of a highly dynamic environment may appear counter-intuitive or even "unnatural." However, the individuals' uniquely controlled response allows them to accurately assess the situation and make appropriate decisions. This control promotes effective adaptation in the face of uncertainty. As a situation becomes increasingly uncertain and chaotic, the Navy SEALs not only respond by utilizing more simple rules and heuristics to make decision, but they also simplify their actions and interactions.

Responsive action

First and foremost, Navy SEALs require their men to maintain a sense of calm composure in uncertain environments. The Navy SEAL recruiting site states, "The ability to control my emotions and my actions, regardless of circumstance, sets me apart from other men." One participant who served as a trainer for future Navy SEALs explained the following,

> We don't want things to get out of control, get chaotic, or get crazy like you said. What we try to teach the guys is don't get crazy. Stay calm. You've been taught how to deal with this. You have body armor on. You've got a helmet. You've got a gun. Use those things and think through what's your next move. Think through quickly and decisively, but think through smoothly what's your next step.

The Navy SEALs see chaos as extremely dangerous and they intentionally train to maintain a sense of internal composure to counteract the external stimuli produced by a chaotic environment. In an actual mission where gunfire had unexpectedly erupted, a participant described his reaction as follows,

> And you know, as tempted as I was to get on the radio and start clogging up the airways to figure out what was going on, I knew I needed, through training, and because of the type of leader I had become at that point, was to just be calm, be quiet and let things work themselves out.

The Navy SEALs can make better adaptive decisions in a moment of uncertainty by maintaining control over their innate response mechanisms.

Furthermore, Navy SEALs actually attempt to slow their actions instead of trying to match the speed of their dynamic environment. This counterintuitive response provides a number of benefits that aid collective adaptation. First, it reinforces the aforementioned calm disposition of the men. As one participant clarified, "Slowing down reduces your anxiety and it also calms the men." One of the most common adages mentioned by the participants, "slow is smooth and smooth is fast," codifies this

principle. Second, by slowing down, Navy SEALs can more appropriately assess the situation and adapt. Three participants who served as officers noted that in the midst of a chaotic situation in which they were taking fire, their first immediate response was to pause and demonstrate "tactical patience" to determine what was happening and what should be done. Another participant summarized this concept with the comment, "By slowing down, the communication is clearer, analysis is clearer, and more often than not, you are correct and communicate it correctly."

Finally, the participants indicated that the Navy SEALs attempt to simplify their actions and communications, rather than matching the complexity of the chaotic environment. One participant commented, "The goal with any mission is to keep it simple." This concept is again instilled in training exercises where simulated chaotic environments are used to embed the principle within the men. One participant explained, "So that's what we try to teach our guys. Don't worry about the external issues you can't control. The bad guys are going to shoot at you so focus on what you can do and what your tasks are." Even communications are simplified, thereby enabling the men to focus all of their attention on responding to the most immediate threat.

Responsive communication

Communication plays a critical role in the collective adaptation of SEAL units. In fact, "shoot, move, and communicate" was one of the most common and fundamental adages mentioned by the participants. However, in times of increased uncertainty, the amount of communication actually decreases between members of a SEAL unit. Rather than having more robust dialogue to identify an appropriate adaptive response, the Navy

SEALs actually reduce the amount of communication and greatly simplify the messages. This reduction of communication was echoed by most of the participants.

Participant	Participant Quote
Navy SEAL Alpha	Less communication actually.
Navy SEAL Gamma	Sometimes a well-prepared team needs zero communication to adapt
Navy SEAL Delta	You don't want to have to communicate extensively in a gunfight or any contingency
Navy SEAL Epsilon	A lot of it doesn't need to be communicated.
Navy SEAL Zeta	Less. I think there's less.

Table 4-5 Quotes Concerning Reduced Amount of Communication

In addition to reducing the amount of communication and simplifying the message, communication also becomes far more direct and clear. This concise delivery allows each Navy SEAL to receive the basic information needed to make adaptive responses without superfluous data that requires processing. One participant stated, "The communication in that instant has to be extremely crisp, clean, simple. There are not conversations. There are not detailed dialogues. It is 'shift left,' 'call for fire,' 'snipers up.' It is not a dialogue." Another participant noted, "Communication... has to be very consistent. But again, it's not running and screaming through the house and yelling like you see in the movies... yelling over coms "DO THIS! DO THAT!" It's slow, it's methodical, and it's calm." The distinct characteristics of Navy SEAL communication as described by the participants is summarized in **Table 4-6**.

Participant	Reduced Amount of Communication	Communication uses Shortened Phrases	Direct Style of Communication	Calm Delivery of Messages	Slowed Delivery of Messages
Navy SEAL Alpha	●	●	●	●	
Navy SEAL Beta			●	●	●
Navy SEAL Gamma		●	●	●	●
Navy SEAL Delta	●	●	●		●
Navy SEAL Epsilon		●	●	●	
Navy SEAL Zeta	●		●		
Navy SEAL Eta				●	●

Table 4-6 Communication Characteristics in Uncertain Environments

It is the familiarity between teammates and their shared cognitive templates that allows the SEAL units to successfully adapt despite the reduced amount of communication. One participant suggested, "Not everything needs to be explained because everybody thinks somewhat the same or can figure out what you're thinking because they know you." Another participant explained,

> Sometimes a well-prepared team needs zero communication to adapt to a situation because they have been trained so well that you know exactly what your buddy to the left and right are going to do when the shit hits the fan and therefore, you know what you need to do.

Rather than spending time or cognitive focus on sending and receiving messages, the SEAL unit can react instinctually using their shared cognitive framework and personal familiarity that has been developed through extensive past experiences in training and on the battlefield.

Summary

It is apparent that the ability to adapt is one defining characteristic that distinguishes the Navy SEALs from other military forces. One participant explained the following,

> It is probably the most overarching theme of training and execution in real-world scenarios of anything we do. It's really all about adaptation. Combat is all about adaptation and adaptation is all-encompassing as far as how you change and adapt in highly chaotic environments.

This ability to adapt in uncertain environments is often manifested through a SEAL unit's dynamic, but fluid movement. When asked to describe a SEAL unit, one participant responded that it was like "smoke running through a maze." He expanded on his metaphor by describing what it would look like to watch a SEAL unit move through a house, securing the structure, and engaging enemy combatants as needed,

> If you're looking at it from the top, it [the SEAL unit] looks like smoke. It just flows and moves around the house and pokes holes and moves until the maze, that is the house, is full. The reason I said it looks like smoke is there isn't a whole lot of wasted energy running around, asking questions and doing things. Instead it's filling spaces, making decisions, adapting and moving—making decisions, adapting and moving.

The dynamic instability of a SEAL unit is the source of this fluid collective adaptation. The utilization of effective simple rules plays a major part in dynamic instability, but the function of these heuristics is inherently tied to other morphostatic and morphogenetic factors that demand exploration when considering collective adaptation.

Chapter 5:

CONCLUSIONS AND IMPLICATIONS

Introduction and Overview

The use of teams is increasing in every facet of society (Cannon-Bowers & Salas, 1998). Their adaptive capacity is particularly critical in situations where future outcomes are difficult to foresee (Pina e Cunha, M. & Vieira da Cunha, J., 2006). This is never more evident than in the United States military who must routinely respond to asymmetric threats posed by extremists, terrorists, and radicals (Johnson, 2006). SOFs, such as the Navy SEALs, now play a central role in the War on Terror because of their ability to adapt in a variety of dynamic environments.

Despite the importance of collective adaptation in today's world, the nature of how that adaptation takes place within action teams is largely unknown. There is general consensus that team members need to have some minimum degree of individual capability to adapt and training can enhance that capability, but the cognitive and social mechanisms that actually form the foundation of individual and collective adaptation are still undefined (Tu et al., 2009). This study explored the following research question to begin defining these critical mechanisms: *what is the nature of the types of simple rules (heuristics) used by a Navy SEAL unit in response to an unexpected critical incident characterized by environmental uncertainty?*

Results of this study produced five conclusions that provide greater insight into the nature of individual and collective adaptation by action teams and their members. This chapter (a) examines these conclusions in light of the research question and existing literature, (b) discusses limitations of this study and their impact on the conclusions, and (c) presents implications of this study for theory, research, and practice.

Discussion of the Conclusions

Data obtained through document reviews and individual interviews with retired Navy SEALs identified four emergent themes:

1. Use of fundamental rules vs. mission-specific rules (as they relate to the five types of simple rules)
2. Role of experience in the process of individual and team adaptation
3. Role of trust, team familiarity, and distributed leadership in the process of team adaptation
4. Team response (including communication) in an environment characterized by uncertainty

An examination of these themes using existing research and theory produced five conclusions and eleven related sub-conclusions.

Conclusion	Sub-conclusion
Individuals in an action team mentally reference a combination of general simple rules and situation-specific simple rules when they adapt in an uncertain environment.	Varying application of different types of simple rules correspond with different levels of environmental uncertainty.
	Simple rules provide the basis for a shared cognitive structure that enables greater collective adaptation.
Previous experience plays an important role in the adaptive capacity of an action team.	Experience provides an individual with context to determine how simple rules can and should be applied.
	Experience strengthens the relationship (trust and familiarity) between team members which allows them to adapt more quickly and effectively as a collective.
Relationships between team members, grounded in previous experience and a shared culture, play an important role in the adaptive capacity of an action team.	Trust between team members gives each individual the freedom and permission to take initiative and adapt as necessary.
	Familiarity between team members enables the action team to collectively adapt more quickly and effectively because they can predict how another teammate will react given a specific set of parameters without the need for extensive communication.
The ability of individual team members to control emotions, slow and simplify reactions, and focus communication promotes more effective adaptation by an action team in an uncertain environment.	Individual decision-making is enhanced when individuals are able to control their reactions and react calmly in the midst of an uncertain environment.
	As environmental uncertainty increases, individuals who react by slowing down and simplifying their actions are capable of more effective adaptation.
	In an uncertain environment, action teams that focus communication, reduce potential distractions for team members. This reduced, but effective communication is possible because of the trust and familiarity between team members.

An action team's ability to adapt is dependent upon its dynamic instability (the interplay between morphostatic and morphogenetic factors).	Morphostatic factors that promote structure include simple rules, selection of team members, familiarity between team members, and perpetuation of a structured culture that regulates behavior.
	Morphogenetic factors that promote flexibility include previous experience, distributed leadership, trust between team members, and perpetuation of a permissive culture that encourages innovation.

Table 5-1 Conclusions from the Research

Conclusion 1

Individuals in an action team mentally reference a combination of general, simple rules and situation-specific, simple rules when they adapt in an uncertain environment.

This study confirmed that simple rules do play a central role in the adaptation of action teams. When requested, the participating Navy SEALs readily named off a variety of simple rules they routinely referenced during missions. Furthermore, simple rules were mentioned throughout their historical accounts of situations where their platoons or squads were required to adapt in an uncertain environment. The participants explained that simple rules provided them with "fundamentals" that guided decision-making and actions throughout their missions. This basic function of simple rules confirms the supposition made by Pina e Cunha, M. & Vieira da Cunha, J. (2006). They serve as an enabling structure on which to formulate decisions while operating in a novel and dynamic situation.

Furthermore, these rules, which were manifested in a variety of forms, could be appropriately categorized using Eisenhardt and Sull's (2001) taxonomy. Rules that fell within the categories of timing rules or exit rules were primarily situation-specific. The Navy SEALs established these mission-specific rules to serve as heuristics that assisted with risk-assessment during the operation. By establishing "drop dead times" or "minimum force requirements," the platoon or squad had clear and definitive criteria with

which to evaluate whether the specific mission objectives could still be accomplished within an acceptable range of risk. Boundary rules used by the Navy SEALs provided guidance at a slightly higher level of abstraction. They were still contextually-dependent guidelines but more general in their application. Priority rules and how-to rules contained fundamental information with a wide range of applicability. These essential directives could be referenced as needed to provide clear tactical instruction.

The application of different types of simple rules varied according to levels of environmental uncertainty, suggesting the Davis et al. (2009) assertion was accurate; environmental unpredictability (or uncertainty) has a significant impact on a system's use of simple rules and other semi-structures. Rules that were far more contextual and situation-specific played a more significant role at lower levels of uncertainty in which the predesigned plan and original objectives were still applicable. Timing and exit rules, unique to every mission, were of primary importance to the Navy SEALs when they were operating in a situation whose parameters still fell within the preplanned scope of possibility. The decision-making reference points shifted toward more generalized heuristics as environmental uncertainty began to increase. Specifically, boundary rules became far more important as the men began assessing what actions were still feasible considering the new reality. The Navy SEALs used these heuristics to weigh mission accomplishment against risk to the SEAL unit. Rules of engagement, a specific type of boundary rule, became the key heuristic as the situation continued to deteriorate. These general, but contextualized rules provided the men with the template they needed to engage enemy combatants. Boundary rules were superseded by priority rules and how-to rules when environmental uncertainty continued to increase. The Navy SEALs

referenced universal guidelines that were always applicable under these conditions. These guidelines provided the men with basic heuristics that increased the likelihood of survival regardless of the situation (Holland, 1995). Finally in extreme cases where the environment had become chaotic, the Navy SEALs employed instinctual how-to rules grounded in experiential knowledge. These most fundamental rules elicited automated responses that had been ingrained through thousands of hours of training. This progression of rule application by the Navy SEALs is depicted in **Figure 5-1**.

Figure 5-1 Environmental Uncertainty and Types of Simple Rules Used by a Navy SEAL Unit

All of the simple rules served a structuring role for the SEAL units regardless of type (Buckley, 1998). Simple rules in the form of tactical principles, common adages, rules of engagement, and abort criteria, amongst others, restricted the team's potential actions to those that would promote survival in a potentially dangerous environment (Holland, 1995; Kauffman, 1993). The rules created an actionable, but flexible template that could be applied to increase the chance of success in a variety of situations.

Furthermore, the simple rules were one of the cornerstones used to construct a shared cognitive framework. The cognitive framework shared by the Navy SEALs was critical for collective adaptation (Weick & Roberts, 1993). Armed with a common set of fundamental rules, the Navy SEALs could accurately predict the future behavior of their

teammates. This foreknowledge empowered them to take individually-adaptive actions that would work in concert with the other members of the SEAL unit.

Conclusion 2

Previous experience plays an important role in the adaptive capacity of an action team.

The Navy SEALs' adaptive actions were inextricably linked to their previous experience. Previous experience, whether it was personal experience or historical narrative shared by the community, influenced collective adaptation in multiple ways. It played a significant role in application of the aforementioned simple rules and strengthened critical relationships between team members, thereby enhancing the adaptive capacity of the SEAL unit as a whole.

Responses from the Navy SEALs indicated simple rules were never truly independent of previous experience. Multiple participants noted that adapting in the midst of uncertainty involved a combination of simple rules and experiential knowledge. When pressed further, the Navy SEALs explained that the simple rules they referenced to make decisions and take action were embedded within previous experience which provided thick context to guide application. They were able to take adaptive action because this combination produced a structured, but flexible, template that formed coherent and meaningful patterns.

The Navy SEALs' experiences packaged critical information in such a way that the members of the action team could readily access the appropriate simple rules to react effectively. Baumeister and Newman (1995) suggest the value of these experiences are related to stories. "People will nearly always make sense of their experiences by constructing them in story form, and... proceed from these stories to infer or deduce

generalizations" (p. 98). The Navy SEALs used their personal and corporate experiences (stories) to guide adaptive action in the midst of uncertainty (Boal & Schultz, 2007). Fundamentally, these experiences, and subsequent stories, served as a vehicle to store and cognitively deliver important information when needed.

Most, if not all, members of a SEAL unit shared similar applicable experiences, in training or on the battlefield. The shared experience provided the Navy SEALs with the foundational elements with which to construct a shared cognitive framework. Navy SEALs conducted extensive training to build on this foundation and further develop the shared cognitive structure. As noted by multiple participants, this training was designed to force collective adaptation by SEAL units. According to Weick (1998), extensive practice is critical for successful, collective improvisation. The intense experience produced an additional compounding benefit for the SEAL units. The participants indicated previous experiences also strengthened the relationships between the men. This finding confirms Vera & Crossan's (2005) proposal that practice improvising not only improves the cognitive factors associated with effective adaptation as a team, but it also "builds on affective factors such as trust, respect, and mutual support" (p. 207). Through the course of the interviews, the Navy SEALs repeatedly confirmed the importance of these affective factors as they relate to collective adaptation.

Conclusion 3

> *Relationships between team members, grounded in previous experience and a shared culture, play an important role in the adaptive capacity of an action team.*

It is widely accepted that a team's ability to function and react to environmental cues is impacted by the interpersonal dynamics between team members (Brown & Eisenhardt, 1998; Levi 2007; Weick, 2009). The Navy SEALs are no exception. In

particular, the participants noted trust and familiarity between team members played a significant role in a SEAL unit's ability to adapt in uncertain environments. These two affective factors were rooted not only in the experiential knowledge discussed above, but also in the demanding selection process every Navy SEAL must endure to become part of the community.

Trust in the Navy SEAL community is partially the product of the exclusivity of the "fraternity." The community has very strict requirements for entrance due to the extreme demands placed on a Navy SEAL. Restricted membership is necessary for any high-functioning action team (Sundstrom, 1999). Requirements to become a Navy SEAL are universally applied to officers and enlisted men, alike. These shared standards create an atmosphere of trust between all Navy SEALs because they have been measured against the same benchmarks and deemed worthy to join the community.

Trust is also a result of personal knowledge between men who have witnessed each other's actions in volatile situations. Navy SEALs in the same unit spend vast amounts of time together both in training and deployment. This experiential knowledge translates to stronger interpersonal dynamics, translating the generalized trust of all members of the community to a personalized trust between team members.

Trust serves as a creative, destabilizing force, encouraging individuals to take calculated risk and adaptive actions in response to situational factors (Stacey, 1995). It gives each Navy SEAL the individual freedom and authority to innovate without fear of reprisal. Although some degree of inhibition is important for proper adaptation, the emotion of fear typically inhibits improvisation (Vera & Crossan, 2005). By perpetuating

an atmosphere of trust in an exclusive community, the Navy SEALs mitigate or eliminate the emotion of fear as it relates to improvisation.

Furthermore, this pervasive trust provides a culture where distributed leadership can flourish. Day, Gronn, and Salas (2004) suggest distributed leadership provides resources that help teams be more resilient and versatile in challenging situations. The collective can respond to the environment more appropriately by embracing diverse knowledge from multiple sources within an interdependent team. The Navy SEALs embraced this concept, giving a voice to even the most junior men when it came to collective decision-making. Although experience is highly valued in the community, there is a readiness to entertain novel ideas from any source.

Familiarity also played a significant role in the collective adaptation of the SEAL units. However, unlike trust, familiarity between team members served a structuring role. The men within a unit could predict each individual's future actions as the men within a unit became intimately familiar with each other's behavioral tendencies and personal habits. This foreknowledge allowed each man to make his own personal adaptive decisions within the larger context of the team. Improvisation requires a grounding structure where there are "patterns of mutually expected responses" (Weick, 1998, p. 549). These patterns are established by the familiarity between team members, which leads to a shared cognitive structure. Equipped with this structure, the SEAL unit could act in concert with minimal explanation or communication. The Navy SEALs simply "knew" what each member of the team would do because they all used similar heuristics and they had observed each man's personal patterns of behavior over thousands of hours together.

Conclusion 4

> *The ability of individual team members to control emotions, slow and simplify reactions, and focus communication promotes more effective adaptation by an action team in an uncertain environment.*

A shared cognitive framework, extensive experience, and interdependent relationships between team members strengthen an individual team member's ability to respond appropriately in extreme situations. Rather than matching the environment's velocity, complexity and dynamism, the Navy SEALs reacted by slowing and simplifying decision-making and subsequent actions. By reducing their tempo, they could more accurately assess the situation and take decisive action.

Pham (2000) notes that many studies in the field of psychology have demonstrated that information processing is impacted by the affective state of the individual employing heuristics. Navy SEALs train extensively to maintain the proper affective state, calmly responding to the situation at hand. As one participant noted, Navy SEAL trainers use traumatic simulations to elicit extreme emotions. Repeated exposure to traumatic situations helps the men learn to control the natural rush of emotions that accompanies such situations.

As a situation's dynamism increases, Navy SEALs slow their actions to enable a calm and controlled response, while also making time to make sense of the situation. Moulton, Regehr, Myloupoulos and MacRae (2007) suggest that experts, such as Navy SEALs, demonstrate "expert judgment:"

> We would propose that expert judgment be considered as an expert's ability to respond effectively in the moment to the limits of his or her automatic resources and to transition appropriately to a greater reliance on effortful processes when needed. With adequate judgment, the expert will slow down when appropriate and take the time to ensure that the muddy problems of practice will be correctly named and framed. (p. 114)

Slowing down allows the Navy SEALs to dedicate a much greater amount of cognitive resources to maintaining situational awareness.

The importance and limitations of cognitive capacity align with Kahneman's (1973) assertions. He posits that paying attention requires effort, which uses up some degree of cognitive capacity. Humans have limited cognitive capacity to process information and make decisions. This capacity is stretched thin when individuals are required to identify multiple cues and reference multiple heuristics in an uncertain and potentially dangerous situation. In dynamic scenarios, processing communications from team members can be invaluable, but it also uses up some of this limited capacity. The Navy SEALs recognize communication between team members can be a dangerous distraction at times. SEAL units will focus messages and reduce communication to the bare minimum in uncertain and dynamic environments. The participants clarified that verbal and nonverbal communication is critical for coordinating adaptive actions, but it can be supplemented by the familiarity between team members. Experiential knowledge of each other's behavioral tendencies provides a sufficient level of structure to coordinate actions without the need for robust communication.

Conclusion 5

> *An action team's ability to adapt is dependent upon its dynamic instability (the interplay between morphostatic and morphogenetic factors).*

Stacey (1995) suggested bounded instability, or dynamic instability, was necessary for a complex adaptive system to remain at the edge of chaos and react appropriately to a dynamic environment. He further suggested that this paradoxical state of dynamic instability was only possible through the interplay between stabilizing

structures and destabilizing structures. This concept was echoed later by Buckley (1998) who described the structures as morphostatic (stabilizing) and morphogenetic (destabilizing). This conceptualization was confirmed by the identification of the interdependent factors that impact the adaptation of SEAL units. A depiction of these factors using Buckley's theoretical model is found in **Figure 5-2**.

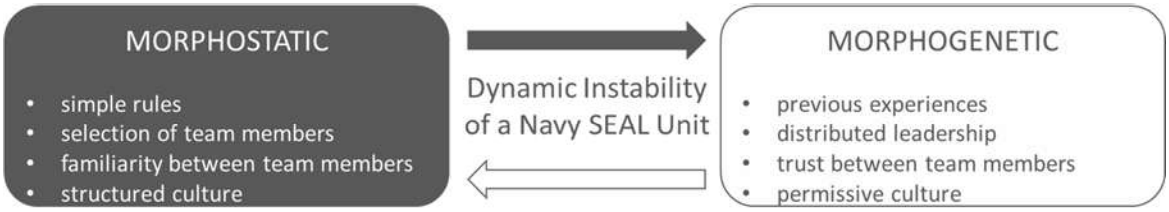

Figure 5-2 Dynamic Instability of a Navy SEAL Unit

Simple rules, selection of team members, familiarity between team members, and a structured culture that regulates behavior are morphostatic factors promoting structure. Simple rules act as a stabilizing force by creating fundamental boundaries within which the system can act (Stacey, 1995; Kamoche & Pina e Cunha, 2001). The selection process controls access to the community, ensuring only a select type of individual with certain essential characteristics is part of the team. This exclusivity is necessary to maintain the interdependent dynamics of an action team (Sundstrom, 1999). Familiarity between team members creates emotional bonds and a knowledge of each other's behavioral tendencies, both of which contribute needed structure during improvisation (Hatch, 1999). Finally, the culture of the organization establishes norms and mores which standardize the behavior of the team members. These morphostatic factors collectively provide a defined and shared cognitive structure within which limited creative and innovative actions can take place.

The morphogenetic factors that promote creative and innovative actions by team members include previous experiences, distributed leadership, trust between team members, and a permissive culture that encourages appropriate risk-taking and innovation. Previous experience provides each team member with unique expertise to contribute to the group (Vera & Crossan, 2005). Disparate expertise and experience can be combined and reformed in new and effective ways (Weick, 1999). A structure of distributed leadership allows authority to shift to the individual within a group who has the most valuable knowledge, experience, or vantage point. The group can adopt best practices quickly and effectively by allowing leadership to pass freely with minimal restrictions (Day et al., 2004). Trust also encourages innovation because it allows individuals to take action without the need for permission or substantial oversight. Each man can react quickly and decisively to his immediate environment. Finally, a culture that endorses adaptation reinforces the other three factors, encouraging new members to contribute and share their limited, but valuable experience and knowledge with the community.

The perpetual interplay between these counterbalancing forces allows Navy SEALs to employ common heuristics in novel ways while still retaining a sufficiently shared cognitive framework to perform coordinated actions. This combination provides the necessary ingredients for collective improvisation which is "a mixture of the precomposed and the spontaneous" (Weick, 1998, p. 551). One participant suggested this mixture is the "secret sauce" that enables the Navy SEALs to effectively adapt regardless of the uncertainty they face.

Summary of Conclusions

SEAL units are exceptional teams who simultaneously use morphostatic and morphogenetic factors to adjust their tactical response to asymmetric threats across the globe. The Navy SEALs who constitute these units make remarkably accurate split-second decisions, as individuals and groups. Findings from this study identified how simple rules are used by the Navy SEALs to collectively adapt as a unit. Additionally, this study provided qualitative evidence that confirms complexity theory, specifically the principle of dynamic instability, is an appropriate lens with which to examine the collective adaptation of action teams. Finally, and perhaps most importantly, this study clarified that multiple stabilizing and destabilizing factors are employed concurrently to enable SEAL units to react in the midst of an uncertain environment.

Limitations of Study

This study possessed a number of limitations that should be considered when examining conclusions and their related implications. First, the design of the study limits the applicability of its findings. Inherently, a single case study has limited generalizability. Additionally, all participants came from high-performing SEAL units, which are not representative of typical action teams. This selection bias necessarily impacts the appropriate generalization of conclusions and should be considered when extrapolating results. Furthermore, the SEAL units operate in exceptionally unique environments. Lichtman (2010) suggests examining an exceptional group via case study is a valid research method; however, researchers should consider the implications of studying such a group when applying principles to other action teams.

Second, each interview focused on a different platoon or squad; therefore, the data reflected the perspective of only one team member. There was no way for the researcher to corroborate each participant's account or triangulate findings using another team member's perspective. Additionally, each participant described a unique event they had witnessed in the course of training or on a mission. Responses from the participants were remarkably uniform despite the researcher examining unrelated events with differing situational characteristics. This uniformity allowed the researcher to identify findings that could be extended to the larger Navy SEAL community.

The characterization of the environment was a third significant limitation of the study. Each event described by the participants displayed varying levels of environmental uncertainty. Furthermore, these events displayed heightened degrees of velocity, complexity, and ambiguity. Although the study had intended to examine team adaptation in uncertain environments, it may be more appropriate to classify the environments described by the participants as highly dynamic (Davis et al., 2009). The researcher could not definitively say the nature of dynamic instability described by the research was reflective of an uncertain environment rather than a dynamic one.

Data credibility was the final significant limitation of the study. The study was designed to evaluate multiple streams of data (document reviews and individual interviews) and then use those streams to triangulate results. Officially-sanctioned documents were difficult to obtain due to the secretive nature of the participant's organization. Personal information about the participants was also restricted to ensure protection for the individuals and the Navy SEAL organization. The researcher

compared and corroborated results from the different individual interviews and performed member checks to compensate for these limitations.

Many of the limitations listed above are a direct result of access issues and security concerns for the retired Navy SEALs and the Navy SEAL organization. Most of the limitations could be addressed by repeating this study with multiple participants from one action team who could describe a single event characterized by uncertainty. The researcher would have access to far more official documents and personal background information if there were no security concerns surrounding the event or action team. The researcher could conduct improved corroboration and triangulation to ensure conclusions were accurate and representative with a greater number of data sources.

Implications

Conclusions from this study suggest compelling implications for future organizational theory, research, and practice.

Implications for Theory

Complexity theory is routinely criticized for lacking significant functionality and application in real-world social systems (Uhl-Bien et al., 2007). This study took a step toward operationalizing complexity theory by identifying the factors that enabled the dynamic instability of an action team. Not only were these factors identified for an actual social system, but the nature of their stabilizing/destabilizing influence was also initially explored (Tu et al., 2009). There is certainly far more work that needs to be done to fully understand the complex interaction of these different morphostatic and morphogenetic factors, but this research makes notable progress towards describing dynamic instability in an uncertain environment.

Relatedly, the research findings illuminated the complex nature of heuristics used by individuals in an action team. The study demonstrated that simple rules, as depicted by Eisenhardt and Sull (2001), played a major role in a team's dynamic instability; however, the study also revealed that simple rule development, recall, and application was inextricably linked to individual experience and relationships between team members. This finding reaffirmed Starbuck and Milliken's (1988) assertion that simple rules are built upon the historical information possessed by the system or its actors. Future research that explores or utilizes the concept of dynamic instability must consider the complex interaction between simple rules, experience, and relationship without inappropriately or improperly simplifying the process.

Finally, this study revealed that dynamic instability is a useful concept with which to relate the social-centric work on improvisation with the systems-centric work on adaptation. Although both areas of study ultimately involve the capability of a system to change, their primary focus is far different. The literature on improvisation focuses on the creative and social act that produces novel outcomes through nonlinear interactions (McDaniel, 2007) while the literature on adaptation focuses on a system's ability to balance novel and existing techniques to increase survival in response to environmental pressures (Eisenhardt & Tabrizi, 1995). Dynamic instability provides a conceptual lens through which to examine a social system as it recombines pre-existing elements through social interactions (improvisation) to preserve a system as it responds to a dynamic and uncertain environment (adaptation).

Implications for Research

Results from this study also pointed toward the need for future research on a variety of different scholarly topics.

Complexity theory and team functioning

Despite its limitations, complexity theory is a useful framework with which to examine systems at various levels of analysis, including teams. In particular, this research study demonstrated that the principle of dynamic instability is a valuable model with which to explore team functioning. This result suggests other foundational aspects of complexity theory should also be considered to advance understanding of social systems. Concepts such as "sensitivity to initial conditions" (Buckley, 1998) and "self-organization fueled by dissipative structures" (Prigogine & Stengers, 1984), may provide surprisingly practical models to further understand action teams. Such an exploration may also help to develop the nuances of complexity theory through real-world organizational phenomena.

Structuring role of communication and familiarity

Communication is a fundamental feature of all action teams. Communication enables team members to develop a shared cognitive framework, which enables them to coordinate and structure their collective activity (Tu, et al., 2009; Taylor & Van Every, 2000). This study demonstrated that the critical coordinating/structuring function provided by communication can be supplemented, or even replaced, by relational-based knowledge. The familiarity between team members can produce a shared mental template that can be accessed more quickly and with less cognitive strain than one produced through interpersonal communication. The relationship between

communication and familiarity should receive further attention in regards to their common structuring role during collective adaptation.

Sensemaking and dynamic instability

Karl Weick (2009) suggests adaptation in the midst of uncertainty is intimately connected with the concept of sensemaking. He states the following,

> Sensemaking appears to be the root activity when people deal with an unknowable, unpredictable world. In these dealings, they produce continuous ongoing change. Thus, effective sensemaking and effective emergent change are tied together closely. The more fully sensemaking activities are activated, the more effective the change (p. 235).

This study verified that heuristics also serves a critical role in adaptation. Additional exploration of the relationship between sensemaking and heuristics may further illuminate the nature of dynamic instability in a complex adaptive system.

Storytelling and dynamic instability

The research concluded that simple rules are effectively utilized by an action team when these guiding principles are embedded within a thick context. As suggested by Boal & Schultz (2007), context is valuable because it provides underlying patterns that allow an individual to access the critical information more quickly and appropriately. "By virtue of their narrative structure, stories tend to sort information into coherent patterns" (p. 419). Although storytelling was not explicitly explored in this study, the participants' universal agreement of the importance of experience suggests narrative may play a significant role in dynamic instability. Boal and Schultz (2007) explored the connection between complexity theory and storytelling at the organizational level, but additional research at the meso-level of analysis could provide practical implications for action teams in a variety of circumstance.

Collective adaptation and heuristics

Kahneman (2011) proposes that cognitive activities may be divided into two categories; System 1 which operates automatically and rapidly with little voluntary control, and System 2 which allocates attention to mental activities that require an effortful response. System 1 is intuitive thought while System 2 is deliberate thought. Kahneman further suggests these two systems routinely interact to allow humans to operate effectively in a perpetually-changing world constantly delivering competing cues. This concept was certainly supported by the accounts of the participants, suggesting the interaction of the two systems play a critical role in individual adaptation. It would be worthwhile to further explore this concept and its relationship to collective team adaptation. There may be a valuable link between Weick's (1993) work on collective cognition, the concept of dynamic instability, and Kahneman's two-system conception.

Varying usage of morphostatic and morphogenetic factors

The study provided substantial evidence to support Buckley's (1998) theoretical conception of dynamic instability by identifying the morphostatic and morphogenetic factors impacting a team's adaptive capacity. However, there is still a number of areas that require further exploration to develop a thorough understanding of the relationship between collective adaptation and dynamic instability. First, it would be valuable to determine if the factors identified as playing a role in a team's dynamic instability are similarly identified in a true meso-level study. Furthermore, a cross-level study could also produce valuable results. This type of research at varying levels of analysis would benefit theory expansion by determining if certain types of stabilizing/destabilizing factors are universal to all systems and a necessary ingredient for dynamic instability. It

would also benefit practice by illuminating how individuals, teams, and organizations should develop themselves for great adaptive capacity.

Second, further research should be conducted to examine how a team's concurrent usage of morphostatic and morphogenetic factors evolves over time. The study indicated that experience and familiarity play a major role in dynamic instability and these two factors are highly dependent upon the amount of time a team interacts together. A greater conception of dynamic instability and team maturation could provide valuable insight into the adaptive capacity of stable teams and ad hoc teams.

Varying levels of adaptive capacity

This study examined high-performing teams who successfully operated in uncertain environments on a routine basis. Repeating this study with a low-performing team may provide valuable comparative data. Exploring the nature of dynamic instability in teams with varying levels of adaptive capacity would clarify the importance of different morphostatic and morphogenetic factors and potentially pave the way for the creation of a future team assessment tool. Relatedly, conducting a case study involving a situation in which there was an imbalance of morphostatic or morphogenetic factors that resulted in a catastrophic team failure may deliver important insight into the necessary balance between the two types of factors. Re-examining some of Weick's work, such as the Mann Gulch disaster (Weick, 1993), using a lens of dynamic instability and focusing on the imbalance of morphostatic and morphogenetic factors may offer an alternative and intriguing perspective.

Implications for Practice

Finally, the results of this study pointed to consequential implications for team functioning. There are practical suggestions for both action teams operating in uncertain environments and teams operating in a business environment. In both cases teams will likely increase their adaptive capacity by considering the following recommendations.

Action teams operating in uncertain environments

Findings from this study implied simple rules are most effectively utilized when embedded within personal experience, or narrative. Establishing universal guidelines or general principles will be far more effective if they are presented through actionable training where team members can develop experiential knowledge and a shared framework. Stripping detailed context from simple rules makes them more generalizable, but it also makes them less meaningful and applicable. It is the experiential knowledge acquired in training and real-world situations that harbors meaningful patterns and it is those patterns that guide team members' application of heuristics in the midst of dynamic and uncertain environments.

Teams who are required to respond in such environments need training designed to elicit collective adaptation and improvisation rather than training that requires application of a prescriptive, standard response. Training that prompts an adaptive response still hones individual skills and automates responses, but its greatest values lies in is proliferation of dynamic instability. It produces experiences that form shared cognitive frameworks that team members can use in future situations and provides opportunities to develop trust and familiarity between team members.

Finally, the research demonstrated that communication is a critical component in collective adaptation, but it can also have detrimental effects in dangerous environments. As previously noted, communication is a morphostatic function that serves a structuring, organizing and coordinating role for a system; however, it also places a major cognitive strain on individuals who are focused on responding to a fluid and potentially threatening situation. Teams who operate in these environments need training to identify when communication is worth the cognitive price and when they should rely on team member familiarity to provide structure, organization, and coordination.

Teams operating in business environments

Effective teams in any environment must be comfortable operating in a paradoxical state characterized by ongoing tension. The findings from this research suggested that adaptive teams maintain a concurrent existence of morphostatic and morphogenetic factors, implying that some degree of tension is not only healthy, but necessary for team success. Business teams are not exempt from these findings. It is a difficult conclusion for many business leaders to accept because it suggests a degree of ongoing discomfort is required. Leaders of business teams must come to accept the inevitability of tension within their teams and recognize its potential value. They must intentionally take steps to maintain their teams in an excitable state of anticipation if they hope to adapt to a perpetually changing world.

Similar to action teams such as the SEAL units, one of the best ways to promote this excitable state and a comfort with tension is through real-world simulations. Teams that collectively engage in these simulations will learn to harness perpetual tension by concurrently fostering both stabilizing and destabilizing factors within their teams. **Table**

5-2 depicts how the conclusions produced by this study may be manifested in both a SEAL unit and a business senior leadership team.

Conclusion	Sub-conclusion	Manifestation in an adaptive SEAL Unit	Manifestation in an adaptive business senior leadership team
Individuals in an action team mentally reference a combination of general simple rules and situation-specific simple rules when they adapt in an uncertain environment.	Varying application of different types of simple rules correspond with different levels of environmental uncertainty.	While a raid is being executed according to plan, the SEAL unit primarily references timing and exit rules to make decisions, but if an unexpected firefight breaks out, the SEAL unit begins utilizing priority and how-to rules to guide decisions.	A team uses situation-specific exit rules when evaluating a potential acquisition that has clear financial ramifications. The team utilizes broad, pre-established priority and how-to rules if there is a significant level of uncertainty concerning the impacts of the acquisition.
	Simple rules provide the basis for a shared cognitive structure that enables greater collective adaptation.	A commonly cited priority rule in the Navy SEAL community is "win the gunfight." Navy SEALs who are caught in an unexpected firefight know that their teammates will operate under this simple principle and can make individual decisions based on this corporate knowledge.	When a team establishes clear, risk-based "go-no go" criteria in regards to pursuing contracts, team members have a shared set of guidelines that empowers them to make rapid and appropriate decisions to seize time-sensitive opportunities.
Previous experience plays an important role in the adaptive capacity of an action team.	Experience provides an individual with context to determine how simple rules can and should be applied.	Combat experience allows a Navy SEAL officer to recognize when a timing rule should still be applied during a specific operation and when an exit rule should be applied because the mission objective can no longer be safely accomplished.	A business group president relies on years of experience to determine how a specific "go-no go" rule should be appropriately applied given the specific context surrounding a particular business opportunity.
	Experience strengthens the relationship (trust and familiarity) between team members which allows them to adapt more quickly and effectively as a collective.	Navy SEALs who have successfully conducted previous missions together naturally develop a stronger bond of trust and greater familiarity that produces valuable social dynamics that increase the adaptive capacity of a SEAL unit.	A CEO who routinely witnesses a business group president make profitable business decisions understands the decision-making process employed by the president and naturally trusts the individual even if the CEO is concerned about the transaction.

Conclusion	Sub-conclusion	Manifestation in an adaptive SEAL Unit	Manifestation in an adaptive business senior leadership team
Relationships between team members, grounded in previous experience and a shared culture, play an important role in the adaptive capacity of an action team.	Trust between team members gives each individual the freedom and permission to take initiative and adapt as necessary.	All Navy SEALs must pass the same rigorous selection process. This assurance of competence produces a communal trust that gives permission to every SEAL to take initiative and adapt in the midst of a mission.	The trust that pervades the team when it comes to taking appropriate financial encourages individual team members to make accurate risk assessments based on factual data rather than emotions of fear and risk-aversion.
	Familiarity between team members enables the action team to collectively adapt more quickly and effectively because they can predict how another teammate will react given a specific set of parameters without the need for extensive communication.	A SEAL that has operated with his unit in dozens of missions and training exercises can predict how his teammates will react when they unexpectedly take fire. This knowledge allows him to make quick decisions based on those historic behavioral patterns.	A strong familiarity between team members allows one business president to maintain a basic understanding of how other business group presidents will react in a given situation. Armed with that knowledge, the individual makes time-critical decisions even when those decisions impact multiple business functions.

Conclusion	Sub-conclusion	Manifestation in an adaptive SEAL Unit	Manifestation in an adaptive business senior leadership team
The ability of individual team members to control emotions, slow and simplify reactions, and focus communication promotes more effective adaptation by an action team in an uncertain environment.	Individual decision-making is enhanced when individuals are able to control their reactions and react calmly in the midst of an uncertain environment.	A Navy SEAL officer maintains control over his emotions and exudes a calm demeanor even when becoming engaged in an unexpected firefight. This calm enables him to make appropriate tactical decisions based on the situation and not adrenaline-based feelings of fear and excitement.	The CEO holds emotions in check and maintains calm during a turbulent market fluctuation which enables the leader to divorce the decision-making process from adrenaline-based feelings of fear and excitement.
	As environmental uncertainty increases, individuals who react by slowing down and simplifying their actions are capable of more effective adaptation.	A Navy SEAL officer exhibits "tactical patience" when his SEAL unit encounters an unexpected fire fight. Rather than making immediate decisions based on limited data, he seeks additional information and issues simple orders to reduce confusion and allow his men to individually adjust tactics as needed.	During dramatic business shifts, a business group president simplifies strategy and clarifies priorities and guidelines so that employees can make appropriate project-specific decisions within the larger context.
	In an uncertain environment, action teams that focus communication, reduce potential distractions for team members. This reduced, but effective communication is possible because of trust and familiarity between team members.	When the point man is engaged by an enemy combatant, the Navy SEAL officer reduces communication and trusts the Navy SEAL to appropriately deal with the situation. Any orders or communication that is provided is very simple, thereby reducing distraction.	When a business group president is engaging in a critical business deal, the CEO refrains from micromanaging and repeatedly checking on status. This allows the business group president to focus on negotiations rather than responding to internal phone calls and emails.

Conclusion	Sub-conclusion	Manifestation in an adaptive SEAL Unit	Manifestation in an adaptive business senior leadership team
An action team's ability to adapt is dependent upon its dynamic instability (the interplay between morphostatic and morphogenetic factors).	Morphostatic factors that promote structure include simple rules, selection of team members, familiarity between team members, and perpetuation of a structured culture that regulates behavior.	The SEAL unit has a shared set of basic tactical rules that all team members use and understand. The men have all undergone a challenging selection process which ensures they share common traits. They also operate frequently together such that they have a clear understanding of what everyone else will do in a certain situation. Finally, the SEAL culture integrates each individual creating a shared mindset. All of these factors promote a defined cognitive structure that creates a stable foundation on which quick and effective decisions can be made by each individual in the SEAL unit.	The team has clear values and principles that guide all strategic decisions. Selection of team members has been based on these values and each individual embodies these simple principles. The team spends significant time working together and team development includes business simulations such that everyone is familiar with each other's typical business practices. Expectations are clearly laid out by the CEO and these expectations align with the company's values and culture. All of these factors promote a defined cognitive structure that creates a stable foundation on which quick and effective decisions can be made by each team member.
	Morphogenetic factors that promote flexibility include previous experience, distributed leadership, trust between team members, and perpetuation of a permissive culture that encourages innovation.	Each Navy SEAL has a diverse operational background that can be mentally accessed to creatively respond to a novel situation. Each Navy SEAL trusts that the other members of his unit will respond appropriately, giving each individual great freedom to experiment and react accordingly. Finally, the SEAL culture promotes a distributed leadership model where each individual serves in a leadership capacity and has the freedom to take the initiative. All of these factors promote an innovative environment where individuals are expected and encouraged to be creative.	The team is made of individuals with diverse perspectives and backgrounds whose experience can be leveraged. The CEO encourages a distributed leadership model where each business group president has an equal voice and is seen as an expert in their field. Team members trust each other to make wise financial decisions that align with the shared values of the team. Finally, the company culture explicitly promotes innovation and appropriate risk-taking at all levels. All of these factors promote an innovative environment where individuals are expected and encouraged to be creative.

Table 5-2 Manifestations of Study Conclusions in SEAL Units and Business Senior Leadership Teams

Summary and Concluding Remarks

This qualitative case study examined the collective adaptation of SEAL units by using complexity theory as a theoretical lens. Document reviews and individual interviews with retired members of this elite action team provided insight into the nature of SEAL units' heuristics in the midst of uncertainty. Data analysis identified the morphostatic and morphogenetic factors that enabled SEAL units to maintain dynamic instability, thereby increasing the team's adaptive capacity. Adaptive capacity is essential for SOFs, emergency response teams, surgical teams, firefighters, police units, and other action teams who operate in environments characterized by uncertainty.

The conclusions reached by this study significantly expounded on theory, informed future research, and provided practical application for teams. The significance of this research will surely increase as the civilized world continues to face asymmetric threats by terrorists, extremists and fanatic radicals. Elite SOF units, like the Navy SEALs, will increasingly be called upon to respond to these threats that are perpetually changing and evolving. Only those units who maintain dynamic instability will be able to collectively adapt to these dangerous and uncertain situations. Thankfully, the Navy SEALs have the capacity and the willingness to respond to these threats and preserve our way of life.

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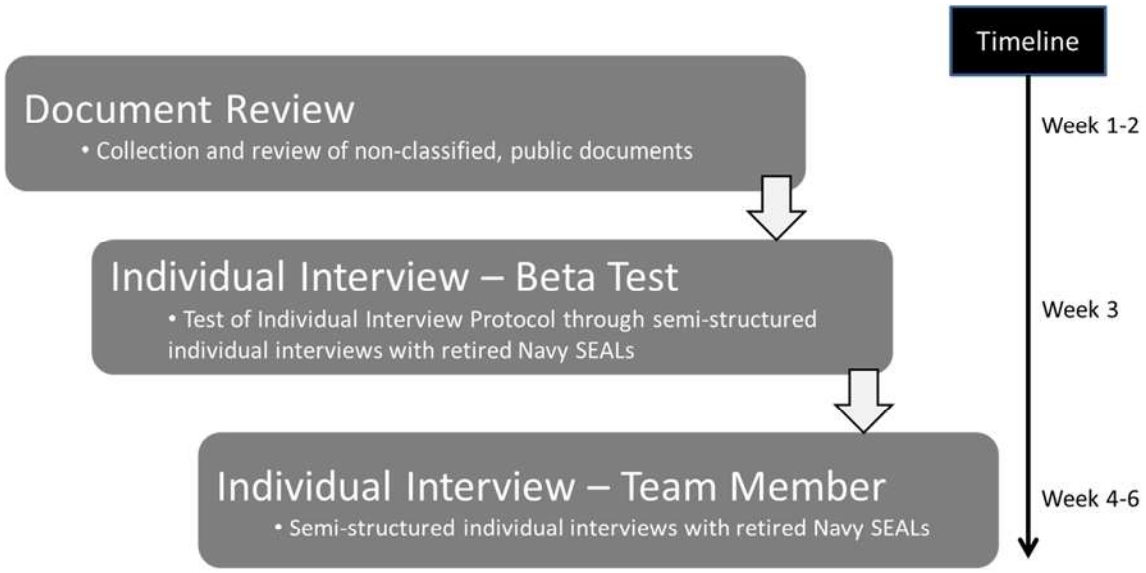
Appendices

Appendix A:

DATA COLLECTION OVERVIEW

Team Adaptation in Uncertain Environments: A Descriptive Case Study of Dynamic Instability in Navy SEAL Units



Appendix B:

INDIVIDUAL INTERVIEW RESEARCH PROTOCOL

Team Adaptation in Uncertain Environments: A Descriptive Case Study of Dynamic Instability in Navy SEAL Units

My name is David Livingston and I am a doctoral student at the George Washington University studying leadership. First, I want to thank you for taking the time to speak with me. I truly appreciate your help with this study. To give you a background, my research focuses on examining how teams adapt to uncertain environments. It is my hope that this research may help other units adapt and improvise, thereby assisting our men and women in uniform be more successful.

This interview session will last for approximately 60-90 minutes and involve us discussing a previous operation when something unexpected happened that forced the team to adapt. I would like your permission to record the session so that I ensure I capture all the important data. The recorded data will be captured in the form of written transcripts and I will take notes. I will make the transcript and my notes available to you for a final review to ensure no sensitive information is transmitted. Your name will not be recorded to guarantee security and anonymity. If your name is inadvertently used during the interview, it will be deleted during transcription. Just to clarify, you are not required to participate and you may excuse yourself at any time. Before I begin, do you have any questions?

Begin Recording the Interview

Type of Data	Interview Question
Demographic	Approximately how many live fire combat situations have you experienced? 0 1-5 6-20 >20
Simple rules	What are some of the most important rules SEALs follow during an operation? (for example, “It pays to be a winner”)
Contextual	Think of an operation or a training evolution when something went very wrong and the team had to suddenly adapt. Could you describe what happened? What was your role?
Adaptation	How did your teammates know what to do in that moment? How were you communicating? Is this different from your normal communication during an operation?

Adaptation	Often times when you ask someone to describe how their team adapted so quickly, they say it was a result of muscle memory from years of training. We call that tacit knowledge – knowledge so ingrained that you take it for granted and it's hard to articulate. To truly understand how the team was able to collectively adapt and succeed, we need to dig down into this tacit knowledge. Let's talk about the moment you realized something was wrong. Can you describe to me moment-by-moment what you were doing and what your teammates were doing? What was going through your mind?
Adaptation	Although this may seem a bit odd, sometimes the best way to describe tacit knowledge is through a picture or metaphor. When you think about your team adapting during an operation, what kind of pictures or ideas come to mind?

We are just about done with the interview. Do you have anything else to add or do you have any questions for me? The information you provided today is extremely valuable and I really do appreciate your assistance. Here is my business card. If you think of anything later that you'd like to discuss or if any portion of this research is troubling you, please feel free to call my cell phone or email me. Thank you again.

Appendix C:

INFORMED CONSENT DOCUMENT

Team Adaptation in Uncertain Environments: A Descriptive Case Study of Dynamic Instability in Navy SEAL Units

Researcher: **David Livingston**
David.livingston@ch2m.com
757-338-2136

Principal Investigator **Dr. David Schwandt**
Schwandt@gwu.edu
703-726-3770

GW IRB Number: **041418**

Introduction

You are being invited to participate as a subject in a research study. Before you decide to participate in the study, please carefully review this document which reviews the risks and benefits. Participation in this research is entirely voluntary. If you agree to participate, you will be asked to verbally provide your consent before any data is collected. Any information you provide will be kept in confidence by the researcher and other reviewers. You may choose not to participate or decide to withdraw from the study at any time. You should skip or refuse to answer any interview questions that would result in the disclosure of sensitive or classified information. Upon completion of written transcripts from the interview process, you will be asked to review the document to ensure no sensitive or classified information will be disclosed. The researcher will edit and/or remove any sensitive or classified information you identify during the review and it will not be included in research analysis or result reporting. You may contact me at the email or phone number listed below at any time for additional information.

Purpose of the study

As part of the Executive Leadership Doctoral Program in the Graduate School of Education at the George Washington University, I am completing a dissertation on team adaptation in uncertain environments. Specifically, I am exploring how Navy SEAL units adapt during an unexpected critical incident. You are being asked to take part in this study as a recently retired Navy SEAL (between 2007 and 2014) who has knowledge regarding activities relating to the study content. You will be one of approximately 15 participants asked to take part in an interview.

Involvement of study participant

If you choose to take part in this study, you will be asked to participate in an interview with the researcher lasting 60-90 minutes. Individual interviews will be taped subject to individual consent. Tapes, notes, and transcripts will be used for research purposes only and will not be released for any other purpose. Your name will not be recorded and a

pseudonym will be used to ensure confidentiality. If your name is inadvertently used during the interview, it will be deleted during transcription. Tapes and transcripts will not include individual identification except for operational roles, and will be secured by the researcher. Recorded data will be destroyed following written transcription. You will be provided with the transcript prior to the completion of this study to ensure no material deemed sensitive in nature is exposed.

Risks of participating in this study

There are no physical risks associated with this study; however, there is a risk of emotional and/ or psychological discomfort as a result of describing and re-living an unexpected critical incident that took place during an operation or training exercise. If you do experience discomfort, I can provide you with contact information for counselors employed by the Department of the Navy to provide support.

There is also a risk of emotional and/or psychological discomfort as a result of concern that operational or personal data deemed sensitive in nature may be released to the general public. Every effort will be made to keep your information confidential. All notes, transcripts, and records will be linked to a pseudonym to disguise your identity. I will be the only individual to listen to the recording of your interview recording and transcribe the contents. I hold a security clearance issued by the Department of Defense (person of trust). Several measures will be taken to ensure your privacy in this study (see Protection of Privacy below). However, there is a risk that members of your previous organization or others will observe the researcher meeting with you during the interview. Additionally, you will have the opportunity to review the transcripts and conclusions prior to the publishing of research to ensure no material deemed sensitive in nature will be released to the general public. The data will be struck from the record if you believe it may identify you or pose a possible security threat.

Please note that at any time you may take a break during the interview. Additionally, you may stop your participation in this study at any time.

Benefits to taking part in this study

As a participant, you will not benefit directly from your participation in this study. Research benefits that might result from this study is to expand knowledge of team adaptation, producing practical applications for other military and civilian teams that regularly encounter uncertain environments.

Options

You may opt not to participate in this study**.** Should you decide to participate and choose to stop, you may do so at any time.

Payment for being in this study

You will not be paid for taking part in this study. The investigators for this study will not be paid for conducting this research.

Termination of participation in the study

The researcher can decide to withdraw you from the study at any time. You could be taken off the study for reasons related solely to you or because the entire study is stopped.

Protection of Privacy

If results of this research study are reported in journals or at scientific meetings, the subjects who participated in this study will not be named or identified. Privacy for individuals will be protected by using pseudonyms to disguise participant identities, although operational roles may be preserved. All tapes will be destroyed directly after completion of written transcripts. Should direct quotations be used in any publications, they will be identified by a pseudonym. The research records will be confidential unless you approve their release or they are required to be released by law.

Problems or Questions

The Office of Human Research of George Washington University can provide further information about your rights as a research participant. The office can be contacted at telephone number (202) 994-2715. If you think you have been harmed in this study, you may report this to the Principal Investigator of this study. Further information regarding this study may be obtained by contacting David Livingston, researcher, at 757-338-2136.

*Please keep a copy of this document in case you want to read it again.

If you agree to participate in this study, please provide your verbal consent.

Appendix D:

INFORMATIONAL EMAIL FOR POTENTIAL PARTICIPANTS

Team Adaptation in Uncertain Environments: A Descriptive Case Study of Dynamic Instability in Navy SEAL Units

You are being invited to participate as a subject in a research study. As part of the Executive Leadership Doctoral Program at the George Washington University, I am completing a dissertation on team adaptation in uncertain environments. Your participation in this research is entirely voluntary. Any information you provide will be kept in confidence by the researcher and other reviewers. You may choose not to participate or decide to withdraw from the study at any time.

Specifically, this study is exploring how a Navy SEAL unit adapts during an unexpected critical incident. To aid in this exploration, I intend to conduct individual interviews with recently retired Navy SEALs (retired between 2007 and 2014) who experienced a training evolution or real-world operation in which their team was required to adapt to an unexpected event.

Individual interviews will last for approximately 60-90 minutes each. Interviews will be recorded to ensure all important data is captured; however, names will not be recorded. Operational roles will be captured, but a pseudonym will be used to guarantee security and anonymity. The recorded data will be transcribed and immediately following transcription, all recorded data will be destroyed. If your name is inadvertently used during the interview, it will be deleted during transcription. Hard copies of the interview transcripts will be given to you for a final review to ensure no sensitive material is transmitted.

I am very grateful for your assistance and I hope this research may produce practical applications for other military and civilian teams that regularly encounter uncertain environments.

You may contact me at the email or phone number listed below at any time for additional information.

Very Respectfully,

David Livingston
Doctoral Student at the George Washington University
David.livingston@ch2m.com
757-338-2136

Appendix E:

CODING RESULTS

Coding Results from Data Collection

Emergent Themes	Codes	Interviews with Retired Navy SEALS							Document Review			TOTALS:
		Navy SEAL Alpha	Navy SEAL Beta	Navy SEAL Gamma	Navy SEAL Delta	Navy SEAL Epsilon	Navy SEAL Zeta	Navy SEAL Eta	Navy SEAL Code	Navy SEAL Credo	Navy SEAL recruiting site	
Use of fundamental rules vs. mission-specific rules (as they relate to the five types of simple rules)	Adaptation (use of simple rules)	0	0	1	6	1	0	2	0	0	0	10
	Adaptation (necessity of)	3	1	1	1	2	1	2	0	0	0	11
	Adaptation (relationship between training and simple rules)	0	0	2	5	1	1	1	0	0	0	10
	Common SEAL adage	2	4	1	1	1	0	3	0	0	0	12
	Rules (Boundary rule)	3	1	2	6	0	0	0	0	1	1	14
	Rules (Exit rule)	1	3	0	0	0	0	0	0	0	0	4
	Rules (How-to rule)	2	8	1	2	1	1	4	1	0	0	20
	Rules (Priority rule)	3	2	2	4	0	4	0	0	1	0	16
	Rules (Timing rule)	1	6	0	3	0	0	0	0	0	0	10
	Rules that are mission specific (rules of engagement)	1	0	2	1	0	0	1	0	0	0	5
	Situational awareness	3	2	1	1	2	4	4	0	0	0	17
	Unpredictable environment	1	0	1	0	0	1	0	0	1	1	5
Demographic	Combat experience	1	1	1	1	1	1	1	0	0	0	7
Role of experience in the process of individual and team adaptation	Adaptation (comfort with)	1	0	1	1	4	2	1	1	1	1	13
	Adaptation (culture of)	0	1	1	1	6	0	0	1	1	1	12
	Adaptation (past experience used as template)	3	5	3	6	6	1	2	0	0	1	27
	Adaptation (training designed to increase capability)	0	4	5	2	0	3	4	0	0	1	19
	Respect for legacy	0	4	0	1	0	0	0	0	1	3	9
	Planning (contingencies)	2	4	1	1	0	3	4	0	0	0	15
	Planning (importance of)	0	2	0	0	0	1	1	0	0	0	4
	Preparation (importance of)	0	1	2	0	0	2	2	0	0	1	8

Emergent Themes	Codes	Interviews with Retired Navy SEALS							Document Review			TOTALS:
		Navy SEAL Alpha	Navy SEAL Beta	Navy SEAL Gamma	Navy SEAL Delta	Navy SEAL Epsilon	Navy SEAL Zeta	Navy SEAL Eta	Navy SEAL Code	Navy SEAL Credo	Navy SEAL recruiting site	
Role of trust, team familiarity, and distributed leadership in the process of team adaptation	Distributed leadership	2	5	2	3	2	1	0	1	0	1	17
	Selection process	2	0	2	3	2	0	0	0	0	0	9
	Shared cognitive framework	1	2	2	0	3	4	0	0	0	0	12
	Team familiarity (awareness of others' actions)	2	1	1	1	0	2	1	0	0	0	8
	Team familiarity (established in training)	2	0	1	1	1	2	0	0	0	0	7
	Team familiarity (provides ability to predict actions)	1	2	2	0	2	6	0	0	0	0	13
	Team familiarity (recognition of others' capabilities/tendencies)	0	0	0	0	0	1	1	0	0	0	2
	Team trust (allows for individual adaptation)	2	0	0	0	0	0	1	0	1	1	5
	Team trust (by Command)	2	0	0	0	3	0	0	0	0	0	5
	Team trust (established in training)	2	1	0	1	0	1	0	0	0	0	5
	Team trust (role in adaptation)	1	1	0	0	3	2	0	0	1	0	8
Team response (including communication) in an environment characterized by uncertainty	Adaptation (metaphor)	1	0	0	0	1	1	0	0	0	0	3
	Adaptation (team described as fluid, dynamic)	2	0	1	1	1	0	1	0	0	0	6
	Adaptation (use of communication)	0	1	5	1	0	0	0	0	0	0	7
	Communication (calm delivery)	2	0	1	0	1	0	1	0	0	0	5
	Communication (clarity of message)	0	3	1	1	0	0	0	0	0	0	5
	Communication (direct style)	1	1	0	1	1	1	0	0	0	0	5
	Communication (reduced volume)	2	0	1	2	1	2	0	0	0	0	8
	Communication (simplify message)	1	0	0	1	1	0	0	0	0	0	3
	Communication (slowed delivery)	0	0	1	0	0	0	0	0	0	0	1
	Response to unpredictability (address biggest threat)	2	0	1	0	0	6	0	0	0	0	9
	Response to unpredictability (automated response)	2	0	1	0	2	1	2	0	0	0	8
	Response to unpredictability (calm down)	1	1	0	1	0	1	2	0	0	1	7
	Response to unpredictability (follow SOPs)	3	0	0	0	0	0	0	0	0	0	3
	Response to unpredictability (simplify)	3	0	0	1	0	0	1	0	0	0	5
	Response to unpredictability (slow down)	3	2	0	2	0	2	0	0	0	0	9
	Response to unpredictability (take action)	1	0	0	1	1	0	0	0	0	0	3
	Risk Analysis	0	5	0	6	0	0	0	0	0	0	11

Appendix F:

DOCUMENTS OFFICIALLY SANCTIONED BY THE NAVY

Documents Officially Sanctioned by the Navy SEALs and used for the Document Review

Navy SEAL Credo

You are being invited to participate as a subject in a research study. Before you decide to participate in the study, please Brave men have fought and died building the proud tradition and feared reputation that I am bound to uphold. In the worse of conditions, the legacy of my teammates steadies my resolve and silently guides my every deed. I will not fail.

My Trident is a symbol of honor and heritage. Bestowed upon me by the heroes that have gone before, it embodies the trust of those I have sworn to protect. By wearing the Trident I accept the responsibility of my chosen profession and way of life. It is a privilege that I must earn every day.

I will never quit. I persevere and thrive on adversity. My Nation expects me to be physically harder and mentally stronger than my enemies. If knocked down, I will get back up, every time. I will draw on every remaining ounce of strength to protect my teammates and to accomplish our mission. I am never out of the fight.

We demand discipline. We expect innovation. The lives of my teammates and the success of our mission depends on me – my technical skill, tactical proficiency, and attention to detail. My training is never complete.

We train for war and fight to win. I stand ready to bring the full spectrum of combat power to bear in order to achieve my mission and the goals established by my country. The execution of my duties will be swift and violent when required yet guided by the very principles that I serve to defend.

(As documented by Scott Mcewen & Richard Miniter in *Eyes on Target*.)

Navy SEAL Code

Loyalty to Country, Team and Teammate
Serve with Honor and Integrity On and Off the Battlefield
Ready to Lead, Ready to Follow, Never Quit
Take responsibility for your actions and the actions of your teammates
Excel as Warriors through Discipline and Innovation
Train for War, Fight to Win, Defeat our Nation's Enemies
Earn your Trident everyday

Navy SEAL Recruiting Website

http://www.sealswcc.com/navy-seals-overview.html

Appendix G:

INDIVIDUAL INTERVIEW SUMMARIES

Summary of Individual Interview with Participant Designated Navy SEAL Alpha (pseudonym)

The participant designated Navy SEAL Alpha (hitherto referred to as "Alpha") experienced approximately five live-fire combat situations. Alpha noted that from a command perspective a number of basic "rules" are established during mission planning such as the mission timeline, the minimum number of individuals required to accomplish a mission, and rules of engagement. Establishing rules prior to mission execution provides the leader with a number of automatic assessment criteria with which to make decisions in an ever-changing environment. Additionally, there are "rules" that are more rudimentary and can be universally applied during mission execution. Alpha specifically mentioned the rule "the mission, the men in your command, and then yourself."

Following a general discussion on the use of rules during missions, Alpha provided a detailed account of an unpredictable situation in which his joint strike force, composed of Navy SEALs and Army Special Forces, conducted a mission to apprehend a prominent financier who was supplying foreign agents with weapons that were being used on American interests. The typical planning period for this mission was relatively short and intelligence on the target was unreliable, increasing the likelihood of unpredictability. Due to faulty intelligence, the team initially entered the wrong house which alerted others in the area. While breeching the correct house, gunfire erupted in the courtyard. It was later determined that the "roof team" who was providing overwatch support, shot and killed a man who had a weapon and was waiting in ambush for the assault team. Following elimination of the one individual, there was no additional threat to the team; however, neither Alpha, nor the team, knew that for certain.

Despite the chaotic situation, Alpha waited for 10 seconds before initiating contact with his assault team to prevent distractions and allow the team to react. Alpha then sought "de-complexion" of the situation by asking direct questions over the radio. Alpha then moved forces to make visual contact with the other components of the team and supply additional fire support if needed. This movement was particularly dangerous because it had the potential to elicit a friendly fire incident in which the US military personnel might unknowingly fire on each other. To prevent this situation, Alpha communicated very briefly with his teammates and mentally referenced past training to ensure he followed procedure. He fully trusted that the other components of his team would similarly follow procedure based on previous live-fire training drills (not necessarily SEALs on this particular mission). Alpha fully expected that anyone who had been admitted into the SEAL fraternity would act in an "aggressive and appropriate manner." Alpha noted, "They pick the right people that can be disciplined and be structured, but when everything is thrown out, can still improvise and improvise safely, and quite ingeniously at times." He further clarified that this experience-based trust forged during previous operations and training, actually reduced the need to communicate during unpredictable events.

Summary of Individual Interview with Participant Designated Navy SEAL Beta (pseudonym)

The participant designated Navy SEAL Beta (hitherto referred to as "Beta") experienced more than five live-fire combat situations. Beta suggested there are a number of "go-by's" utilized by SEALs during missions that evolved out of lessons learned from historical events where people were injured or killed. These rules are "written in blood." Beta mentioned a number of rules, but the one he emphasized most was "shoot, move, and communicate." He clarified that this versatile axiom could be widely applied to make operational decisions in the midst of unpredictable events. Another saying that was only used once, but implied throughout the interview was "prior planning prevents piss-poor performance." Beta repeatedly indicated the importance of addressing possible contingencies during the planning stage of a mission. Although not every contingency could be planned, the act of discussing contingencies provided a malleable cognitive structure with which to adapt during unpredictable events.

After discussing general operational rules, Beta described a reconnaissance mission in which his squad infiltrated to an enemy compound and took pictures that could be utilized for future mission planning. The transit to the location was particularly difficult and slow due to challenging terrain. Furthermore, the compound was located further than the intelligence reports had suggested, requiring even more time and energy. Despite the challenges, the squad was able to conduct the reconnaissance and begin exfiltrating to rendezvous with the extraction vehicles. To meet the mission timeline and escape enemy-controlled area before sunrise, the team had to improvise. Rather than walking to the extraction point, it was suggested that they steal an enemy vehicle. To assess the situation and devise an action plan, the entire squad collectively discussed the alternatives. Although the final decision was made by the squad leader, all members of the squad were probed for their input. Beta noted that during that discussion, it was the experienced team members who spoke frequently and provided the most valuable input.

Beta noted that the ability of SEALs to adapt is directly related to previous experience, whether it was during training exercises or real-world missions. The SEALs use previous experiences as a template that can be customized and applied during unpredictable events. Furthermore, the previous experience familiarizes the SEALs with each other, building trust and enabling them to act in concert. Beta succinctly states, "It goes directly back to the trust thing." Finally, Beta noted that SEALs are trained to lower their anxiety by slowing down. Actions and communication are slowed in order to ensure clarity of transmission and clarity of reception. By reducing anxiety and relying on the aforementioned trust between SEALs, the teams are able to make better adaptive decisions to "reevaluate and reengage."

Summary of Individual Interview with Participant Designated Navy SEAL Gamma (pseudonym)

The participant designated Navy SEAL Gamma (hitherto referred to as "Gamma") experienced more than 20 live-fire combat situations. Gamma noted that in addition to specific rules of engagement for a particular mission, most rules utilized during combat situations are truly a "function" of the Navy SEAL training. The training serves as the reference point that guides action amidst unpredictable scenarios. At multiple times, Gamma used the phrase, "preparation over planning" to indicate the central importance of relying on training to dictate action rather than a specific plan designed for a particular mission. To emphasize this point, Gamma described his first experience in a firefight.

Gamma's platoon was tasked with a capture/kill mission in which an insurgent leader was to be apprehended or eliminated. Although intelligence indicated it would be a relatively routine mission, multiple variables forced the platoon to immediately adapt. Within the first five minutes of the mission, the platoon had to deal with a failed breech of the front door, reduced visibility caused by a grenade blast, and advancing up a staircase while taking enemy gunfire. When pressed to describe what he was thinking about as he exchanged gunfire with an enemy combatant 12 feet away, he noted that his mind was referencing hundreds of hours of training, using that as a template to deal with the immediate threat. Similarly, he suggested that the collective adaptation of the team as they dealt with the threat was a direct result of their collective experience during training in Close Quarters Combat drills. He described the team's movement as a "constant dynamic flow."

In the midst of the changing environment, Gamma noted that the team's communication was "slow, calm, and methodical." He even suggested that a well-prepared SEAL platoon needs almost "zero communication to adapt to a situation." The selection process and subsequent training all SEALs undergo produces a shared cognitive framework that dictates fundamental actions and decisions. Additionally, Gamma implied the training produces a relational bond and an intimate knowledge of what the other individuals in the platoon will do given a certain set of circumstance.

Summary of Individual Interview with Participant Designated Navy SEAL Delta (pseudonym)

The participant designated Navy SEAL Delta (hitherto referred to as "Delta") experienced over 20 live fire combat situations. From an officer's perspective, Delta suggested the fundamental job of a leader is to measure risk. Rules utilized during an operation are designed to measure and mitigate that risk. An example of these rules is predetermined abort criteria, such as a timeline or minimum force requirements. If these conditions are not met, it is determined that the risk is too high to the platoon and the mission is called off. Delta clarified that these criteria are not only based on mission-specific intelligence and standard operating procedures, but also on experience and previous missions. He likened these criteria to a mental playbook that could be pulled out and utilized in an unpredictable situation. In conjunction with this mental playbook, he noted there are "cardinal sins" that every SEAL needs to avoid and "rules of the road" that apply universally and were developed through the experiential knowledge of former SEALs. These overarching principles, such as "swim pair integrity" and "win the gunfight," now govern the decisions and actions of present-day SEALs.

To illustrate this principle, Delta described a scenario where a platoon he was commanding was tasked with a capture/kill mission that required splitting his force into two components. On the way to the target, Delta received information of a higher value target that could potentially be apprehended that night. Delta was given the choice to continue his initial mission or abort and accept the new mission. To make the decision, he gathered his team and discussed the situation, applying the "playbook" to determine the best course of action. With input from the other operators, it was determined that the new mission could be accepted and they adapted their original plan, coordinating additional support while traveling to the new target. During infiltration, the team encountered a field full of sleeping sheep and shepherds. It was unknown whether the sheep or shepherds might wake up and alert the target, but Delta made a calculated risk based on his experiential knowledge and led his team through the field to successfully complete the mission.

Delta noted that during highly volatile situations in which the team does not have the luxury to gather around and discuss options, communication becomes "crisp, clean, simple." Additionally, he clarified that the individual who has the best perspective of the overall situation (usually the person closest to the action) initiates communication and provides immediate direction. Only after that immediate direction does the officer begin communicating and giving orders. Delta suggested that this disciplined communication and the formation of the aforementioned "playbook" are a direct result of SEAL training. Due to the stringent selection process and the "obscene physical trauma and psychological trauma" during training, the SEALs are conditioned for calm and moderated responses regardless of the situation.

Summary of Individual Interview with Participant Designated Navy SEAL Epsilon (pseudonym)

The participant designated Navy SEAL Epsilon (hitherto referred to as "Epsilon") experienced over 6 live fire combat situations. Epsilon noted that there were a myriad of different phrases used by the SEALs to highlight certain operating principles such as, "smooth is slow and slow is fast," "two is one and one is none," and "anything worth doing is worth overdoing." He suggested that these rules form a type of "boiler plate" utilized during operations that still allows for significant flexibility by the team. This flexibility is not only built into operational planning, but also serves a central role in training design to prepare SEALs to adapt to unforeseen variables. Epsilon commented that it was even embedded within their culture. If operators show the strength, determination and intelligence to make it through the selection process, it is assumed these operators have the ability to successfully adapt and are therefore, given the freedom and authority to innovate as situations arise.

When pressed further to describe SEALs' innovation, Epsilon noted that in the midst of adaptation a SEAL is referencing past experiences in training or operations and using these experiences as a "type of template to work with as different situations arise." To illustrate his point, Epsilon described an incident where a student was unintentionally shot and killed during a training exercise. Epsilon was functioning as an instructor during the training exercise and administered first aid to the student immediately after the incident took place. He began treating the student despite lack of needed medical supplies. To compensate, he mentally referenced past experiences of administering medical aid while overseas in which he similarly lacked basic medical equipment. This experiential knowledge allowed him to process the situation quickly and begin aiding the casualty. Epsilon suggested that while administering first aid, he was combining tacit knowledge (commonly referred to as muscle memory by the SEAL Teams) and higher order processing in which he was searching for possible solutions while also experiencing an emotional response of regret. Epsilon noted that there may have been better decisions or actions that he could have taken in that situation, but the SEALs are trained to begin taking action immediately without concern whether that decision is the absolute best course of action. This freedom to act and perpetually innovate is a direct function of the trust that exists between SEALs and their Command. Epsilon commented, "It gives you phenomenal permission to take risks and not be risk adverse and to innovate."

Finally, Epsilon suggested that during times of unpredictability, communication is relatively calm, concise, and directive in nature. This reduction in communication is also a direct result of the trust between teammates. There is an innate assumption by the SEALs that their teammates will make the appropriate decisions. Furthermore, communication is unnecessary because the SEALs assume those decisions made by their teammates will be similar to the decisions they would make because the entire community of SEALs have basic "hard and fast rules" and shared similar experiences.

Summary of Individual Interview with Participant Designated Navy SEAL Zeta (pseudonym)

The participant designated Navy SEAL Zeta (hitherto referred to as "Zeta") experienced over 5 live fire combat situations. Zeta suggested the fundamental rule for Navy SEALs is to stay calm, trust their teammates, and know the location of their teammates. These simple principles are embedded through extensive training where the instructors "throw monkey wrenches" at the operators to force innovation and successful adaptation to a variety of scenarios. Zeta noted that the first step when encountering an unpredictable situation is to assess the situation and then utilize the past experiences to guide decisions and actions. Successful adaptation as a unit is simply the combined team taking these basic steps together, trusting each other to act in a predictable fashion based on hundreds of hours of shared training and operational experience.

After discussing general adaptation by SEALs, Zeta described a mission where his platoon was tasked with the seizure of a critical fuel manifold station under enemy control. A number of unexpected variables during the mission forced the squad to repeatedly improvise: the unknown presence of concertina wire at the landing sit; dug-in enemy fortifications; the use of unfamiliar weaponry; the presence of a larger than expected enemy force; and the presence of non-traditional structures that needed to be cleared of enemy combatants. To make the necessary adjustments, the squad mentally referenced a combination of previous training, specific mission preparation drills, and tactical prowess based on simple rules such as, "address the biggest threat." Zeta noted that communication during this mission came in multiple forms including verbal, visual and tactile; however, the communication was directive in nature and limited.

Zeta suggested that it is common for communication to decrease as a squad or platoon engages in more improvisation. This decrease does not impact team functioning in the midst of unpredictable events due to the aforementioned familiarity between the team members. After years of working shared operational experience, the SEAL platoons and squads have a common framework that allows them to collectively adapt with minimal communication.

Summary of Individual Interview with Participant Designated Navy SEAL Eta (pseudonym)

The participant designated Navy SEAL Eta (hitherto referred to as "Eta") never engaged in a live fire combat situation. Eta noted there were several adages employed by the Navy SEALs on a regular basis, but the one most pertinent to adaptation was, "why plan when you can react." Eta clarified that the phrase did not imply planning was underutilized or dismissed, but rather, it takes considerable effort and training to prepare to react. Eta suggested that the extensive SEAL training creates a "playbook" that establishes basic responsive actions by the team that can then be adjusted to fit a particular situation. The extensive training has the added benefit of enabling the SEALs to develop an intimate knowledge of each team member's strengths and tendencies. Finally, the training allows the SEALs to automate much of their actions in a type of "muscle memory," thereby freeing their conscious attention to "focus more on the external issues we are trying to address."

Eta noted that prior to missions, the platoons or squads practice "calling an audible" to adjust to a variety of different contingencies; however, even with extensive preparation, there are always unforeseen variables and contingencies that cannot be imagined prior to a mission. It's at that time that SEALs rely most heavily on fundamental rules. "When it goes well beyond any contingency you've planned for, then you're getting into your fundamentals. Shoot, move, and communicate with the guys nearby."

Another common rule shared by Eta was "smooth is fast and slow is smooth." According to Eta, this rule is of primary importance when communicating in an unpredictable environment. The adage is intended to remind SEALs that slowing down their actions and thought process in the midst of chaos allows them to remain calm and react more appropriately and quickly. In the midst of crisis, the SEALs want their communication to similarly be composed, calm and succinct. Eta clarified that communication was critical between team members and with supporting assets because that calm and accurate communication enables SEALs to consider the full range of potential adaptive responses to a threat.

Appendix H:

PARTICIPANT MEMBER CHECK RESULTS

Participant Member Check Results in Response to Initial Findings from the Data Collection and Data Analysis

Initial Findings

The following initial findings were presented to those retired Navy SEALs who participated in individual interviews. The participants were asked to review the findings and comment on the accuracy and of the findings.

1. **Navy SEAL platoons or squads mentally reference a combination of general rules/principles and mission-specific guidelines when they adapt to an unpredictable environment.**
    a. The general rules/principles typically fall into the category of "how-to rules" (such as "shoot, move, and communicate") or "priority rules" (such as "address the biggest/immediate threat first").
    b. The mission-specific guidelines typically fall into the category of "timing rules" (such as mission timelines), "exit rules" (such as abort criteria), or "boundary rules" (such as rules of engagement).
2. **Previous experience, whether in training or on the battlefield, plays a major role in the adaptability of a Navy SEAL.**
    a. Experience provides the operator with context so that he can decide how the rules mentioned above can and should be applied.
    b. Experience provides an operator with a mental template that can be used to make decisions when encountering a dynamic situation.
    c. Experience strengthens the relationship (trust and familiarity) between members of the same squad and platoon which allows them to adapt more quickly and effectively as a unit.
3. **Relationships between members of the same platoon or squad, grounded in previous experience and a shared culture, play a major role in the adaptability of an individual Navy SEAL and his unit.**
    a. Trust, which is a product of a challenging selection process and experiential knowledge, gives each Navy SEAL the freedom and permission to take initiative and adapt as necessary. Each Navy SEAL is seen as a leader and capable of making difficult, but appropriate decisions
    b. Familiarity between members of a platoon or squad enable the entire unit to adapt more quickly and effectively because they can predict how another teammate will react given a specific set of parameters without the need for extensive communication.
4. **The ability of individual team members to control emotions, slow and simplify reactions, and focus communication promotes more effective adaptation by an action team in an uncertain environment.**
    a. Navy SEALs are selected and trained to control their reactions and react calmly in the midst of a dynamic and uncertain situation to enable better decision-making.

b. As the situation becomes more complex and dynamic, Navy SEALs respond by demonstrating tactical patience (slowing down) and simplifying commands and decisions.
c. During a complex and dynamic situation, Navy SEALs reduce the amount of communication to the bare minimum to reduce distraction. This reduction is possible because of the trust and familiarity between members of the platoon or squad.

Participant Member Check Results

Five of the seven participants responded with comments on the accuracy of the initial findings. Their verbatim responses are below:

	Participant Response
Navy SEAL Alpha	Your results are spot-on, especially given the difficult and ambiguous task you chose to undertake.
Navy SEAL Beta	Very good David. You nailed it.
Navy SEAL Gamma	Your summary below is spot on and will hopefully provide significant value added to your readers.
Navy SEAL Delta	*No response*
Navy SEAL Epsilon	Topically, I think you captured and structured your points accurately.
Navy SEAL Zeta	Outstanding!
Navy SEAL Eta	This looks good. My interest is piqued.