

MINDFULNESS IN ACTION: DISCOVERING HOW U.S. NAVY SEALS BUILD CAPACITY FOR MINDFULNESS IN HIGH-RELIABILITY ORGANIZATIONS (HROS)

AMY L. FRAHER
University of Birmingham

LAYLA JANE BRANICKI
Macquarie University

KEITH GRINT
Warwick University



This study of US Navy Sea Air and Land (SEAL) commandos contributes to research investigating mindfulness in high-reliability organizations (HROs) by identifying the individual and collective influences that allow SEALs to build capacity for mindful behaviors despite the complexity of their missions, the unpredictability of their operating environments, and the danger inherent in their work. Although the HRO literature identifies a number of hallmarks of reliability, less attention is paid to how mindfulness is operationally achieved *in situ* by individuals on the frontline working in HROs. This study addresses this gap using a multiphase, multimethod investigation of US Navy SEALs, identifying new links between individual mindfulness attributes (*comfort with uncertainty and chaos*) and collective mindfulness influences (*a positive orientation towards failure*) that combine to co-create a phenomenon we call “*mindfulness in action*.” Mindfulness in action occurs when HROs achieve an attentive yet flexible focus capable of incorporating multiple—sometimes competing—realities to assess alternative solutions and take action in dynamic situations. By providing a more nuanced conceptualization of the links between individual mindfulness attributes and collective mindfulness influences, this paper opens up new avenues of discovery for a wide range of reliability-seeking organizations. For supporting media please see <https://vimeo.com/153223681>.

The authors wish to thank Stephen Brammer, Kathleen B. Jones, Robert Schoultz, and the journal editor and

two anonymous reviewers for their guidance and support.

Editor's Comment

As a journal dedicated to using data to surface and generate plausible explanations for emergent or poorly understood organizational phenomena, processes, and relations, AMD strives to help authors get the most from their data. This paper by Fraher, Branicki, and Grint offers a wonderful example of how the AMD review process can help authors “dig deeper” to expose and leverage the “gems” in their data that ultimately benefit us all by offering surprising insights that are key to the development of new theories and more nuanced downstream theorizing. But beyond exposing new avenues for theorizing on mindfulness and high-reliability organizations, this paper serves as an important landmark in management research, being the first video ethnography to be published in the Academy of Management’s portfolio of journals. On behalf of the editorial team, we hope to see more scholars take advantage of AMD’s advanced media capabilities as a means by which to expand the breadth and depth of discovery in management and organizational science.

Peter Bamberger, Action Editor

INTRODUCTION

Although there is a long history of studies investigating performance reliability in organizations, research examining *high-reliability organizations* (HROs)—organizations that perform in a near error-free manner despite their complex, unpredictable and dangerous operating environments—is more recent (La Porte, 1996; Roberts, 1989; Rochlin, LaPorte, & Roberts, 1987; Weick, 1987). Aircraft carriers, nuclear power plants, and air traffic control towers are known for their standardized procedures, checklists, and other routinized organizing processes. However, research by Weick and Roberts (1993), among others, reveals that the consistent performance of these HROs is grounded less often in routines and structures and more often in processes related to organizational mindfulness—the human capacity to detect and correct errors and to adapt to unexpected events before small factors develop into catastrophic failures.

Weick and Sutcliffe (2006: 516) further attribute “mindfulness” to a “rich awareness of discriminatory detail” coupled with a “capacity for action” and observe that successful HROs share “five hallmarks” of mindfulness:

1. **Preoccupation with failure** – small failures must be noticed;
2. **Reluctance to simplify** – “distinctiveness retained rather than lost in a category”;
3. **Sensitivity to operations** – “notice nuances that portend failure”;
4. **Commitment to resilience** – ability to bounce back by “locating pathways to recovery”;
5. **Deference to expertise** – empowerment of individuals “to implement those pathways.”

However, despite definitions such as these, mindfulness remains an amorphous construct in the extant literature, and we know little about how mindfulness is operationally achieved by individuals on the frontline in HROs, a process that Weick

(2011) notes must be continuously reaccomplished *in situ*. Therefore, the research question adopted here focuses on how individual mindfulness attributes and collective mindfulness influences interrelate to sustain reliable organizational performance in HROs.

Weick, Sutcliffe, and Obstfeld (1999: 37) explain that although there has been ample recognition that diverse cognitive processes are associated with high reliability functioning, how these diverse processes interrelate in a state they refer to as “collective mindfulness” is less often investigated. To understand collective mindfulness, they note, it is important to consider not only where an individual’s limited attention is allocated and what is noticed at the microlevel but also how autonomous those individuals are empowered to be and what action is taken at the macrolevel as a result. Therefore, examining collective mindfulness involves inquiry, interpretation, sense-making, framing and reframing processes, and challenging assumptions within the repertoire of action capabilities (Fraher, 2011). As Weick et al. (1999: 37) note, “The richness of a state of mindfulness is determined by the richness of the action repertoire.” However, we know little more about what links individual processes at the microlevel and organizational processes at the macrolevel to achieve this collective mindfulness in HROs.

This study aims to address this question by exploring “mindfulness in action” as a means to link two previously distinct levels of mindfulness analysis: the traits of individual mindfulness (see for example, Fiol, Pratt, & O’Connor, 2009; Kabat-Zinn, 1994; Langer, 1989, 2000; Weick & Sutcliffe, 2006) and the state of collective mindfulness at the organizational level (Weick & Putnam, 2006; Weick & Roberts, 1993; Weick & Sutcliffe, 2001; Weick, Sutcliffe, & Obstfeld, 1999). Mindfulness in action occurs when HROs achieve an attentive yet flexible focus capable of incorporating multiple—sometimes competing—realities to assess alternative solutions and take action in dynamic situations. Mindfulness in

action is developed by focusing on Weick and Sutcliffe's (2001) five hallmarks of mindfulness and a new sixth factor: comfort with uncertainty and chaos. As such, mindfulness in action is a dynamic cocreational process among individuals, the organization, and the wider context and environment.

To investigate this phenomenon, our research team conducted a novel multimodal study of an elite military community: US Navy SEAL commandos, commonly referred to as SEALs. The Navy SEAL community was established by President John F. Kennedy in 1962 to enhance the US military's unconventional warfare capability after the success of Underwater Demolition Teams on the Normandy beaches and Pacific coral reefs during World War II. Named for the three environments in which they operate—Sea, Air, and Land—SEALs provided a flexible maritime counterpart to Army Green Berets and quickly established themselves as one of the toughest Special Operations Forces (SOF) in the world (Dockery, 2004). In researching Navy SEALs, we are examining mindfulness in an organization at both individual and collective levels that demands near error-free action.

Central to SEAL training and development is the completion of Basic Underwater Demolition/SEAL training known simply as BUD/S: an arduous, 30-week training course held at the Naval Special Warfare Training Center in Coronado, California, where much of the research for the present study was conducted. A highlight of the BUD/S program is "Hell Week," an event designed during World War II to quickly prepare frogmen for the Normandy beach landing, which includes five days of continuous training exercises in hypothermic environments along with intense sleep deprivation. The training objective of Hell Week is for SEAL candidates to demonstrate a "never quit" attitude, regardless of assignment difficulty. Nonetheless, Hell Week is so demanding that approximately 75 percent of each BUD/S class typically quit by week's end (Doolittle, 2004). Training culminates with a graduation ceremony where candidates become authorized to wear the coveted *Trident* pin, and the class elects its "Honor Man": the trainee who most inspired others to overcome adversity and succeed. While attending a SEAL graduation, our research team observed that even for retired SEALs, a sense of pride and camaraderie as a navy commando remains deeply engrained and dozens often make the pilgrimage back to the Coronado training facility six times per year for SEAL graduation.

Through our detailed multimodal empirical analysis, we establish a more grounded, nuanced, and detailed conceptualization of mindfulness in action than previous HRO research has accomplished to date. Bringing together previously disparate research on both individual and collective mindfulness, we construct a foundation from which to identify new attributes of mindfulness in our empirical data. Then, we theorize the interrelationship between mindfulness at the individual and collective levels of analysis and their relationship with reliable organizational performance. In so doing, we open up new avenues for research examining the links between mindfulness and reliable performance, informing debates in a wide range of contemporary organizations encountering increasing levels of uncertainty and threat in contexts not typically associated with risky work. For example, research has examined "reliability-seeking" in organizations as heterogeneous as a US business school (Ray, Baker, & Plowman, 2011), a software firm (Vogus & Welbourne, 2003), and a German manufacturer (Gebauer, 2012). The commonality in this research centers on the recognition that, regardless of industry, no one can predict when or how the next unexpected challenge will emerge, or where, following Weick and Sutcliffe (2007: 90), "ugly surprises are most likely to show up." It is simply universally agreed that they will. Therefore, a wide range of organizations can benefit from a clearer sense of how mindfulness is continuously reaccomplished *in situ*.

RESEARCH DESIGN

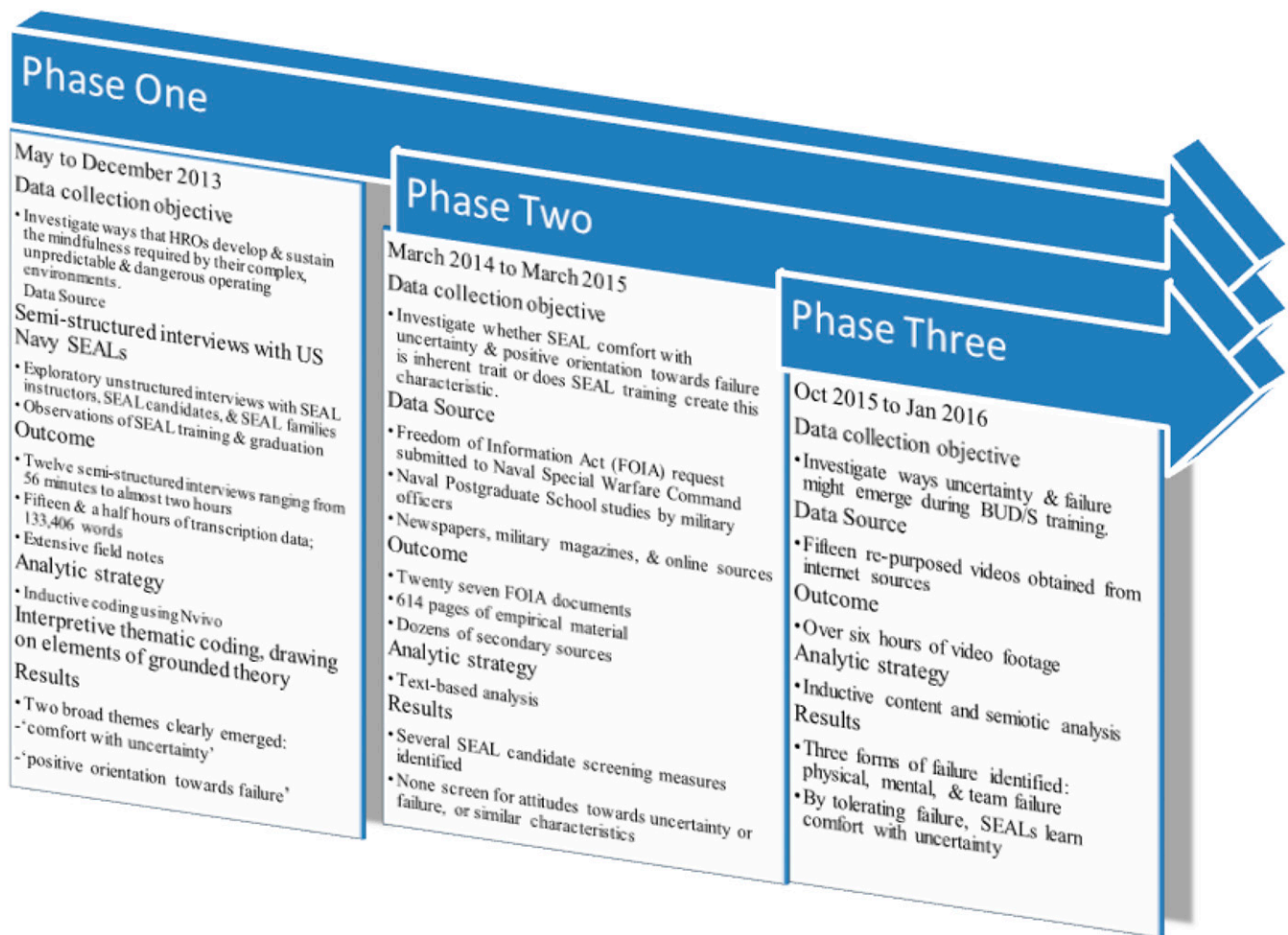
This qualitative study used a multimodal research design consisting of three phases: interviews, documentary analysis, and video analysis (see Figure 1). Perhaps back as far as Campbell and Fiske (1959), authors recommend that researchers employ several different methods as part of a validation process that ensures that a study's findings are the result of the reported phenomenon. Torrance (2012) notes that mixed-methods research considers multiple viewpoints, thus providing novel opportunities for validation by offering ways to compare interpretations across data sources in seeking to triangulate research findings. Following Denzin (1978), we adopted four triangulation methods: (1) data triangulation using a variety of data sources; (2) investigator triangulation using three different researchers; (3) theory triangulation combining multiple theories to interpret findings; and (4) methodological triangulation adopting a multimodal research design. Several scholars have recently argued that multimethod research has become so popular that it should join quantitative and qualitative approaches as a "third methodological community" because of these

Author's voice:

Was there anything that surprised you about the findings? If so, what?



FIGURE 1
Overview of Multimodal Research Design



advantages (Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Teddlie, 2010; Torrance, 2012).

Phase One – Fieldwork

The first phase of our study investigated how mindfulness is developed by analyzing data gleaned from semistructured interviews with US Navy SEALs; exploratory unstructured interviews with SEAL instructors, SEAL candidates, and SEAL spouses and other family members; and observations of several training evolutions and a graduation ceremony at the SEAL training facilities, after which detailed field notes were recorded. Twelve semistructured interviews were conducted with three

active duty, three reserve, and six retired US Navy SEALs in California. Interviews ranged in length from 56 minutes to almost 2 hours and resulted in 15.5 hours of transcribed data. Extensive field notes were treated as additional empirical material.

Contact with study participants was initially made via an email introduction by a mutual colleague of the first author, a retired military officer now working in academia, and then other participants were identified through “snowball sampling” (Goodman, 1961). Informants were all volunteers interviewed by the first author between May and December 2013 during their off-duty time. After providing informed consent, interviews were digitally recorded and then fully transcribed by a professional service.

Author's voice:

How did you get access to your data or site?



Author's voice:

What motivated you personally to undertake this research? Why is it important to you?



Participants were all male, in ranks from Master Chief (E-9) to Captain (O-6), ranging from 34 to 70 years in age, with between 8 and 30 years of military service experience. Although six participants (50 percent) began their careers as enlisted men, all but one were officers at the time of the interview. Five had earned a direct officer commission, four had attended the Naval Academy, and two were commissioned through Reserve Officer Training Corps. Four participants (25 percent) had served during the Vietnam-era, or shortly thereafter, and the remaining eight (75 percent) had recent experience in the Iraq and/or Afghanistan war-zones. In sum, informants were all senior military members with extensive experience in Naval Special Warfare, half of whom had worked their way up from the lowest enlisted military ranks to earn an officer commission.

Informants were articulate, outspoken, eager to tell their stories, and interested in the study topic and the research findings. The first author's years of experience as an H-46 helicopter pilot—an aircraft often used for SEAL transport—provided common ground. As a result, a sense of trust quickly developed and informants were candid, reflective, and detailed when sharing information. Similar to many professionals discussing their career with a fellow professional, they responded with curiosity and enthusiasm and spontaneously offered additional insights and raised numerous questions of their own at the end of the interviews. The initial scope of the study sought to explore how professionals working in high-risk fields made sense of unusual and potentially escalating crisis situations. A semistructured interview schedule was used as a guide, but the interviews were generally nondirective, and participants were encouraged to talk about their lives, careers, families, reflections, feelings, and other experiences both inside and outside the military.

To ensure a high level of reliability and validity in the study, all transcripts were manually coded using the Nvivo computer software. The textual dataset totaled over 133,000 words, and analysis took the form of an interpretive thematic coding, drawing on elements of grounded theory (Glaser & Strauss, 1967). Using an inductive research approach, the research team identified key themes within the SEALs' responses and coded these quotes using informants' own words, such as

“learning through failure” and “quitting is not an option.” To maintain the integrity of the original texts, several readings of the data were undertaken, and the codes and subcodes adopted were discussed extensively within the research team to ensure inter-rater reliability. In sum, our approach was consistent with the emerging reflexive approach in qualitative inquiry in which researchers attempt to question their own values and assumptions, their active role in the field work, and the stake they have in the findings and interpretations (Cunliffe, 2003).

Phase Two – Documentary Analysis

Throughout this process, two broad themes clearly emerged from the dataset: “comfort with uncertainty and chaos” and a “positive orientation toward failure,” which caused our research team to wonder whether these were inherent traits of those selected as SEAL candidates or whether SEAL training creates—or at least enhances—these characteristics. To investigate this question, a *Freedom of Information Act* (FOIA) request was submitted to the Naval Special Warfare Command in Coronado in March 2014 requesting access to all government studies investigating SEAL recruitment, selection, and training processes. In response, 27 documents were provided, which totaled over 600 pages of empirical material. Our research team reviewed these documents using a text-based analysis approach during phase two of our study (see Table 1).

Although some areas of these documents were redacted as “protected under the deliberate process privilege” and “for internal use only,” the available data were nonetheless revealing. We found that several SEAL candidate-screening measures had been developed over time, yet none screen for attitudes involving uncertainty, chaos, failure, or similar HRO mindfulness characteristics.

Phase Three – Video Analysis

With our interest further piqued, our research team sought to identify other empirical materials to investigate the ways in which SEALs cope with the uncertainty, chaos, and failure that might emerge during BUD/S training. We discovered that more than six hours of government-sponsored SEAL marketing and recruitment videos were publically available on the internet. Designed to provide potential SEAL candidates with accurate information about BUD/S training and expectations, we quickly saw that these real-world documentaries might prove to be another fruitful data source.

Author's voice:

How did the paper evolve and change as you worked on it?



TABLE 1
Summary of Freedom of Information Act (FOIA) Request Empirical Material

Ref.	Topic	Year	Total Pages
1	NSWC Pretraining Questionnaire	Unknown	8
2	Selection and Training of BUD/S Instructors	1979	40
3	SEAL Training Profile Questionnaire	1990	10
4	Training Success in US Navy Special Forces	1990	8
5	Profiles of Exercise History and Overuse Injuries among US Navy SEALs	1994	6
6	So You want to be a Frogman? Determining what it takes to become a US Navy SEAL	2002	10
7	NSWC Consulting Report on SEAL Database Analysis	2002	34
8	Individual characteristics related to SEAL training success	Unknown	14
9	Metacognition in BUD/S training	2003	14
10	BUD/S Attrition: A Review of Past Research and Current Practices	2002	26
11	Point Paper - Costs to Train a SEAL Operator	2005	4
12	USN SEALs Candidate Profile Study	2005	20
13	CENSEALSWCC - BUDS Candidate Histories	Unknown	38
14	The Thomas Group - Macro Assessment Outbrief - CFTs	2006	3
15	Prediction of BUDS Retention Using the ExamCorp Assessment Process	2006	6
16	SEAL Production Process Improvement Program	2007	48
17	NSW Final Research Findings (Gallup)	2009	48
18	NSW Psych Description Successful BUDS Students	2010	25
19	Appendix High Potential BUDS Candidates	2009	48
20	Importance of Activities Preparing you for SEALs	2009	34
21	Profiles of Exercise History and Overuse Injuries Among SEAL Recruits	1994	8
22	Thermal and Physiological Responses of BUDS Students to a 5.5 Mile Open Ocean Swim	1993	26
23	Personality Profiles of US Navy SEAL Personnel	1994	20
24	Adaptations to the Three Weeks of Aerobic Anaerobic Training in West Coast US Navy SEALs	1994	20
25	The Effect of Hypoxia and Cold at Rest on Human Thermoregulation	1996	16
26	Determinants and Effects of Training Success in US Navy Special Forces	1988	20
27	Physical Demand of US Navy SEAL Operations	1995	60
			614

Therefore, phase three of our study included an analysis of these videos (see Table 2).

“Re-purposing” video footage, that is, adopting preexisting videos from television broadcasts, “home-made” videos, CCTV, or internet websites for use as a data source has grown as a research practice as the availability of recording devices has spread (Jewitt, 2012). Several researchers note the need to expand contemporary research practices to include more visual research and that a linguistic turn may have extended too far in establishing the primacy of language in empirical studies of organizations (Bell & Davison, 2013; Lefsrud, Graves, & Phillips, 2016; Liu & Maitlis, 2014). In response, the use of publicly available web-based videos from sources such as YouTube has emerged as a viable research area. However, extant studies predominantly focus on the various characteristics, practices, and motivations of the users of the website rather than offering methods of analysis of the videos themselves (Adami, 2009; Soukup, 2014).

Smets, Burke, Jarzabkowski, and Spee (2014) report important advantages in using video as an empirical data source, such as allowing researchers to study individuals in their natural setting without being present, thereby reducing the

potential for observer bias and enhancing the accessibility of hard-to-reach populations. Admittedly, the navy videos used here were created from documentary-like footage for marketing purposes, so the material available was not unbiased. However, research supports the notion that repurposed video data such as this nonetheless offers researchers the advantage of being a durable, malleable, shareable record that can be repeatedly viewed and edited in multiple ways. These advantages have become particularly important for studies involving dangerous or restricted contexts, such as the present study, thus illuminating previously off-limit environments such as SEAL training.

Although there are not many organizational studies models to follow in the analysis of repurposed video, other fields offer some guidance. For example, visual design research in sociological research analyses a range of human-made artifacts as data sources, including video. Margolis and Pauwels (2011) observe that visual research serves two purposes, to help observers make sense of the surrounding world and to provide a lens into the design process itself, which provides a variety of visual and tactile means of doing research. In addition, the hermeneutical model

TABLE 2
Summary of Video Materials

Title	Description	Time
Navy SEAL Life After the Teams	Interview with Professor, former US Navy SEAL	5:28
Navy SEAL Life After the Teams	Interview with Astronaut, former US Navy SEAL	3:47
BUD/S Class 224	Videography of BUD/S instructors and Navy SEAL recruits in training	14:52
BUD/S-First Phase	Videography of BUD/S Day One Selection events	1:47
BUD/S-First Phase	Videography of BUD/S first phase of training	2:41
BUD/S-First Phase	Videography of BUD/S Hell Week	2:26
BUD/S-Second Phase	Videography of BUD/S Combat Diving training	1:30
BUD/S-Third Phase	Videography of BUD/S Land Warfare training	2:02
BUD/S Class 274	Videography of BUD/S instructors and Navy SEAL recruits in Land Warfare training	3:40
BUD/S Class 234	Part 1 – ‘Welcome To BUD/S’: Video of BUD/S instructors and Navy SEAL recruits	45:58
BUD/S Class 234	Part 2—“It pays to be a winner”: Video of BUD/S instructors and Navy SEAL recruits	45:58
BUD/S Class 234	Part 3—Two weeks and one long day	45:58
BUD/S Class 234	Part 4—Hell Week	49:54
BUD/S Class 234	Part 5—The only easy day was yesterday	49:08
BUD/S Class 234	Part 6—The home stretch	49:17

developed from the communications field by Knoblauch and Schnettler (2012) informed our inductive process.

First, we repeatedly watched approximately 6 hours of online video footage listed in Table 2. Then, using an inductive research approach similar to the transcription coding process described in phase one, we identified representational video segments. The final stage of our analytic process required reviewing the coded material to identify patterns. Three concepts emerged as the basis for categorization: physical failure, mental failure, and team failure. Key video segments were identified, copied, and spliced into one larger video using Camtasia, a video editing computer software program. Over time, 16 minutes of video clips were identified as representational (please see <https://vimeo.com/153223681>). This multistage process helped our research team to observe both the physical and verbal reactions of Navy SEAL candidates and their instructors during the BUD/S training process. Moreover, through this process, we gained a deeper understanding of the themes that we identified in phases one and two of our study.

FINDINGS

A pivotal discovery early in phase one of our research was that SEALs unanimously agree that their success is less dependent on individual physical prowess and more dependent on mental characteristics. For example, every informant mentioned dedication, determination,

motivation, and resilience as essential to SEALs’ success. However, not one informant mentioned physical attributes such as running speed, swimming endurance, or weight lifting strength as critical. One SEAL explained it in the following manner:

People usually think being a SEAL is this intense physical challenge, which there certainly are components of. But most guys who graduate from BUD/S are not physical specimens. I mean, they are above average physically. But all the guys who I went through training with who were the fastest runners, the fastest swimmers, the strongest—all of the really elite athletes—college quarterbacks, Olympic athletes. . . Those guys usually dropped out fairly early in the program and it wasn’t at all because they were physically exhausted or challenged. . . What I think that points to is more mental characteristics than physical.

[SEAL 3]

This discovery led our research team to ask the following question: If outstanding physical skills were not the key to SEAL success, what qualities were?

Individual Mindfulness

After reviewing the study’s field notes, we identified that the SEALs studied exhibited a paradoxical mix of attitudes and behaviors. For instance, they confided, reflected, and self-analyzed, candidly expressing strong opinions while also

unabashedly sharing stories full of ambiguity and inconsistencies. Untroubled by these contradictions, informants were comfortable discussing chaotic, confusing, and complex situations with little need for tidy closure or rational conclusions. In addition, field notes documented certain common SEAL slogans that reflected the contradictions inherent in SEAL operations: “Get comfortable being uncomfortable” and “Embrace the suck.”

We discovered that by acknowledging these contradictions, SEALs were able to mentally prepare for the uncertainty and danger of their work and to consider the ramifications of completing the tasks required of them in a mindful manner before embarking on their mission. One SEAL explained his mental preparation process as follows:

You have to be comfortable with yourself [to succeed as a SEAL]. . . I didn't just go through that training and then go “OK, what's the next thing another 4 mile run”? I went home and spent days contemplating, imagining, going through scenarios [considering what I might be asked to do]. . . You may be asked to put a garrote around some guy's neck just because he's in the way and we have to get through the fence. . . He could be a great guy. But I'm sorry you're in the way. . . I want to be okay with that now, so I don't have to deal with that after. . . Mentally and spiritually.

[SEAL 5]

Therefore, a key to SEALs' ability to accomplish their missions is that they were unencumbered by feelings of trepidation or mental angst that might preclude them from being fully present. Applying Weick and Sutcliffe's (2006: 516) mindfulness definition, we found that SEALs demonstrated a rich awareness of discriminatory detail and a capacity for action by mentally preparing for and acknowledging the wide variety of challenges that they might encounter during the course of their work (See Table 3).

Analysis of our data revealed a range of ways in which mindfulness was enacted by Navy SEALs; subsequently, played a role in achieving high reliability. We discovered that SEALs drew upon both individual and collective skills and capabilities in building capacity for mindfulness in their extreme operating contexts. Specifically, our empirical materials confirmed four attributes previously identified in the individual mindfulness literature: attention to discriminatory detail (Weick and Sutcliffe, 2006), active engagement in

the present (Kabat-Zinn, 1994; Langer, 2000), a flexible, open state of mind (Langer, 1989, 2000; Levinthal and Rerup, 2006), and awareness of multiple emerging realities and the creation of new categories of meaning (Fiol et al., 2009; Langer, 1989).

Collective Mindfulness

At the collective level of analysis, our participants' accounts were less congruent with the HRO literature, in particular, Weick, Sutcliffe, and Obstfeld's (2008) five hallmarks of “collective mindfulness.” For instance, we found evidence that our respondents, and importantly their team and organization, were concerned with failure but not in the manner anticipated in the extant literature (see Table 4).

For example, our participants were less “pre-occupied” by failure, as Weick and Sutcliffe (2001, 2006) emphasize, and more focused on psychologically adjusting to failing. For example, SEALs discussed the importance of not quitting even if they failed, of quickly moving on from failure by not obsessing about it, and of analyzing failure so that they could learn from it. Notably, although we have presented them here as separate characteristics these attributes were often bundled or amalgamated in informant responses, suggesting that factors act in combination rather than alone. In other words, our participants tended to demonstrate a mix of these attributes in explaining how they achieve excellent and low-error performance in challenging contexts.

Of the themes identified, the strongest evidence was in relation to embracing—and even thriving—under conditions of uncertainty and chaos. Nearly every SEAL described how unpredictability and chaos had a calming influence, signaling a need to shift focus to the challenges of the immediate present:

I can predict that something will unpredictably happen here shortly. . . That's the way life is, you can't stop it. Something is going to happen, so if it's going to be outrageously bad then you have to deal with it [now]. . . Suddenly it rockets you into this chaos but it's [comforting]. . . I have nothing else to worry about. There's no other priority. I don't have to worry about getting my taxes done on time [laugh] because it doesn't matter.

[SEAL 2]

TABLE 3
Summary of Interview Data Analysis – Attributes of Individual Mindfulness Exhibited by Navy SEALs

Level of Analysis	Link to Attributes in Extant Literature	Inductive Codes	Indicative Quotations
Individual Mindfulness	Attention to discriminatory detail (Weick & Sutcliffe, 2006)	‘Constant focus’	‘One of the keys to being successful in the SEALs is a disciplined, constant focus’ ‘A distracted SEAL is a great concern for our community and our instincts or intuition’ ‘You’re at work and all of a sudden you get a phone call, and somebody’s been killed. All of a sudden you’ve got to drop what you’re doing and get a focus on fixing that’ ‘Being able to process it, lay it out, make the call, shift and collect the problems as they’re unfolding’ ‘So then you shift, you click, and then you focus and you have to be tuned to your senses’ ‘I guess it’s a constant re-evaluation. So you’re constantly trying to reorient and observe, how am I going to deal with this new piece of information’
		Rapidly shifting focus	‘So telling them to slow down and keep an eye on what’s going on and figure things out... one of the things that SEALs say in all these sorts of environments is ‘slow is fast’. Slow it down’ ‘The fact that your mind operates in such a way that you can compartmentalize concepts, ideas, information, relationships, people, events. How I act at home maybe different than at work and you can be almost a different personality’ ‘And then suddenly it rocketed you into this chaos but it’s very clear—people go oh it’s chaos. Once again I have to bring it back to the same point. It’s becoming clearer and clearer to me that I have nothing else to worry about. There’s no other priority. I don’t have to worry about getting my taxes done on time [laugh]’ ‘... When I’m talking about flexibility I’m not talking about oh we’ll just change the plan. I’m talking about changing your mind-set, changing your perception’ ‘So you have to have this constant play in this challenging environment to come up with a new idea. Just being determined, butting your head up against the wall with the same failing attempt every time isn’t going to find success. You have to at some point be able to step back and figure out, have a new outlook and a new way to get around the problem’ ‘To differentiate SEALs from other special forces, what I refer to is a Macgyver mentality and they do have that. The guys have to be flexible. It’s very rare that a big huge muscular guy makes it through training’
		‘Slow is fast’	
	Actively engaged in present (Kabat-Zinn, 1994; Langer, 2000)	‘Ability to switch/compartmentalize’	
	Creating new categories of meaning (Fiol et al., 2009; Langer, 1989)	‘Changing your mindset & perception’	
	Flexible state of mind (Langer, 1989, 2000; Levinthal and Rerup, 2006)	‘Macgyver mentality’	

TABLE 4
Summary of Interview Data Analysis – Attributes of Collective Mindfulness Exhibited by Navy SEALs

Inductive Codes	Indicative Quotations	Extant Literature
I just won't quit (even if I fail)	<p>'In the training, when you go to the training, you have to know that you cannot quit. So I think that particular mindset has to stay with you. That you can never quit. I could never quit, no matter what's thrown at you'</p> <p>'...I was cold but I didn't have another uncontrolled shiver, I was speaking properly and um. But that's just – it's the attitude going in. Like quitting is not an option'</p> <p>'You always want to win. No matter what you're doing and even if you know you're not the fastest runner you're going to run as fast as you can'</p>	<p>Preoccupation with failure (Weick et al., 1999)</p>
Failure as learning opportunity	<p>'The ability to look at a situation and say what can go wrong? Not what does the book say and this is where in aviation, you might have a protocol, steps to follow for a left engine failure. We don't have those exact steps. We deal with it 'well, here's the operation, here's the things we expect to encounter, here are the might not go so well things'. And then you have to go to another level if you want to maximize your chances for success. . . . I believe that is inculcated from the earliest stages dealing with failures'</p> <p>'We got through it together and let's learn from that'—if it was a mistake. Or if things went as well as they could have, let's log that. Next time we won't make the same error. It's always an evolution'</p>	

Expecting unpredictability, SEALs readily acknowledged that the best-made plans are nonetheless just “a basis for change,” as one SEAL described it. Therefore, when things go wrong, SEALs are not surprised and can, therefore, remain calm and unflustered. In fact, several SEALs described how they thrive on the challenge of unpredictability. For example, when asked to provide a specific example of how he faces the challenge of chaotic environments, one SEAL described his tour of duty during the Arab Spring:

In Yemen, it was just this constant process of not knowing what's going on in this kind of evolving situation where every day—minute by minute, hour by hour things were changing. . . . We evacuated all non-essential personnel but maintained a small presence [at the Embassy]. . . . You had no idea what was going to happen next. . . . I don't know how to characterize this but *I thrive on change*. I would prefer to be in an environment that is chaotic or changing or uncertain because I think that it presents an opportunity to do something, to excel, or to respond probably in a place where a lot of people are going to struggle and be frustrated with it.

[SEAL 3]

What is important to emphasize is that SEALs are not deterred by unpredictable challenges but rather calmly reorient by recognizing that not every contingency can be anticipated and that chaotic environments present their own unique opportunities in which to excel. One SEAL provided an example from his Afghanistan deployment experience:

Most SEALs are adaptable and this is one of the greatest qualities of the SEAL community above other Special Operations units and above conventional units. . . . I say that confidently, just having observed it. . . . They say, “Oops, we need to send half of your platoon to Afghanistan; a third of them are going to Yemen and the other—the remainder is going to hang out in Iraq. But we're going to marry you up with an East Coast SEAL team and you guys are just going to have to figure it out.” So I think SEALs adapt well and it is one of our greatest strengths to think outside the box and deal with anything.

[SEAL 12]

As one senior SEAL training officer explained, adaptability and comfort with uncertainty is developed early in SEALs' careers when they are encouraged to innovate in their training. This

philosophy is paradoxically reinforced through repeated exposure to failure:

The way we inculcate a [SEAL] mindset and ethos is through failure. We are allowed to fail, in a controlled environment. You know the old expression: you learn more from your failures than your successes? That's very much part of the culture. You fail a lot [laugh]. And you're intended to fail. Because part of it is, how do you measure up? Can you bounce back from it?

[SEAL 10]

Another senior SEAL officer described how he thought about failure and mindfulness:

That's happened to me a couple of times, when things were not going right and it looked like I was going to fail. At that point I got really focused—these are the things that aren't going right. And I've got to really put my energy into it. . . I'm afraid of failure because I didn't prepare well. I'm not afraid of failure if I did the best I could. . . And if I do fail, am I going to have done the best I could and learn from it?

[SEAL 1]

In sum, we found evidence that suggests that SEALs develop the mindfulness required to excel in their complex operating environments because they possess a high level of comfort with uncertainty and chaos that allows them to innovate, experiment, and even fail as long as they prepared as much as possible, gave their best effort, and learned from the experience. Learning from failure implies a willingness to take risks and embrace unconventional thinking, which is another important skill that was reported by nearly every informant. As one senior SEAL officer characterized it, a key SEAL skill is “the ability to look at a situation and say, What can go wrong?” and then build potential solutions while simultaneously recognizing that these plans will likely change.

FOIA Documentary Analysis

The documentary analysis phase of our research predominantly draws on the FOIA materials (see Table 1) and on several SOF studies conducted by military officers at the Naval Postgraduate School in Monterey California (see for example, Allman, Fussell, & Timmons, 2012; Doolittle, 2004; Ferguson, 2012; Hoffman, 2003; Mourouzis, 2011; Swierkowski & Burrell, 2002) and secondary sources such as newspaper articles, professional military magazines, and internet resources. Reviewing this material, our research team discovered that after September 11, 2001,

SOF were extensively deployed to Iraq, Afghanistan, Yemen, and other volatile regions because many of the highly specialized missions of the Global War on Terror could not be accomplished by conventional military forces (NSW Center Public Affairs, 2010). In response, the Pentagon doubled the Special Operations budget to \$10.5 billion, and the Navy aimed to expand the SEAL community by 15 percent.

Although growing efforts have been made to actively recruit skilled candidates and better prepare them for the challenges of BUD/S, the attrition rate has nonetheless remained stubbornly high. Of the 900 candidates recruited to attend BUD/S annually, only about 25 percent will successfully pass to become SEALs at a cost of approximately \$350,000 per trainee (Taylor, Miller, Mills, Padilla, & Hoffman, 2006). High attrition rates, coupled with an ever-increasing demand for Special Operations personnel in operational theaters, present a unique and significant human resource challenge for the SEAL community. Despite these challenges, there has only been a modest investigation into the key mental characteristics predicting performance success of BUD/S candidates.

As far back as the 1950s, research focused on easily quantifiable measures in what was then called “frogman” training and examined physical characteristics and fitness levels in attempting to establish a predictive statistical model for graduates and dropouts. Fifty years later, studies continue to focus on age, weight, swim scores, and running times, reporting that older, heavier recruits with faster run times and better swimming skills were more likely to graduate from BUD/S—but only approximately 10 percent more likely (Aleton, Cohen, Cummings, & Gray, 2002). This led researchers to deduce that mental characteristics must play a more important role than they previously suspected, and researchers then attempted to develop methods to screen BUD/S candidates.

For example, McDonald, Norton, and Hodgdon (1988) administered the Hogan Personality Inventory and found that successful SEAL recruits scored higher than training dropouts in self-confidence, composure under pressure, amicability, courteousness, and even temperedness. Braun, Prusaczyk, Goforth, and Pratt (1994) administered a five-factor survey (NEO Personality Inventory) comparing SEAL recruits to males in the general population in five categories: conscientiousness, neuroticism, extraversion, agreeableness, and openness. The findings revealed that SEALs scored lower than the general population on neuroticism—indicating that they are less prone to feelings of depression and vulnerability—and higher on aspects of extraversion, such as excitement seeking and assertiveness. Another quantitative study compared SEAL

candidates to other navy recruits and found that successful SEAL trainees had greater confidence, motivation, estimation of their abilities, commitment to the service, and support from family and friends than other navy recruits (Harris, Lords, Mottern, White, Jones, & Fedak, 2007). In 2010, a \$500,000 Gallup study reported that successful SEAL candidates conducted extensive research about the SEAL community such as reading SEAL books and memoirs, watching documentaries and fictional military movies, and conducting internet research. By contrast, unsuccessful SEAL trainees reported that they thought they would give BUD/S “a try” and came in less physically fit and mentally prepared (Gallup, 2010). Gallup also found that young men who grew up in New England, played water polo, enjoyed chess, and personally knew someone from SOF were the most likely candidates to succeed in SEAL training.

In response, new recruitment strategies and mentoring programs were developed, and new recruit screening measures were evaluated (Ferguson, 2012; Steele, 2010). For example, Mills and Held (2004) correlated military entry criteria such as scores on the Armed Services Vocational Aptitude Battery and physical fitness tests with BUD/S graduation rate. More recently, the Navy Computer Adaptive Personality Scales (NCAPS) was developed to assess 13 personality traits to screen all navy recruits into a range of military occupations. Oswald, Shaw, and Farmer (2015) report NCAPS is still in the testing phase; however, once approved as the navy’s occupational screening tool, it may prove to be the best selection instrument for future Navy SEALs as well. Although researchers reported “that existing training predictors are too low in validity and/or important predictors of training success are not being accounted for in the selection process” (Mills & Held, 2004: 3), new predictive models have been slow to emerge. As a result, finding and training the right individuals for the job continues to prove challenging, and the SEAL community remains critically undermanned as they struggled with their new role: marketing their elite commando program for the first time in history (Allman et al., 2012; Mourouzis, 2011; Swierkowski & Burrell, 2002).

In sum, quantitative studies repeatedly demonstrated, perhaps unsurprisingly, that SEALs differ from other men in specific ways such as self-confidence, composure, even temperedness, motivation, commitment, excitement seeking, and assertiveness. However, researchers concede that it is difficult to discern the roots of these findings. The lure of excitement and danger might attract SEAL recruits who are predisposed to succeed in the challenging BUD/S environment. Conversely, SEAL training and the military environment might influence recruits’ personality, for example, building their confidence,

assertiveness, and thrill-seeking appetite. New quantitative measures exploring SEAL candidates’ orientation toward uncertainty, chaos, and failure might prove to be helpful screening tools, allowing the Navy to identify and select recruits with a higher propensity to survive BUD/S training and to become successful SEALs. In addition, a clearer focus on identifying and developing mindfulness skills might reduce attrition by helping recruits hone their abilities during training. Nevertheless, little attention has been paid in quantitative studies thus far to the individual mindfulness characteristics identified as essential to success in HROs.

Video Analysis

The last phase of our research capitalizes on the Navy’s efforts to expand their marketing materials after 2001 by using publically available documentary style SEAL recruitment videos. Over time, three categories emerged: (1) physical failure; (2) mental failure; and (3) team failure (see Table 5).

Physical Failure

The first category in which SEAL candidates are pushed to learn from failure is based on individual challenges such as timed runs, swims, and other physical demands. In addition to meeting prescribed time limits, students are urged to continually beat their own “personal best” times and compete with one another to win races to show steady improvement. Although it may not seem surprising to expect continuous progress, physical tests continue to be administered under increasingly challenging conditions such as during Hell Week with its intensive sleep deprivation and hypothermic training environment. Failure to meet minimum standards, no matter what the context, will result in being dropped from SEAL training. It is not uncommon for an individual to excel in one area such as running and struggle in others such as calisthenics or swimming, and SEAL instructors are quick to notice any mental weakness when candidates’ physically falter (see video segment: <https://vimeo.com/194967140>).

Mental Failure

The second category in which SEAL candidates are pushed to learn from failure is based on mental challenges during which students are forced to struggle with their own individual doubts and insecurities. For example, SEAL instructors may confront a student for “not demonstrating leadership” or “not putting out” and giving 100 percent effort. Employing slightly different tactics, instructors

TABLE 5
Video Data Analysis – Attributes of Individual and Collective Mindfulness Exhibited by Navy SEALs

Level of Analysis	Link to Attributes in Extant Literature	Inductive Codes	Indicative Quotations
Individual Mindfulness	Attention to discriminatory detail (Weick & Sutcliffe, 2006)	‘Constant focus’	Scene: briefing on beach Instructor: ‘Small little schedule change, right easy to follow, easy to track. Pay attention. . . Now you’ve shown me to some extent that you can withstand some pain, but you’re lacking attention to detail, to do it right the first time. Have some honor, have some integrity’.
	Actively engaged in present (Kabat-Zinn, 1994; Langer, 2000)	‘Slow is fast’	Scene: Shooting exercise Narrator: ‘accuracy versus time’
	Actively engaged in present (Kabat-Zinn, 1994; Langer, 2000)	‘Compartmentalize /focus on current task’	Scene: team sat with arms linked in cold surf Candidate 1: ‘take every evolution at a time’. Candidate 2: ‘one evolution at a time, stay fired up’.
	Creating new categories of meaning (Fiol et al., 2009; Langer, 1989)	‘Changing mindset & perception’	Scene: Boat exercise Candidate: ‘Everyday it got harder, every evolution. I thought to myself it can’t get any worse than this and it did, but you keep amazing yourself everyday. You know I didn’t think I could do that and you do it. . . Coldest I’ve ever been in my entire life, but I did it and got through it, I got through the whole entire week. Proves to you, you can get through anything, I can get through this week, I can get through next week I can get through hell week’.
	Flexible state of mind (Langer, 1989, 2000; Levinthal and Rerup, 2006)	Coping/thriving with uncertainty	Scene: Candidates are underwater wearing scuba gear while being harassed by instructors.
			Candidate: ‘They come up to grab you, spin you around a couple of times, rip off your mask, rip out your regulator, turn off your air You have to basically keep your composure, turn on your air, find your regulator, put it back in, check yourself and make sure all your straps are properly put on’.
Collective Mindfulness	Preoccupation with failure (Weick et al., 1999)	I just won’t quit (even if 1 fail)	Scene: Candidate is being pushed to limits through repetitive physical exercise
			Instructor: ‘If you can’t do them perfect just change them for a bit. Don’t give into the pain and quit’
			Scene: In 50-meter underwater swim test a candidate’s push to complete test results in loss of consciousness underwater
			Instructor: ‘How many guys went over a hurdle today that they didn’t really realise that they were going to be able to go over? You just proved to your bodies through your mind that you can push yourself further that you thought possible. Feels good to get over a hurdle doesn’t it’.

might ask if a SEAL candidate officer was “worthy of leading men” or suggest that “there are other programs out there” that the student might consider because he appears not up to the standards of being a SEAL (see video segment: <https://vimeo.com/194970117>).

Team Failure

The third category in which SEAL candidates are pushed to learn from failure in a controlled setting is based on the challenge of working within a team under duress. Examples in this category are boat crews’ inability to follow directions, coordinate activities and execute as a team, not meeting timed evolutions, and the constant pressure to beat other boat crews at the assigned challenge. First-place finishers are “winners,” and often get to rest, whereas second-place finishers are merely the “first loser” and join the other losers for more exercises (see video segment: <https://vimeo.com/194968913>).

Although each of the failure categories is described separately, it is important to emphasize that they are not experienced as standalone events by participants. For example, a SEAL candidate may be urged to quit BUD/S by a SEAL instructor who observes that the student is “too weak” to complete his push-ups (failure 1), “not putting out” (failure 2), and letting his boat crew down by making them wait for him to finish (failure 3). The SEAL candidate develops an enhanced ability to tolerate uncertainty by this experience because he is unsure of whether he, in fact, has the strength and stamina to complete more pushups and whether his boat crew will continue to respect him if he makes them late. In contrast to a “preoccupation with failure,” the SEAL candidate is forced to compartmentalize his emotions—and not fixate on them—to provide his best effort in the moment and to not obsess over the “what-ifs” of his potential failures.

Examples of learning through failure such as these abound in BUD/S. For instance, SEAL candidates must jump into a swimming pool, flip underwater, and then complete a timed 50-meter underwater swim without kicking off the wall or taking an additional breath. Students are closely monitored by divers because in several cases automatic reflexes take over causing the swimmer to inhale water and pass out. To successfully pass in the time allocated (overcome failure 1), SEAL candidates must learn to control their anxieties about drowning (overcome failure 2) and trust that instructors will monitor their safety (overcome failure 3) (see video segment: <https://vimeo.com/194970889>).

In sum, analysis of both the video images and audio track provides additional support for the individual and collective mindfulness attributes

identified previously. After extensively reviewing the videos, our research team concluded that SEAL candidates were forced to grapple with multiple forms of failure on a daily basis during BUD/S training. In response, we observed that SEAL trainees developed the ability to learn from failure in a highly stressful, demanding, and dangerous environment, thereby honing a sense of comfort with chaos and uncertainty in a controlled training context as a way of avoiding fatal failures in their future frontline operating environments. This combination of individual and collective mindfulness attributes highlights the need for researchers to adopt a multilevel analytic approach as a means of better understanding performance in risky environments, a point we will further elaborate on in the following section.

DISCUSSION

Roberts (1989) was perhaps the first scholar to propose that existing organizational theory offered little assistance in deciphering the nearly error-free organizing processes of hazardous industries. Building on Perrow’s (1984) “Normal Accident” theory identifying the vulnerabilities of highly technical, tightly coupled, and interactively complex systems, Roberts (1989) coined the term “*High Reliability Organization*” after she and her University of California, Berkeley colleagues noted how risky organizations sustained excellent performance over long periods despite the inherent danger of their work. Organizations were categorized as HROs based on how often they might have failed with catastrophic implications—and yet did not. Roberts noted, “if the answer is ‘repeatedly’, the organization qualifies for membership in the ‘high reliability’ group” (1989: 113).

Initially some HRO theorists, such as Weick (1987), characterized HROs based on their total elimination of mistakes and inability to learn by trial-and-error due to the severe implications of failure. However, this stance was later reassessed to allow for the inevitability of error, referenced in the literature as a “preoccupation with failure,” and the importance of trial-and-error learning, albeit in a limited manner (Weick et al., 1999). Another early HRO researcher, La Porte (1996) further defined HROs as organizations that must continuously operate at a very high level of efficiency using complex and hazardous advanced technologies without major failure while maintaining the capacity to address unpredictability. Similarly, Carroll’s (1998) HRO study found that nuclear power and chemical processing plants employ a unique organizational learning process cycle to avoid errors, to limit the consequences of problems, and to learn from near-misses and minor incidents. Other early studies cited the fixation of

HROs on safety as the source of their reliability. However, more recent research recognizes that HROs actively pursue multiple objectives to achieve peak performance (Weick et al., 1999).

What was novel about these pioneering studies was that before this time, studies of complex operations in hazardous industries often involved adopting an engineering presumption that performance reliability resulted from clear hierarchy, stable environments, unambiguous functions, and routinized procedures. In this paradigm, human operators were seen as a potential weakness and that vulnerability was controlled through engineering design, managerial supervision, and routinization. For instance, once a nuclear power plant was built and debugged, nuclear utilities and governmental regulators assumed that the plant would simply run safely. Nuclear accidents were deemed too unlikely to worry about until the Three Mile Island meltdown in 1979 proved the flaw in this logic (Carroll, 1998).

By contrast, early HRO researchers recognized that a new paradigm was needed in which reliability was achieved through organizational flexibility, resilience, and responsiveness to the unexpected, rather than through rigidity and routines. As such, resilience resulted from organizational slack that allowed operators to continually manage small fluctuations and uncertainties, not from organizational invariance and tight managerial control (Schulman, 1993). Although Weick et al. (1999) argue that HROs experience low failure rates because stable processes of cognition allow organizational actors to detect and adapt patterns of activity in managing unexpected events, we still do not know how this is achieved in practice. Therefore, to better understand how organizations organize to enhance reliability, Weick et al. (1999) suggest that researchers analyze how and when mindfulness arises in practice.

Much of the recent research in the field has involved applying HRO concepts to the study of less dangerous workplaces. Termed “reliability-seeking organizations,” studies include a broad set of organizations in which human fatality is unlikely; however, their unpredictable operating environments nonetheless mean that small failures can amplify into organizational mortality (Vogus & Welbourne, 2003). Studies such as these show that the “organization literature has, on the one hand, been abuzz about the concept of organizational mindfulness,” as noted by Ray et al. (2011: 191), “but relatively quiet when it comes to empirical demonstrations of the idea.”

Individual Mindfulness

Langer (2000: 220) offers one of the most often cited definitions of individual mindfulness: “[M]indfulness

is a flexible state of mind in which we are actively engaged in the present, noticing new things and sensitive to context.” In addition, Kabat-Zinn (1994) observes that individual mindfulness involves paying attention in a present, purposeful non-judgmental way. More recently Fiol et al. (2009) added that achieving mindfulness depends on an individual’s openness to new information, the ability to create new categories of meaning, and the awareness of multiple, sometimes competing realities. In sum, individual mindfulness is based on several, often overlapping characteristics: (1) attention to detail; (2) engagement in the present; (3) a flexible state of mind; and (4) openness to multiple emerging realities.

In addition, quantitative researchers have studied other individual characteristics that may contribute to mindfulness, albeit in an oblique manner, such as the big five personality traits (Goldberg, 1990), grit (Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Quinn, 2009), emotional intelligence (Bar-On & Parker, 2000; Goleman, 1995; Salovey & Mayer, 1990), and resilience (Smith, Dalen, Wiggin, Tooley, Christopher, & Bernard, 2008; Windle, Bennett, & Noyes, 2011), among others. For example, grit involves perseverance and passion for long-term goal achievement, thereby creating a sense of purpose, whereas resilience is a more immediate, short-term process of adapting to challenges and remaining motivated. Both involve aspects of emotional intelligence, which involves an individual’s ability to understand and use emotional information to guide thinking and behavior.

Collective Mindfulness

As summarized in Table 6, at the collective level, HRO theory demonstrates that HROs achieve their high reliability through heedful performance, heedful interrelating, and other mindful organizing processes. For example, Weick and Roberts (1993) note that heedful interrelating is an ongoing social process in which HROs capitalize on individual know-how to meet unexpected situational demands by identifying small failures before they turn into catastrophes. Moreover, heedful performance is the outcome of training and experience linked with thinking and feeling that allows HROs to flexibly apply knowledge in ambiguous situations. Yet how these important micro- and macrolevel factors are linked to achieve high performance in HROs has been largely unexplored. Weick et al. (1999: 37) observe that although there has been ample recognition that diverse cognitive processes are associated with high reliability functioning, how these diverse processes interrelate in a state of “collective mindfulness” is less understood.

TABLE 6
Table of Terms

	Term	Definition	Key References	
Key Terms	Mindful Organizing	Five Hallmarks of mindfulness: preoccupation with failure, reluctance to simplify, sensitivity to operations, commitment to resilience, and deference to expertise	Weick and Sutcliffe (2001)	
	Collective Mindfulness	Updated five hallmarks: preoccupation with failure, reluctance to simplify, sensitivity to operations, commitment to resilience, and under-specification of structures	Weick et al. (1999)	
	Individual Mindfulness	Active refinement of existing distinctions, creation of new categories, and nuanced appreciation of alternative ways	Langer (1989)	
		Paying attention in a present, purposeful nonjudgmental way	Kabat-Zinn (1994)	
		Flexible state of mind, actively engaged in present noticing new things	Langer (2000)	
		High level of attentiveness and capacity to respond to unanticipated cues in order to carry out novel action in flexible manner	Levinthal and Rerup (2006)	
	Adjacent Terms	Resilience	Rich awareness of discriminatory detail coupled with a capacity for action	Weick and Sutcliffe (2006)
			Openness to new information, ability to create new categories of meaning, and awareness of multiple, sometimes competing realities	Fiol et al. (2009)
		Resilience	Negotiating, managing and adapting to change, stress or trauma while staying motivated	Windle et al. (2011)
		Heedful Performance	Heedful performance is the outcome of training and experience linked with thinking and feeling, creating an ability to apply knowledge flexibly in ambiguous situations	Weick and Roberts (1993)
Heedful Interrelating		Heedful interrelating is an ongoing social process that capitalizes on individual know-how to meet unexpected situational demands by identifying small hard to see or believe failures before they build into catastrophe	Weick and Roberts (1993)	
Reliability		Reliability is capacity to produce collective outcomes of certain minimum quality repeatedly and achieved through highly standardized routines	Hannan and Freeman (1984)	
Emotional Intelligence	Emotional intelligence is ability to understand your own emotions and those of others and use emotional information to guide thinking and behavior	Goleman (1995), Salovey and Mayer (1990)		
Big 5 Personality Traits	Conscientiousness, neuroticism, extraversion, agreeableness, openness	Goldberg (1990)		
Grit	Grit involves perseverance and passion for long-term goals	Duckworth and Quinn (2009), Duckworth et al. (2007)		

Mindfulness in the Military Context

Mindfulness has been previously studied in a military context, yet in a limited way. Following civilian studies such as Brown and Ryan (2003), which found that mindfulness training (MT) such as yoga, meditation, and reflexive exercises with undergraduate students often created a greater sense of focus and well-being; military researchers examined whether MT could similarly impact soldiers' performance. For example, Stanley, Schaldach,

Kiyonaga, and Jha (2011) tested whether MT before an Iraq assignment could bolster U.S. Marines' psychological resilience as a prophylaxis against deployment stressors. Jha, Morrison, Dainer-Best, Parker, Rostrup, & Stanley (2015) examined whether MT could reduce U.S. Army soldiers' attention lapses and mind wandering. Meland, Fonne, Wagstaff, and Pensgaard (2015) investigated whether MT with pilots and mission support personnel in a Norwegian F-16 squadron could reduce anxiety and improve concentration. All of these studies reported success,

albeit to a modest extent, by measuring military members' perceptions of the impact of MT on their individual thoughts and feelings (e.g., "the training has really opened my eyes"; "I have become more calm and relaxed"; "I feel I can concentrate more easily"). However, none of this military research addressed the aim of the present study to examine how HROs such as US Navy SEALs build capacity for the mindfulness required to succeed in the complex unforgiving environments in which they operate.

Comfort with Uncertainty and Chaos

During this study, we discovered that risky, chaotic and ambiguous HRO environments that would cause most people to become anxious, frustrated, and fearful, signal SEALs to become mindful, shifting their attention to the immediate present and heightening their sense of alertness for the unanticipated and awareness of multiple, sometimes competing realities. During this shift, the priority becomes achieving only the most immediate goal: one more evolution, one more pushup. Previous HRO research identified the connection between HROs and chaos at the organizational level. However, nearly all researchers have assumed that chaos would have a negative impact, potentially undermining reliability.

For example, Roberts (1990: 168) referred to the aircraft carrier flight deck as "organized chaos" because flight operations involved tightly coupled systems operating with extreme interdependence in uncertain environments, which led them to be vulnerable. Similarly, Vidal and Roberts (2014: 18) noted how US firefighters use *Incident Management Teams* "to bring 'order to chaos'" and French firefighters described their job as "organizing chaos." Comments such as these reflect a sense that chaos should be organized and contained—not embraced—lest it influence the reliability of high-risk teams' performance. By contrast, this study's findings support the notion that "mindfulness in action" allows Navy SEALs to live comfortably and even thrive in chaos, uncertainty, and change without the need to "bring order" and resolve inconsistencies. For SEALs, chaotic environments seem to trigger "mindfulness in action" in ways that lead to improved performance and reliability by allowing them to compartmentalize, focus intensely on the present, and disregard outside distractions. Similarly, we discovered that embedded within SEALs' mindful organizing processes is the freedom to innovate, experiment, and even fail in a controlled environment, as long as they gave their best effort and learned from the experience.

Freedom to Fail—A Positive Orientation towards Failure

Most HRO studies note that the catastrophic repercussions of mistakes in the HRO environment prohibit learning from trial-and-error and instead emphasize that organizational reliability is increased through a "preoccupation with failure." Typical examples of this preoccupation include an organizational willingness to reward the discovery of error, a proactive reporting of "bad news," and an ability to keep small mistakes from escalating (Gartner, 2013; La Porte, 1996; Ray et al., 2011). However, what was discovered in this study was a different preoccupation—a focus on *learning through failure and then moving on*.

Through repeated failures in a controlled setting, SEALs learned how to adapt to uncertain situations; moreover, our study of SEALs shows that impending failure triggers mindfulness processes that have not previously been discussed in HRO research. For example, most HRO studies support Weick et al.'s (1999: 39) observation that "worries about failure are what give HROs much of their distinctive quality" and by that they note, "HROs are preoccupied with something they seldom see." However, SEALs in this study failed often and were not preoccupied with avoiding failure in that manner. Instead, SEALs' intense focus on learning in the present allowed them to shrug off failure and move on to the next event.

In our video analysis, a SEAL instructor chastises a recruit who just failed an important timed run. The bare-chested recruit is standing at attention, completely covered in sand, and the instructor calmly explains:

"It looks like the only thing out of this timed run that you're going to end up benefiting from is the fact that now you know what it means to be wet and sandy... You know it now, because you failed the run and we got you sandy. So you'll still end up benefitting in one little way" (see video segment: <https://vimeo.com/194971382>).

This discussion helps reveal how SEALs can be both attentive to failure but not become immobilized by the potential repercussions of failing—a connection that has not been extensively investigated in HRO theory. Instead, observations that HROs are "preoccupied with failure" have been largely unchallenged, in part, because it is so difficult to separate individual and collective characteristics in the analysis.

One thing that is clear: SEAL recruits know that the likelihood of successfully completing BUD/S is extremely low. They know they will be repeatedly pushed to the brink and forced to fail because the fastest runner may not be the strongest during calisthenics or swimming. However, successful SEALs

often report that “quitting was never an option.” This indicates that SEALs are not “preoccupied by failure,” as Weick and Sutcliffe (2001, 2006) argue; instead, they have a positive orientation toward failure as an opportunity to identify a weakness, to learn, and to grow stronger. This is a subtle, yet distinctly different perspective that warrants further research.

Revisiting Weick and Sutcliffe’s (2006: 516) explanation of the five hallmarks, we add the following: Successful HROs foster an organizational climate at the macrolevel that allows individuals to develop comfort with uncertainty and chaos at the microlevel. Rather than being preoccupied with failure, we find that some HROs develop a positive orientation toward failure as an opportunity to identify a weakness, to learn, to grow stronger, and then to move on, which is the opposite of preoccupation. For instance, SEALs in this study demonstrated that they can be both attentive to failure but not become immobilized by the potential repercussions of failing.

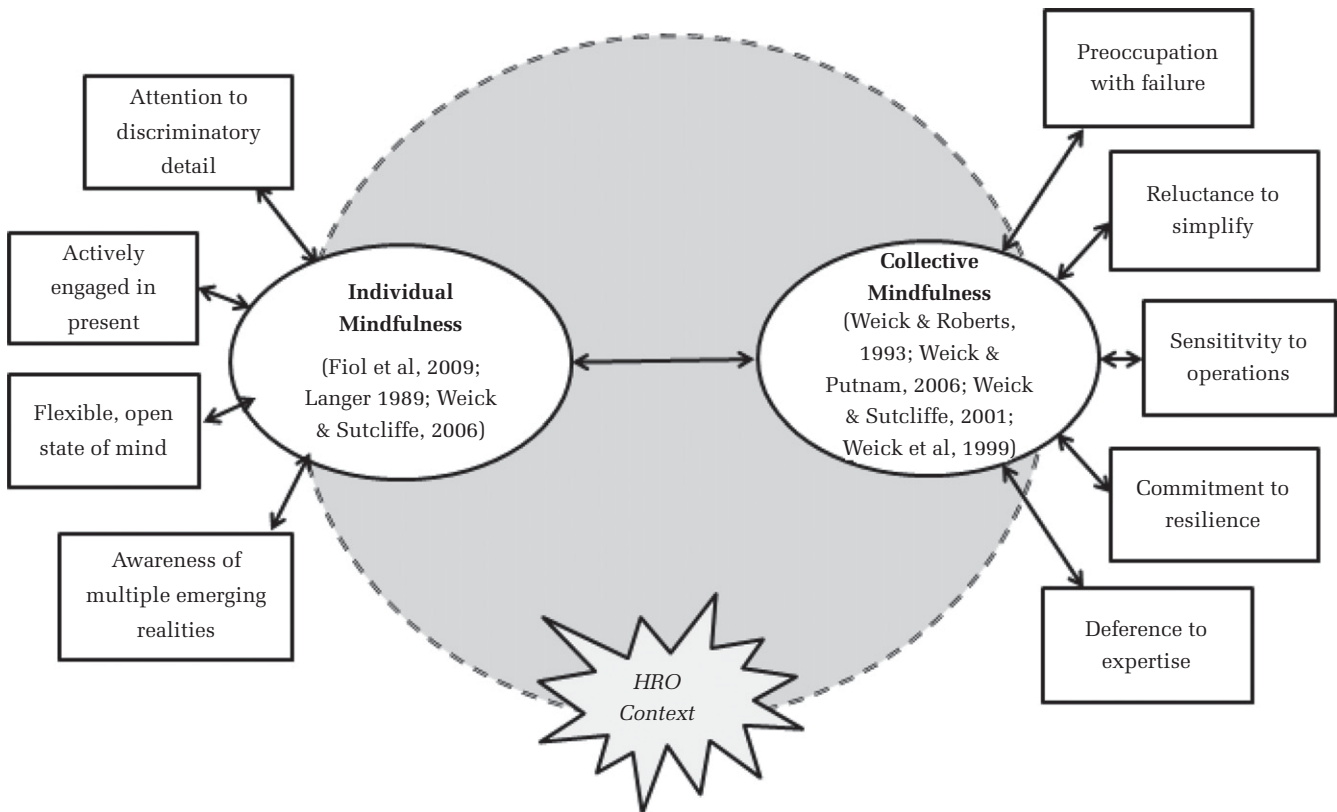
Mindfulness in Action

“Mindfulness in action” crystalizes this range of individual and collective level influences

demonstrating how overlapping traits such as grit, resilience, and emotional intelligence at the individual level combine with organizational phenomena such as heedful performance and heedful interrelating on the macrolevel to support collective mindfulness in HROs. To understand “mindfulness in action,” it is important to consider not only where an individual’s attention is allocated and what is noticed, but also how autonomous those individuals are empowered to be and what action they can take as a result. Therefore, we find that both individual mindfulness attributes and collective mindfulness influences combine to form the conditions for “mindfulness in action” (see Figure 2).

We emphasize action here, as our data suggest a series of complex and interrelated processes that involve inquiry, interpretation, sense-making, framing and reframing processes, and challenging assumptions within a repertoire of action capabilities (Fraher, 2011). As Weick et al. (1999) note, “the richness of a state of mindfulness is determined by the richness of the action repertoire” (p. 37). Our research suggests some of the ways in which individual mindfulness attributes and collective mindfulness

FIGURE 2
Unpacking HRO Mindfulness at Individual and Collective Levels



influences interrelate to enable HROs to succeed. For example, we find evidence to suggest that the established individual mindfulness attribute of thinking and acting in the present (Kabat-Zinn, 1994) combines with a collective comfort with failure to enable SEALs to move on from errors rather than inappropriately dwelling on negative experiences or emotions.

The HRO literature explains that mindful organizing only exists to the extent that it is collectively enacted and continuously reconstituted and that this process is a function of the behaviors of organizational members (Vogus & Sutcliffe, 2012). As such, achieving organizational mindfulness involves both individual characteristics and organizational phenomena within a given context. However, how these two levels interrelate has largely remained unaddressed in previous HRO studies. Through our multimodal study, we address this gap by introducing “mindfulness in action” as a means of linking two previously distinct bodies of mindfulness research: attributes of individual mindfulness (see for example, Fiol et al., 2009; Kabat-Zinn, 1994; Langer, 1989, 2000; Weick & Sutcliffe, 2006) and collective mindfulness at the organizational level (Weick & Putnam, 2006; Weick & Roberts, 1993; Weick & Sutcliffe, 2001; Weick et al., 1999).

In our view, “mindfulness in action” occurs when individuals are collectively supported to achieve an attentive yet flexible focus, when failure is viewed as acceptable and transient and when individuals are empowered to take action flexibly in dynamic situations. We suggest that to understand HRO success, individual mindfulness attributes (e.g., “constant focus,” “ability to compartmentalize,” etc.) must be considered along with collective factors (e.g., “comfort with failure”) and that, in fact, there is an important overlap between the individual and collective. For example, although “comfort with uncertainty and chaos” appears to be an individual level attribute, the influence of the collective on an individual’s attitude appears from our data to be critical; similarly, we found evidence to indicate that the collective “comfort with failure” supported individual mindfulness behaviors. As such, we view “mindfulness in action” as a dynamic cocreational process between individuals, the organization, and the wider context and environment and, therefore, suggest that what was previously considered discrete bodies of research ought to be combined.

CONCLUSION

Quantitative research has shown that individual traits such as grit, resilience, and emotional

intelligence are important factors that contribute to individuals’ success at the microlevel. In addition, HRO theory demonstrates that HROs achieve their high reliability through heedful performance, heedful interrelating, and mindful organizing at the macrolevel. However, how these important micro- and macrolevel factors are linked to achieve high performance in HROs has remained largely unexplored. This paper offers one of the first examinations of the ways that individual mindfulness traits at the microlevel and organizational mindfulness at the macrolevel interrelate in HROs in a process we call mindfulness in action.

Through a study of US Navy SEALs, we provide a more nuanced conceptualization of one of Weick and Sutcliffe’s (2001, 2006) five hallmarks of mindfulness—a preoccupation with failure—and identified a sixth hallmark of mindfulness that allows SEALs to perform in a near error-free manner despite the complexity, danger, and unpredictability of their operating environments: comfort with uncertainty and chaos. Most HRO studies note that the catastrophic repercussions of mistakes prohibit learning from trial-and-error and instead emphasize that organizational reliability is increased through a “preoccupation with failure.”

By contrast, the findings in the present study reveal that embedded within SEALs’ mindful organizing processes is the autonomy to fail and move on, as long as they gave their best effort and learned from the experience. These findings parallel sports psychology studies that report that athletes who can put mistakes behind them report more effective coping skills and greater motivation than those who dwell on failure (Mouratidis & Michou, 2011). SEALs learned through repeated failure in a controlled setting how to adapt to uncertainty and chaos, and during this process, mindfulness processes are triggered in ways that have not previously been identified in HRO research. We discovered that SEALs’ ability to reconfigure mistakes into learning experiences ensures that they do not become immobilized by the potential repercussions of failing in their risky operating environments.

LIMITATIONS

Although we believe that the multimodal research approach adopted here offers novel yet reliable insights about our research question, we recognize that there are certain limitations in our research design. First, interview results were based on a small informant group of very experienced SEALs who volunteered for the study and were, therefore, not randomly selected. Second, some of the text-based

materials analyzed in phase two were redacted for security purposes, making some documents only partially usable. Third, although much of the video analyzed in phase three was documentary footage gathered during actual SEAL training, the footage was edited and narrated for a different purpose by the Navy and therefore not unbiased. In addition, some critics believe that the mere presence of a video recording device distorts social interaction to such a great extent that video as a data source is of little empirical value (Jewitt, 2012). That said, other researchers claim this issue is exaggerated and empirically unsubstantiated, and that within a short time, the camera is hardly noticed by video participants (Heath, Hindmarsh, & Luff, 2010). In addition, video repurposing is an emergent research approach with few models to refer to for guidance within the field of organization studies. Finally, although we adopted Weick and Sutcliffe's (2006) definition of HRO mindfulness as a rich awareness of discriminatory detail and a capacity for action, we recognize that some readers may have difficulty accepting our application of mindfulness to military operations. For example, Kabat-Zinn's (1994: 7) popular definition based on Buddhist influences describes mindfulness as "gentle, appreciative, and nurturing," which are not likely descriptors for Navy SEALs.

In this paper, we have contributed to research investigating mindfulness in HROs by identifying the individual and collective influences that allow SEALs to build the capacity for mindful behaviors despite their complex, dangerous, and unpredictable operating environments. Although the established HRO literature defines a range of hallmarks and attributes of mindfulness, in this paper, we empirically unpack how frontline people working in HROs create a state of individual and collective mindfulness. This study, therefore, addresses the gap in the extant literature on mindfulness and HROs by theorizing mindfulness at both the individual and collective levels of analysis. In so doing, we are able to provide an extended and nuanced conceptualization of both individual mindfulness attributes (e.g., comfort with uncertainty and chaos) and the hallmarks of collective mindfulness (e.g., comfort with, and positive orientation to, failure), and we are able to identify the links between individual mindfulness attributes and collective mindfulness influences ("mindfulness in action"). These discoveries have the potential to create new avenues of HRO research and to contribute to practice through an empirically grounded understanding of how near error-free performance can be achieved in a wide range of reliability-seeking organizations through "mindfulness in action."

IMPLICATIONS AND NEW RESEARCH TERRITORY

Mindfulness is an important phenomenon to study because a wide range of organizations today must navigate complex, unpredictable environments that pose a significant risk to their survival. Weick et al. (1999) observe that HROs warrant closer attention in mainstream organizational theory because they are harbingers of organizational adaption in increasingly complex environments and can serve as role models of how mindful processes can foster organizational effectiveness and suppress tendencies toward inertia. In addition, Vogus, Rothman, Sutcliffe, and Weick (2014: 592) add, "mindful organizing is relevant to organizations of all kinds." Similarly, Gebauer (2012: 203) explained that managers and management scholars can learn from mindful organizing because, in contrast to rationality-based management paradigms, mindful organizing "provides the guiding principles and proactive managerial mindset to build collective organizational capabilities for anticipating the evolution of unexpected events and acting resiliently in times of crisis." Therefore, the discoveries presented in this article open new territory for organizational research and practice with implications for a wide range of high-performing, reliability-seeking organizations (Vogus & Welbourne, 2003).

One of the most intriguing discoveries of this study is the fact that some individuals do not just succeed in ambiguous and chaotic contexts but positively thrive in them, seeking out uncomfortable situations that most of us try to avoid. Rather than focusing energy on containing the chaos in these environments, we discovered chaos-thrivers tap into cues that trigger an increase in mindfulness, which fosters creative leadership processes that lead to innovative solutions. In contrast to a presumption that reliability results from stable hierarchical environments in which human operators are controlled through close supervision and rigid procedures, we discovered that a flexible and less hierarchical approach improved performance in ambiguous environments by enhancing mindfulness. In addition, we discovered that our study's participants were less "preoccupied" by failure and more focused on psychologically adjusting to failing and learning from failure. A deeper investigation into these research areas is warranted. Understanding the nature of these dynamics more clearly would not only expand HRO theory but perhaps help the Navy select more suitable candidates for SEAL training.

Although recent studies have applied HRO frameworks, particularly Weick and Sutcliffe's (2001) popular five hallmarks of mindfulness model in the study of less physically risky workplaces, the rich

discoveries reported here support a return to the study of high-risk fields to surface clues that further identify the links between mindfulness and high reliability. After all, if we can manage to maintain high levels of safety, reliability, and success in HRO environments such as nuclear safety, aviation and, in this case, Navy SEALs, it is likely that equivalent levels of high performance are achievable within a wide range of reliability-seeking organizations in less risky contexts.

REFERENCES

- Adami, E. 2009. 'We/YouTube': Exploring sign-making in video-interaction. *Visual Communication*, 8(4): 379–399.
- Aleton, S., Cohen, Z., Cummings, J., & Gray, M. 2002. *So, you want to be a frogman? Determining what it takes to become a US Navy SEAL*. Coronado, CA: Naval Special Warfare.
- Allman, W., Fussell, J., & Timmons, M. 2012. *High value talent: Identifying, developing, and retaining naval special warfare's best leaders*. Unpublished thesis, Naval Postgraduate School, Monterey, CA.
- Bar-On, R., & Parker, J. D. A. (Eds.). 2000. *The handbook of emotional intelligence*. San Francisco: Jossey-Bass.
- Bell, E., & Davison, J. 2013. Visual management studies: Empirical and theoretical approaches. *International Journal of Management Reviews*, 15(2): 167–184.
- Braun, D. E., Prusaczyk, W. K., Goforth, J. H. W., & Pratt, N. C. 1994. *Personality profiles of U.S. Navy Sea-Ar-Land (SEAL) personnel (94-22362)*. San Diego, CA: Naval Medical Research and Development Command.
- Brown, K. W., & Ryan, R. M. 2003. The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4): 822–848.
- Campbell, D. T., & Fiske, D. W. 1959. Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological bulletin*, 56(2): 81–105.
- Carroll, J. S. 1998. Organizational learning activities in high-hazard industries: The logic underlying self-analysis. *Journal of Management Studies*, 35: 699–717.
- Cunliffe, A. L. 2003. Reflexive inquiry in organizational research: Questions and possibilities. *Human Relations*, 56(8): 983–1003.
- Denzin, N. K. 1978. *The research act: A theoretical introduction to sociological methods*. New York: Praeger.
- Dockery, K. 2004. *Navy SEALs: A complete history from World War I to the present*. New York: Berkley Books.
- Doolittle, J. 2004. *Naval special warfare (NSW) enlisted manning concerns key elements for successful growth and retention of enlisted personnel*. Unpublished thesis, Naval Postgraduate School, Monterey, CA.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. 2007. Grit: Perseverance and passion for long-term goals. *Journal of Personality & Social Psychology*, 92(6): 1087–1101.
- Duckworth, A. L., & Quinn, P. D. 2009. Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment*, 91(2): 166–174.
- Ferguson, P. R. 2012. *Targeted recruitment for Naval Special Warfare (SEALs): Connecting NSW to recruit pools with social movement theory*. Unpublished thesis, Naval Postgraduate School, Monterey, CA.
- Fiol, C. M., Pratt, M. G., & O'Connor, E. J. 2009. Managing intractable identity conflicts. *Academy of Management Review*, 34(1): 32–55.
- Fraher, A. L. 2011. *Thinking through crisis: Improving teamwork and leadership in high-risk fields*. New York: Cambridge University Press.
- Gallup. 2010. *Psychographic description of successful BUD/S students*. Coronado, CA: US Navy.
- Gartner, C. 2013. Enhancing readiness for change by enhancing mindfulness. *Journal of Change Management*, 13(1): 52–68.
- Gebauer, A. 2012. Mindful organizing a paradigm to develop managers. *Journal of Management Education*, 37(2): 203–228.
- Glaser, B. G., & Strauss, A. L. 1967. *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine Pub. Co.
- Goldberg, L. R. 1990. An alternative "description of personality": The big-five factor structure. *Journal of Personality and Social Psychology*, 59(6): 1216.
- Goleman, D. 1995. *Emotional intelligence: Why it can matter more than IQ*. New York: Bantum Books.
- Goodman, L. A. 1961. Snowball sampling. *Annals of Mathematical Statistics*, 32(1): 148–170.
- Hannan, M. T., & Freeman, J. 1984. Structural inertia and organizational change. *American Sociological Review*, 49, 149–164.
- Harris, R. N., Lords, A. O., Mottern, J. A., White, M. A., Jones, L. A., & Fedak, G. E. 2007. *BUDS candidate success through RTC: First watch results. (NPRST-AB-07-4)*. Millington, TN: Bureau of Naval Personnel.
- Heath, C., Hindmarsh, J., & Luff, P. 2010. *Video in qualitative research: Analysing social interaction in everyday life*. London: Sage.

- Hoffman, D. 2003. *Metacognition in BUD/S training*. Unpublished paper, University of Southern California.
- Jewitt, C. 2012. *An introduction to using video for research*. London: National Centre for Research Methods (Working paper).
- Jha, A. P., Morrison, A. B., Dainer-Best, J., Parker, S., Rostrup, N., & Stanley, E. A. 2015. Minds "At Attention": Mindfulness training curbs attentional lapses in military cohorts. *PLoS One*, 10(2): e0116889.
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. 2007. Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2): 112–133.
- Kabat-Zinn, J. 1994. *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York: Hyperion.
- Knoblauch, H., & Schnettler, B. 2012. Videography: Analysing video data as a 'focused' ethnographic and hermeneutical exercise. *Qualitative Research*, 12(3): 334–356.
- La Porte, T. 1996. High reliability organizations: Unlikely, demanding and at risk. *Journal of Contingencies and Crisis Management*, 4(2): 60–71.
- Langer, E. J. 1989. Minding matters: The consequences of mindlessness-mindfulness. In L. Berkowitz (Ed.), *Advanced Experimental Psychology* (pp. 137–173). New York: Academic Press.
- Langer, E. J. 2000. Mindful learning. *Current Directions in Psychological Science*, 9(6): 220–223.
- Lefsrud, L., Graves, H., & Phillips, N. 2016. Analyzing visual rhetoric in organizational research. In K. D. Elsbach & R. M. Kramer (Eds.), *Handbook of qualitative organizational research: Innovative pathways and methods*: 225–237. New York: Routledge.
- Levinthal, D., & Rerup, C. 2006. Crossing an apparent chasm: Bridging mindful and less-mindful perspectives on organizational learning. *Organization Science*, 17(4), 502–513.
- Liu, F., & Maitlis, S. 2014. Emotional dynamics and strategizing processes: A study of strategic conversations in top team meetings. *Journal of management studies*, 51(2): 202–234.
- Margolis, E., & Pauwels, L. (Eds.). 2011. *The sage handbook of visual research methods*. London: Sage.
- McDonald, D., Norton, J., & Hodgdon, J. 1988. *Determinants and effects of training success in the U.S. Navy Special Forces (NHRC 88-34)*. San Diego, CA: Naval Medical Research and Development Command.
- Meland, A., Fonne, V., Wagstaff, A., & Pensgaard, A. M. 2015. Mindfulness-based mental training in a high-performance combat aviation population: A one-year intervention study and two-year follow-up. *The International Journal of Aviation Psychology*, 25(1): 48.
- Mills, L. J., & Held, J. 2004. *Optimizing US Navy SEAL selection*. Paper presented at the 46th annual International Military Testing Association Conference October.
- Mouratidis, A., & Michou, A. 2011. Perfectionism, self-determined motivation, and coping among adolescent athletes. *Psychology of Sport and Exercise*, 12(4): 355–367.
- Mourouzis, M. 2011. *Finding Lawrence: Recruiting talent for unconventional warfare*. Unpublished thesis, Naval Postgraduate School, Monterey, CA.
- NSW Center Public Affairs. 2010. Growing the force. *Ethos*, 8: 17–19.
- Oswald, F. L., Shaw, A., & Farmer, W. L. 2015. Comparing simple scoring with IRT scoring of personality measures: The navy computer adaptive personality scales. *Applied Psychological Measurement*, 39(2): 144–154.
- Perrow, C. 1984. *Normal accidents: Living with high-risk technologies*. New York: Basic Books.
- Ray, J. L., Baker, L. T., & Plowman, D. A. 2011. Organizational mindfulness in business schools. *Academy of Management Learning & Education*, 10(2): 188–203.
- Roberts, K. H. 1989. New challenges in organizational research: High reliability organizations. *Industrial Crisis Quarterly*, 3: 111–125.
- Roberts, K. H. 1990. Some characteristics of one type of high reliability organization. *Organization Science*, 1(2): 160–176.
- Rochlin, G. I., LaPorte, T. R., & Roberts, K. H. 1987. The self-designing high-reliability organization: Aircraft carrier flight operations at sea. *Naval War College Review*, 40(4): 76–90.
- Salovey, P., & Mayer, J. D. 1990. Emotional intelligence. *Imagination, Cognition and Personality*, 9(3): 185–211.
- Schulman, P. R. 1993. The negotiated order of organizational reliability. *Administration & Society*, 25: 353–372.
- Smets, M., Burke, G., Jarzabkowski, P., & Spee, P. 2014. Charting new territory for organizational ethnography. *Journal of Organizational Ethnography*, 3(1): 10–26.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. 2008. The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15(3): 194–200.
- Soukup, P. A. S. J. 2014. Looking at, with, and through YouTube™. *Communication Research Trends*, 33(3): 3–34.
- Stanley, E. A., Schaldach, J. M., Kiyonaga, A., & Jha, A. P. 2011. Mindfulness-based mind fitness training: A

- case study of a high-stress predeployment military cohort. *Cognitive and Behavioral Practice*, 18(4): 566–576.
- Steele, J. 2010. *Study points SEAL recruiters toward athletes*. San Diego, CA: San Diego Union Tribune. Accessed online October 2, 2017. <http://www.sandiegouniontribune.com/sdut-navys-seriously-sports-2010mar15-htmlstory.html>.
- Swierkowski, S. M., & Burrell, R. M. 2002. *Tactics, methods and techniques to improve special forces in-service enlisted recruiting*. Unpublished thesis, Naval Postgraduate School, Monterey, CA.
- Tashakkori, A., & Teddlie, C. (Eds.). 2010. *Handbook of mixed methods in social and behavioral research* (2nd ed.). Thousand Oaks, CA: Sage.
- Taylor, M. K., Miller, A., Mills, L., Padilla, G. A., & Hoffman, R. 2006. *Predictors of success in basic underwater demolition/SEAL (BUD/S) training-part I: What do we know and where do we go from here?* San Diego, CA: Naval Special Warfare.
- Torrance, H. 2012. Triangulation, respondent validation, and democratic participation in mixed methods research. *Journal of Mixed Methods Research*, 6(2): 111–123.
- Vidal, R., & Roberts, K. H. 2014. Observing elite firefighting teams: The triad effect. *Journal of Contingencies and Crisis Management*, 22(1): 18–28.
- Vogus, T. J., Rothman, N. B., Sutcliffe, K. M., & Weick, K. E. 2014. The affective foundations of high-reliability organizing. *Journal of Organizational Behavior*, 35: 592–596.
- Vogus, T. J., & Sutcliffe, K. M. 2012. Organizational mindfulness and mindful organizing: A reconciliation and path forward. *Academy of Management Learning & Education*, 11(4): 722–735.
- Vogus, T. J., & Welbourne, T. M. 2003. Structuring for high reliability: HR practices and mindful processes in reliability-seeking organizations. *Journal of Organizational Behavior*, 24(7): 877–903.
- Weick, K. E. 1987. Organizational culture as a source of high reliability. *California Management Review*, 29(2): 112.
- Weick, K. E. 2011. Organizing for transient reliability: The production of dynamic non-events. *Journal of Contingencies and Crisis Management*, 19(1): 21–27.
- Weick, K. E., & Putnam, T. 2006. Organizing for mindfulness: Eastern wisdom and western knowledge. *Journal of Management Inquiry*, 15(3), 275–287.
- Weick, K. E., & Roberts, K. H. 1993. Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*, 38(3): 357–381.
- Weick, K. E., & Sutcliffe, K. M. 2001. *Managing the unexpected*. San Francisco: Jossey-Bass.
- Weick, K. E., & Sutcliffe, K. M. 2006. Mindfulness and the quality of organizational attention. *Organization Science*, 17(4): 514–524.
- Weick, K. E., & Sutcliffe, K. M. 2007. *Managing the unexpected: Resilient performance in an age of uncertainty*. San Francisco: Jossey-Bass.
- Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. 1999. Organizing for high reliability: Processes of collective mindfulness. In R. S. Sutton & B. M. Staw (Eds.), *Research in Organizational Behavior*, vol. 21: 81–123. Stanford, CA: JAI Press.
- Windle, G., Bennett, K. M., & Noyes, J. 2011. A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes*, 9: 8.



Amy Fraher (a.l.fraher@bham.ac.uk) is a retired military officer and Naval Aviator, and former United Airlines pilot with over 6,000 flight hours. She currently holds academic appointments at the Birmingham Business School in the UK and Graduate School of Management at University of California, Davis in the USA.

Layla Branicki (layla.branicki@mq.edu.au) is an interdisciplinary researcher specializing in individual and organizational resilience and the factors that enable people and businesses to cope with high risk work and extreme events. Before joining Macquarie Graduate School of Management, Layla lectured at Birmingham Business School and was the Warwick Business School Strategy, Organizational Learning and Resilience Research Fellow.

Keith Grint (Keith.Grint@wbs.ac.uk) is Professor of Public Leadership at Warwick Business School. Previously he held chairs at Cranfield and Lancaster University and was Director of Research at the Said Business School, Oxford University, and is a Visiting Professor at the Leiden University Leadership Centre, The Hague.

