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# Preparing to be unprepared: ground force commander decision making in a volatile, uncertain, complex, and ambiguous world

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# NAVAL POSTGRADUATE SCHOOL

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# THESIS

**PREPARING TO BE UNPREPARED: GROUND FORCE COMMANDER DECISION MAKING IN A VOLATILE, UNCERTAIN, COMPLEX, AND AMBIGUOUS WORLD**

by

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June 2016

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What are the characteristics of effective ground force commander (GFC) decision making? What commonalities do we see? What are best practices for pre-mission preparation and mission execution? This thesis focuses on GFC decision making in order to investigate how to better prepare leaders for the current operating environment. It examines tactical-level decision making under conditions of uncertainty. It does so by drawing on interviews with combat-experienced commanders. An examination of their thought processes while leading tactical combat elements reveals that mental preparation, vicarious experience, and complex, repetitive training are key components of effective GFC decision making. The thesis concludes with recommendations about how to enhance GFC decision making for future volatile, uncertain, complex, and ambiguous (VUCA) environments.

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# PREPARING TO BE UNPREPARED: GROUND FORCE COMMANDER DECISION MAKING IN A VOLATILE, UNCERTAIN, COMPLEX, AND AMBIGUOUS WORLD

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Submitted in partial fulfillment of the
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# ABSTRACT

What are the characteristics of effective ground force commander (GFC) decision making? What commonalities do we see? What are best practices for pre-mission preparation and mission execution? This thesis focuses on GFC decision making in order to investigate how to better prepare leaders for the current operating environment. It examines tactical-level decision making under conditions of uncertainty. It does so by drawing on interviews with combat-experienced commanders. An examination of their thought processes while leading tactical combat elements reveals that mental preparation, vicarious experience, and complex, repetitive training are key components of effective GFC decision making. The thesis concludes with recommendations about how to enhance GFC decision making for future volatile, uncertain, complex, and ambiguous (VUCA) environments.

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAR | After Action Report |
| BUD/S | Basic Underwater Demolition/SEAL |
| C2 | Command and Control |
| CASEVAC | Casualty Evacuation |
| EW | Early Warning |
| FOB | Forward Operating Base |
| GFC | Ground Force Commander |
| GPF | General Purposes Forces |
| HVT | High Value Target |
| ICJ | Improved Capacity for Judgment |
| IED | Improvised Explosive Device |
| ISR | Intelligence Surveillance Reconnaissance |
| JOC | Joint Operations Center |
| JTAC | Joint Terminal Air Controller |
| KLE | Key Leader Engagement |
| MARSOC | Marine Special Operations Command |
| MRAP | Mine Resistant Ambush Protected |
| NDM | Naturalistic Decision-making |
| NPS | Naval Postgraduate School |
| OPFOR | Opposition Force |
| PKM | Russian 7.62mm Gun |
| PT | Prospect Theory |
| QRF | Quick Reaction Force |
| ROC | Rehearsal Of Concept |
| RPD | Recognition Primed Decision-making |
| RSE | Reflection on Synthetic Experience |
| SATCOM | Satellite Communications |
| SE | Synthetic Experience |
| SEL | Senior Enlisted Leader |
| SOF | Special Operations Forces |

| | |
|---|---|
| SSA | Shared Situational Awareness |
| TC | Troop Chief |
| TDG | Tactical Decision Games |
| THS | Theory-Based Historical Surmise |
| TIC | Troops In Contact |
| TL | Team Leader |
| TTP | Tactics, Techniques, and Procedures |
| VHF | Verifiable Historical Fact |
| VUCA | Volatile, Uncertain, Complex, Ambiguous |

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# I. VIGNETTE, PURPOSE, LITERATURE REVIEW, METHODOLOGY

It was still dark when the men of Charlie Platoon, SEAL Team TEN, left the compound with members of the 3rd Company, 1st Commando Kandaks, passing the HESCO-barriers of the Afghan base in a dusty column of dented pickup trucks and tan MRAPs.[1] The massive vehicles had remote-controlled weapons turrets on top, and V-shaped underbellies below to shunt explosive blasts away from the interior. The sun was at least an hour away from rising over the mountains to the east, but the night vision goggles worn by the SEALs revealed the barren landscape enough for them to navigate until daylight actually broke.

Nicolas "Nacho" Nevarez munched on some turkey jerky in the navigator seat of the lead MRAP, listening to the chatter on the main inter-team communication net. He looked over at the driver, Mason, one of the Charlie Platoon breachers.

"Keep an eye on the 'Ghans, but this looks like a good track. Another ten clicks at least. Objective HARNESS WHISPER IV. Who thinks these names up?" Nicolas said. Mason grunted his agreement and spat Copenhagen into an empty water bottle.

From the back seat, the voice of their chief, Eric Harper, boomed out, "Welp, if we'd found him on one of the first three times we tried to do this op, we wouldn't be having this discussion, would we?"

"You think we can, Harp?" Mason asked. "Get him, that is?" The MRAP hit a massive hole in the dirt path, and the men jostled against their seat restraints.

Harp shrugged. "If we can get containment set soon enough this time, none of the 'Ghans tip him off this time, and maybe ten other things break our way. But, hey, I'm an optimist."

Thirty minutes later, Chris "CK" Kent, Charlie Platoon's Officer in Charge, sitting in the rear of the trail MRAP, looked at the map under the light of a red lens flashlight with bleary, blood-shot eyes. He had his inter-team radio turned down low, the sporadic radio traffic murmuring in his ears like the far-off sound of ocean surf. CK went over the contingencies

[1] Mine Resistant Ambush Protected, an armored vehicle.

in his head for the umpteenth time since they'd finished the final mission brief and ROC[2] drill the day before. He looked over at Jonas, his Air Force JTAC,[3] who sat opposite him in the back of the MRAP.

"Hey bud, any movement in the village?" CK asked.

Jonas shook his head "No," his wispy and patchy beard shaking back and forth as he did. He'd put a few plastic beads on some braided strands of hair as a joke. "A few movers between some of the buildings, but no one's left the village proper since we put the first Pred overhead yesterday evening."

CK nodded. He turned one of his radios up and called out to Harp on the command net, "ISR[4] reports no movement in the village. How far out are we?"

A moment's pause, then Harp responded, "five to ten minutes, give or take what we find around this next bend."

"Check," CK replied.

"Hey LT, I'm getting some ICOM[5] chatter," Fitch, one of his non-SEAL "enablers" reported.

"Anything good?" CK asked, turning up his other radio, which immediately filled his other ear with voices.

"The Taliban can see our convoy—word's going out right now."

CK frowned. The sun was still maybe twenty to thirty minutes from rising, and some vigilant observers were now compromising their element of surprise. Not that this was a surprise—the Taliban in this area had an outstanding early warning (EW) network. "Roger, keep me posted."

CK thought about the worst-case scenario for the assault. It had to be an IED strike on one of the lightly protected pickups driven by their partner force.

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[2] Rehearsal Of Concept.

[3] Joint Terminal Attack Controller.

[4] Intelligence, Surveillance, and Reconnaissance.

[5] A two-way radio utilized by the Taliban.

"Movement in the northwest corner of the village," Jonas said, looking down at his map of the village and surrounding area. "Several personnel are out and about."

CK's MRAP crested around the final bend in the road, and he could see the entire convoy spread out, the village just beyond it.

"Harp, have the terp (interpreter) tell the 'Ghans to hold up—I need a minute," CK said over the radio to his platoon chief.

"LT, the 'Ghans wanna put the pedal down, and I say let 'em. We need to get this place locked down before the sun comes up," Harp responded.

"Just humor me—I need a few minutes," CK answered back, and then looked over at his communicator. "Ask the JOC[6] for that flight of A-10s, and I want the CASEVAC[7] birds to go to level-one readiness."

"Two movers have left the town and are making their way up to what looks like a fighting position on the finger to the north of the village," Jonas said aloud, then repeated it over the common inter-team net.

Rick, the Communicator and one of the newest members of the platoon, passed the traffic to the JOC over SATCOM[8] and gave him thumbs up.

"CK…," Harp trailed off.

"Just give it a minute," CK replied calmly. Moving the CASEVAC birds to level one would cut their response time from fifty minutes to fifteen, and the A-10s would be a game changer if things went sideways.

CK had a bad feeling about what they were rolling up on, and he had long ago learned to listen to such a feeling. Tense minutes passed until finally the JOC reported the A-10s on the way and the birds at level-one, their highest level of readiness without taking flight.

"OK, send 'em, let's go."

CK could see a glow off to the east that heralded dawn. The Afghan pickups moved to their positions with a surprising level of

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[6] Joint Operations Center.

[7] Casualty Evacuation.

[8] Satellite Communications.

purpose, and CK was thankful the ‘Ghans had physically acted out moving to their respective positions during the ROC drill, followed by the platoon conducting a sand table exercise with key leaders from the Commandos. They war-gamed out the enemy’s likely actions and reactions to their maneuvers.

A loud boom broke the quiet, followed quickly by the staccato chatter of a machine gun. It sounded like a PKM,[9] and it sounded like it was coming from the fighting position on the ridge. Harp’s MRAP already had its turret gun focused in on the fighting position and quickly answered back, the steady bass from the fifty caliber rounds drowning out the more jittery sounds from the 7.62mm PKM. A line from Kipling’s “Arithmetic on the Frontier” came to CK unbidden, from the depths of his mind—The flying bullet down the pass, that whistles clear: ‘All flesh is grass.’[10]

“A-10s are checking on station, and we’ve got movement all over the village now,” Jonas said, in between giving the flight lead of the A-10s a situation brief over the fires net.

Since Jonas was busy, CK talked to the Pred operator directly and had the asset shift focus to the high ground surrounding the village. Immediately, the drone operator located several groups of people moving on the ridge to the west and north. A huge boom rattled the MRAP, jolting everyone inside.

“One of the ‘Ghans’s trucks hit an IED,[11] we’re sending Jake out there now,” Harp reported tersely. Jake was their Explosive Ordinance Disposal technician, a man worth his weight in gold, and then some.

“We have multiple wounded partner force, CK. Blast frag damage and gunshot wounds,” Harp reported.

“Roger,” he replied. “Spinning up the birds now—I’ll let you know when they’re a few minutes out.”

Harp keyed his hand mike twice to acknowledge he’d heard. CK looked at Rick and nodded.

“Pass the nine-line and the MIST report to the JOC and get ‘em in the air,” CK listened as one of his team leaders reported fire from the

[9] Russian machine gun, similar to the American M60 or Mk48.

[10] Rudyard Kipling, “Arithmetic on the Frontier, Poem in full available at http://www.kiplingsociety.co.uk/poems_arith.htm.

[11] Improvised Explosive Device.

ridgeline. He was glad their training prior to deployment had been so rigorous and comprehensive—full of contingencies and deviations from the briefed plan. At the time, he'd thought it was a bit over the top, but now all the chaos was more manageable because of it.

"Jonas, let's get the A-10s in on those firing positions—make sure their run-in angle is good to go."

The next ten minutes passed quickly as the SEALs and Commandos maneuvered around the compound and looked for the sources of incoming fire.

The sounds of gunfire intensified, and CK wondered what it sounded like on the other end of the radio. He had taken great pains to ensure that Rick sounded cool and precise when speaking on the radio. CK had taken Rick on several PT sessions, grueling runs in the hills outside their FOB where he made Rick recite CASEVAC nine-lines and other mission calls out loud until CK was satisfied that Rick would project nothing but calm over the radio.

"Damn, look at Harp," Jonas said, pointing out the window.

The MRAP holding Harp, Nicolas, and Mason drove straight towards a PKM nest on the edge of the village. Jonas and CK watched Harp open the back door and toss a fragmentation grenade into the nest before Mason gunned the MRAP in reverse, out of the blast zone. The frag exploded, and the PKM chattered no more.

"Ah, ahem," Harp called out on the command net, clearing his throat. "CK, we have a little issue over here."

"You mean besides your pitching precision?" CK responded, prompting chuckles.

"Yeah, so we took a few rounds in the radiator. We're good to go right now, but Mason thinks this thing will overheat in ten minutes, tops. Recommend we pull it back and get ready to tow it," Harp reported.

"Roger, I agree, just get it to a good position and let's finish the CASEVAC. Then we can look at getting out of here. The birds are three mikes out; are those wounded 'Ghans ready to go?" CK asked.

"Affirm, they're four hundred yards down the slope to the east with one of the Recce guys," Harp said.

CK heard the Recce team-member talking the helo onto the landing zone while Jonas reported the A-10s were Winchester[12] from multiple gun runs. He then took a moment to update his boss, Commander Josh Reynolds, in the JOC sixty miles to the east, over the SATCOM net. CK conveyed his intent to exfil,[13] and Josh replied with a simple "Charlie Mike," or continue mission. CK was grateful once again that, thanks to his last deployment as assistant ops in the JOC, he understood what information to convey to put his boss in his comfort zone.

Long minutes passed, then the platoon's Afghan partners loaded their pickups, and Harp and the boys rigged the MRAP for tow. The MRAP was still drivable, for now, but the engine temp was slowly rising. Of HARNESS WHISPER, there was no trace. A villager told one of the Afghans who relayed it to the SEALs' interpreter that the target was up north somewhere.

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It had been no smashing success, this operation, but they'd killed several fighters and mitigated as much risk as possible. The fact that some of his Afghans had been injured grated on CK, but at least they were in good hands now. The rest of the Commandos wanted to keep fighting, but CK knew he had made the right call to withdraw.

## A. PURPOSE

This thesis will focus on the decision-making process of Ground Force Commanders (GFCs) in order to investigate how best to prepare leaders for environments like the one described above. In particular, the thesis will focus on tactical level decision making under conditions of uncertainty. The ultimate aim is to help combat leaders better prepare themselves and their units for this unforgiving, chaotic environment. With that purpose in mind, my research questions are: what are the characteristics of effective GFC decision making? What commonalities do we see? What best practices for pre-mission preparation and mission execution should we adopt? To answer these questions, I interviewed 21 combat-experienced tactical leaders from within the student population at

[12] Empty of ammunition.

[13] Short for "exfiltrate" (i.e., depart the area).

Naval Postgraduate School (NPS), and asked each a series of questions in order to better understand their thought processes when they were in command of a tactical combat element and found themselves in a volatile, uncertain, complex, and ambiguous (VUCA) situation or environment.

### 1. Background: The U.S. Army Operating Concept

In October 2014, the U.S. Army Training and Doctrine Command (TRADOC) unveiled a concept entitled "Win in a Complex World," designed to assist the force as it looks ahead to where it might operate in the coming decades.[14] Building on this concept, the United States Army Combined Arms Center produced "The Human Dimension White Paper: A Framework for Optimizing Human Performance," a document that stresses the volatile, uncertain, complex, and ambiguous (VUCA) nature of the current operating environment and the need to prepare leaders to deal with an ever-growing degree of uncertainty.[15] The document's implications for military leaders are captured by the following quote:

> It is not enough for leaders to tolerate or even grow comfortable with the uncertainty described in the future environment. Operating in this complex environment requires agile, adaptive, and ethical leaders trained and educated to improve and thrive in uncertainty. These leaders must possess a natural inclination for disruptive innovation and an abiding sense of urgency both in times of crisis and times of opportunity. They must be professionals of strong character, physically supreme, and resilient to overcome the effects of the great trauma that is the experience of war. The Army must empower Soldiers not only with exquisite technology, but also with broad cultural understanding, professional judgment, critical thinking, and technical skills, so that they can adapt to unforeseen and unpredictable conditions as they emerge.[16]

This passage raises the following relevant questions: what changes should be instituted to accomplish this? How can we better prepare our tactical leaders for the

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[14] *Army Operating Concept: Win In A Complex World*, Fort Eustis, VA, Training and Doctrine Command, 2014, 7.

[15] *The Human Dimension White Paper: A Framework for Optimizing Human Performance*, October 9, 2014, 8. This is informed by *Army Operating Concept: Win In A Complex World*, 15.

[16] *The Human Dimension White Paper: A Framework for Optimizing Human Performance*, 10.

uncertain and unpredictable waters in which they must proverbially (and sometimes literally) swim? In other words, how do we prepare them to cope with being unprepared?

## 2. The VUCA Environment

The term VUCA was first employed by the U.S. Army in 2002 to characterize the current operating environment writ large.[17] The business community then quickly adopted the term. The following is a brief overview of its components:[18]

**Volatility** is created by instability in both the rate of change of information and the specifics of a given situation. **Uncertainty** refers to both the inability to have complete understanding of a given situation and the difficulty in forecasting the effects of a proposed change. In a **complex** environment, numerous factors affect the situation; Arguably, causal links and second- and third-order effects will continue to grow more complex in our hyper-globalized world. **Ambiguity** occurs when a decision maker does not understand the significance of a given event or situation. It can also occur when the implications and consequences of an event can be interpreted in more than one way. VUCA is graphically depicted in Figure 1.

[17] Steven Shambach, *Strategic Leadership Primer*, 2nd ed. (Carlisle, PA: U.S. Army War College, 2004), 12; Shambach makes reference to Owen Jacobs' *Strategic Leadership*, published in 2002 as the origin of the term VUCA.

[18] Shambach, *Strategic Leadership Primer*, 12.


Figure 1. Depiction of VUCA Concept.[19]

### 3. Coming to Terms

Although a ubiquitous term in the Special Operations community, no doctrinal definition for *Ground Force Commander* (GFC) exists among SEALs, Special Forces, Rangers, or Special Mission Units. The term *Command and Control* (C2) perhaps comes closest to describing a GFC's responsibilities and authorities. It is defined thusly in Joint Publication 1-02, the *Department of Defense Dictionary of Military and Associated Terms*:

[19] Source: Bennett and Lemoine, "What VUCA Really Means for You," https://hbr.org/2014/01/what-vuca-really-means-for-you/ar/1.

> Command and Control: The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Also called C2.[20]

The arena in which a commander exercises C2 is one of uncertainty and temporal constraints.[21] For the purposes of this thesis, a ground force commander is defined as *the senior officer, either commissioned or noncommissioned, in command of a tactical level combat element outside of a secured forward operating base*.

## B. LITERATURE REVIEW—THEORIES OF DECISION MAKING

Theories about decision making can be broadly divided into two categories: prescriptive (sometimes referred to as normative) and descriptive.[22] Prescriptive theories attempt to articulate the "preferred" method of making decisions, when ideal quantities of both information and time are available. In contrast, descriptive theories illustrate how people make decisions under "real world" conditions, with all of real world's associated uncertainty and time constraints.

Another way to distinguish between types of decision making is to focus on three sets of conditions or domains—certainty, risk, and uncertainty.[23]

### 1. Prescriptive Theories

Decision-making under certainty occurs when there is certain knowledge about the outcomes of any given alternative. Decision-makers will typically act to maximize the utility value of choices under these circumstances. In the domain of certainty, prescriptive theories of decision making are usually ideal.

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[20] Department of Defense, Department of Defense Dictionary of Military and Associated Terms (JP 1–02) (Washington, DC: Joint Doctrine Branch, 2010), 40.

[21] Department of the Navy, Naval Command and Control (NDP 6) (Washington, DC: Chief of Naval Operations, 1995), 11.

[22] Human Dimension Capabilities Development Task Force Capabilities Development Integration Directorate Mission Command Center of Excellence (MC CoE)**,** *Cognitive Biases and Decision-Making: A Literature Review and Discussion of Implications for the U.S. Army*, 10.

[23] Readings in Defense Resource Management (Boston, MA: Pearson Learning Solutions, 2014), 270.

### *a. Subjective Expected Utility*

This model is employed by economists, statisticians, and operations research (OR) experts to model decision making. The Subjective Expected Utility model assumes that each decision-maker possesses a "utility function" or means of quantifying the desirability of various outcomes.[24] With this model, a decision-maker ranks his choices according to how options will maximize his personal utility. A key assumption of this model is that the decision-maker is aware of all potential alternatives.

### *b. Rational Actor*

Also known as Rational Choice, this model assumes that "individuals choose the best action according to unchanging and stable preference functions and constraints."[25] These assumptions are sometimes violated by real world conditions that are too varied to be adequately captured by the model. This model typically focuses on aggregate outcomes rather than individual decisions in an attempt to discover the causes behind the decisions. Many economists contend that humans are "utility maximizing" and make choices based on unchanging preferences after gathering ideal amounts of information.[26]

### *c. Bounded Rationality*

In his seminal 1957 work, *Models of Man*, Herbert Simon coined the term "bounded rationality" to denote the status of an agent or actor whose imperfect knowledge is shaped by his/her experience and knowledge, and who uses his/her knowledge to construct a simplified model of the world. The agent/actor subsequently makes decisions in accordance with that imperfect model and limited search time. Thus, while the result might not be an optimal representation of the larger reality, the agent/ actor is seen to conduct him/herself rationally because of his/ her fidelity to this model.[27]

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[24] "Improving the Decision-Making Abilities of Small Unit Leaders," 52.

[25] Ibid., 54.

[26] Ibid., 54.

[27] Herbert Alexander Simon, *Models of Man : Social and Rational; Mathematical Essays on Rational Human Behavior in a Social Setting* (New York: John Wiley and Sons, 1957), p198-199.

## 2. Descriptive Theories

Decision-making under risk is akin to a game of chance, such as blackjack or craps. In this situation, a probability is known for each potential outcome. Just as when conditions are certain, a decision maker can be expected to make choices to either maximize his or her expected utility or minimize potential losses by employing a formula to calculate outcomes. An argument can be made that either descriptive or prescriptive techniques of decision making can be employed in this domain.

Finally, decision making under conditions of uncertainty is characterized by the presence of multiple alternative courses-of-action, none of which enable the decision maker to calculate the probability of success or failure. Uncertainty presents the most difficult environment to navigate.[28]

Some scholars divide uncertainty itself into several categories according to whether decision makers encounter data that is conflicting, missing (incomplete), or ambiguous.[29] Under such conditions, prescriptive theories of decision making lack explanatory and predictive power, and descriptive theories rise to the fore.[30]

### *a. Heuristics and Biases*

Some academics who study decision making reject the idea that humans employ a specific checklist-like framework to navigate difficult decisions; they contend that humans instead employ heuristics.[31] A heuristic is a rule of thumb used to make decisions in an environment of uncertainty. Employing a heuristic is said to be "frugal" in

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[28] *Readings Defense Resource Management*. 272. Some decision makers employ criteria analysis tools, such as Minimax, Maximin, Hurwicz, and LaPlace to further illuminate possible outcomes.

[29] Lawrence G. Shattuck, Nita Lewis Miller, and Kacey E. Kemmerer, "Tactical Decision-Making under Conditions of Uncertainty: An Empirical Study," in *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, vol. 53 (SAGE Publications, 2009): 243; Michael J. McCloskey, "An Analysis of Uncertainty in the Marine Corps," in *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, vol. 40 (SAGE Publications, 1996): p194–98.

[30] "Improving the Decision-Making Abilities of Small Unit Leaders" published by the National Research Council in 2012 and the "Cognitive Biases and Decision-Making" White Paper published by the U.S. Army Human Dimension Capabilities Development Task Force in 2015 are both excellent reviews regarding decision-making theories.

[31] Gerd Gigerenzer and Reinhard Selten, *Bounded Rationality: The Adaptive Toolbox* (Cambridge, MA: MIT Press, 2002), 7.

terms of time and cognitive effort expended.[32] However, one danger with employing a heuristic is that it can create cognitive bias. For example, a common heuristic is the "availability heuristic," which describes how quickly something comes to a person's mind when thinking about a given topic, concept, or method.[33]

Several potential cognitive biases can result from the availability heuristic. One is the retrievability bias, a fixation on the recent past or recent memory. Another is known as search set bias—the creation of a pattern of investigation that constrains and bounds our thinking unnecessarily. For instance, an example of search set bias is soldiers searching for an IED maker by focusing only on homes along a road frequently mined with IEDs.[34]

### *b. Dual Process Cognition*

In *Thinking, Fast and Slow*, Daniel Kahneman discusses the existence of "Dual Process" thinking.[35] He posits two systems at work in human cognition. System One thinking is automatic, unconscious, intuitive, and relies upon tacit knowledge and pattern recognition for rapid decision making. System Two thinking is controlled, conscious, reflective, and employs explicit knowledge; decisions are made after a period of deliberative thought. Kahneman asserts that humans utilize System One for the majority of day-to-day decisions, only resorting to System Two when confronted with a problem that System One thinking cannot solve. Kahneman believes that dual system thinking is a default setting the human brain—an evolutionarily advantageous effort to save cognitive resources, as well as time.

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[32] Gerd Gigerenzer and Daniel Goldstein, "Reasoning the Fast and Frugal Way," *Psychological Review 103*, no. 4 (1996): 652.

[33] Amos Tversky and Daniel Kahneman, "Availability: A Heuristic for Judging Frequency and Probability," Cognitive Psychology 5 (1973): 207.

[34] Blair Williams, "Heuristics and Biases in Military Decision-Making," Military Review (September-October 2010): 43.

[35] Daniel Kahneman, *Thinking, Fast and Slow* (New York:Farrar, Straus, and Giroux, 2011), p20-21.

### *c. Prospect Theory*

In 1979, Kahneman, along with Amos Taversky, developed prospect theory (PT), which stands in stark contrast to the subjective expected utility model.[36] Simply put, PT asserts that the "frame" or manner in which decisions are presented and construed by the decision maker plays a key role in decision making. According to Kahneman and Taversky, humans tend to be more risk-averse when decisions are framed in terms of "gain" and more prone to take risk when decisions are framed in terms of "loss."[37] For example, when given the choice between A:(definitely gaining $10) or B:(a 50/50 chance of winning either nothing or $20), experiment subjects chose to take the $10, the safer option. However, when given the option of A:(definitely losing $10), or B:(a 50/50 chance of losing either nothing or $20), most participants in experiments elected to take option B—the riskier option. Also, this theory posits that humans take losses more seriously than they do the equivalent gains—losing $20 is more painful than the pleasure of gaining $20.[38]

### *d. Naturalistic Decision Making*

Unlike PT, which has been developed through experimentation, naturalistic decision making (NDM) attempts to describe decision making under real world conditions.[39] Three major criteria are critical to NDM:

- the expertise of the decision maker
- "field" conditions
- the conditions of complexity and uncertainty that complicate decision making

NDM considers intuition to be an integral component of how practitioners actually make decisions. NDM does not regard intuition as a sort of super-natural ability.

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[36] Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica: Journal of the Econometric Society 47*, No.2 (1979): 264.

[37] Ibid., 268.

[38] Ibid., 279.

[39] Klein, "Naturalistic Decision-Making," Human Factors, vol. 50, no. 3 (2008): 456.

Rather, it is developed through extensive practice.[40] For instance, the intuitive skills of a surgeon might be based on two decades of wielding a surgical blade. Research in the realm of NDM has shed light on what was formerly a mysterious process by identifying the cues that experts use to make decisions.[41] Tacit or informal knowledge, rather than explicit or formal knowledge, has been found to play a critical role in how experts quickly assess a situation and reach an accurate judgment. NDM typically is employed in situations marked by the following characteristics:[42]

- "ill-structured" problems
- incomplete, ambiguous, or changing information
- shifting, ill-defined, or competing goals
- decisions as part of a multi-event feedback loop
- time constraints
- high stakes
- many stakeholders are involved

### *e. Recognition-Primed Decision Making*

For decades, the U.S. Marine Corps has employed recognition-primed decision-making (RPD), which grew out of NDM research. It is a decision-making technique that leverages individual experiences to "pattern match." When encountering a new situation, Marines are supposed to draw on their prior experience for suitable analogues.[43] The U.S. Army has also incorporated naturalistic decision making, and RPD in particular, into

[40] Daniel Kahneman and Gary Klein, "Conditions for Intuitive Expertise: A Failure to Disagree," *American Psychologist 64*, No.6 (2009): 516.

[41] "Improving the Decision-Making Abilities of Small Unit Leaders," 57.

[42] Judith Orasanu and Terry Connolly, *The Reinvention of Decision-Making (*Westport, CT: Ablex Publishing, 1993), 19.

[43] Kahneman and Klein, "Conditions for Intuitive Expertise": 516; Department of the Navy, Command and Control (MCDP6) (Washington, DC: Headquarters United States Marine Corps, 1996), 109.

their doctrine.[44] In one study, NDM researchers found that fire ground commanders used RPD for 80–90 percent of the situations they encountered.[45]

## C. METHODOLOGY

Borrowing from these various theories about decision making, I crafted a set of interview questions, in order to investigate the tacit or implicit knowledge that tactical-level leaders possess. One-on-one interviews were conducted in a secured study room, with the exception of one interview conducted over the telephone due to a scheduling conflict. Interviewees consisted of a convenience sample recruited from among the officer population at NPS in Monterey, California; all volunteered. I conducted a total of 21 interviews, which ranged from thirty minutes to two hours in length. I then transcribed all interview notes and looked for underlying patterns in the data. I also examined the data for dominant themes, which were themes that emerged repetitively across multiple questions. These dominant themes fell into three main categories.

### 1. Selection Bias

Despite the fact that my potential subject population was limited to personnel attending NPS, I obtained a fairly diverse cross-section of participants. These included Army Special Forces officers, Army Ranger officers, Naval Special Warfare officers, Marine Special Operations Command (MARSOC) officers, and Marine Infantry officers. The sample also included four international students, hailing from both SOF and conventional units on two continents. The list of interview questions can be found in Appendix A at the end of this thesis. The mean age of the interview subjects was thirty-six years old, with a mean of fourteen years in the military and a mean of ten years in their respective communities (SF, SEAL, MARSOC, etc.). Interviewees averaged five

[44] Carol Ross et al., "The Recognition-Primed Decision Model," Military Review, August 2004, 8.; Gary Klein, "Making Decisions in Natural Environments," Research and Advanced Concepts Office, U.S. Army Research Institute for the Behavioral and Social Sciences, 17.

[45] Gary A. Klein, Roberta Calderwood, and Anne Clinton-Cirocco, "Rapid Decision-Making on the Fire Ground," in *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, vol. 30 (1986): 576.

overseas deployments totaling nearly thirty months per person, with an average of 240 operations each over the course of their careers thus far.

For the purposes of my survey, an *operation* was defined as leaving the secured confines of a Forward Operating Base (FOB), in order to perform a presence patrol, clearance operation, key leader engagement (KLE), direct action mission, or similar military operation in a semi-permissive or non-permissive area.

In sum, my interviewees represented a very experienced group in terms of time spent in tactical-level command leadership positions and in terms of overseas time navigating the "fog and friction" of the deployed environment.

### 2. Roadmap

Looking ahead, Chapter II will answer my first set of research questions: what are the characteristics of effective Ground Force Commander (GFC) decision making? What commonalities do we see? Chapter III will address the second question: what should be best practices for pre-deployment training and mission execution? In Chapter III I will also recount mistakes and lessons learned by the commanders surveyed. Finally, in Chapter IV, I will present my conclusions, recommendations, and suggestions for further research.

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# II. THREE THEMES FOR EFFECTIVE GFC DECISION-MAKING

> Circumstances vary so enormously in war, and are so indefinable, that a vast array of factors has to be appreciated—mostly in the light of probabilities alone. The man responsible for evaluating the whole must bring to his task the quality of intuition that perceives the truth at every point. Otherwise a chaos of opinions and considerations would arise, and fatally entangle judgment. Bonaparte rightly said in this connection that many of the decisions faced by the commander-in-chief resemble mathematical problems worth of the gifts of a Newton or an Euler.[46]
>
> —Carl Von Clausewitz, *On War*

In a prescient article published in 1999, U.S. Marine Corps General Charles C. Krulak highlighted the need to prepare military leaders for the uncertainty of the modern battlefield. In "Cultivating Intuitive Decision-Making," he writes:

> Napoleon believed that the intuitive ability to rapidly assess the situation on the battlefield and make a sound decision was the most important quality a commander could possess. He referred to this intuition as coup d'oeil, or "the strike of the eye," and thought that it was a gift of nature. More recently, however, practitioners of the military art have come to believe that while heredity and personality may well have an impact on an individual's intuitive skills, these skills can also be cultivated and developed.[47]

The aim of this thesis is to explain how to best foster the cultivation of this intuitive decision making, this *coup d'oeil*. Krulak recommends character development, self-study, repetitive skills training, and a supportive command climate.[48] Before underscoring or adding to his recommendations, let me first identify the key

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[46] Carl Von Clausewitz, *On War*, Indexed Edition (Princeton: Princeton University Press, 1984), *112*.

[47] Charles C. Krulak, "Cultivating Intuitive Decisionmaking," *Marine Corps Gazette 83* (May 1999): 19.

[48] Ibid., 21.

characteristics and components of effective Ground Force Commander (GFC) decision making. Three key themes emerged from my interviews. None are particularly surprising, nor do they represent a critical departure from military orthodoxy when it comes to GFC decision making in combat. However, taken together, they suggest that certain small improvements in training can pay large dividends in GFC performance on the battlefield.

The three key themes that were mentioned or alluded to in my interviews encompass mental preparation, vicarious experience, and complex, repetitive training. Based on my research, these appear to be the main drivers of effective GFC decision making. It must be noted that actual, personal experience matters greatly as well. All of the GFCs I interviewed had significant personal experience leading tactical-level units. The importance of personal experience for improving performance is hardly unique to the military commander. In most fields, direct experience can only be gained with time; one needs to be afforded time "in the seat," so to speak. However, since mistakes made while gaining this experience in the military can be fatal, it seems particularly important to strive for additional ways to enhance a GFC's decision-making abilities and skills.

## A. MENTAL PREPARATION

> *Aequam memento rebus in arduis servare mentem.* Remember to keep a calm and balanced mind in the face of adversity.[49]
>
> —Horace, Odes of Horace

> The first qualification of a general-in-chief is to possess a cool head, so that things may appear to him in their true proportions and as they really are. He should not suffer himself to be unduly affected by good or bad news.[50]
>
> —Napoleon, Military Maxims of Napoleon

Mental preparation refers to how the interviewees organized their minds to deal with the combat environment. Invariably preparation began early in their development,

[49] Horace, *The Odes of Horace*. (Baltimore, MD: Johns Hopkins University Press, 2008), 59.

[50] I. Napoleon, *Military Maxims of Napoleon* (Wiley and Putnam, 1845), verse 73, 11.

before or during adolescence, with a "bias for action" developed in some cases through childhood experiences in Boy Scouts or sporting endeavors. In reference to ground combat, mental preparation consisted of the schema, or mental models, with which GFCs prepared themselves; they used these models or schema to "imagine" how they would react when faced with uncertainty.

> I played ice hockey, and, to me, it was a good metaphor for war. There is a system, a play; you must adjust to an opponent or event. Things will not go to plan—your situational awareness is key. At the end of the day, the situation on the ground dictates, and you must adjust to varying conditions. The GFC is like the coach, you must exploit weaknesses, the players have to do their part— it's like mission command on the ice.
>
> —An International SOF Officer

Considerable research has been done on how the stress caused by battlefield chaos can hamper decision making of military personnel.[51] Individuals handle stress differently, depending on their personality—personality is one of the most significant moderators of stressors.[52] However, all leaders, regardless of personality differences, can benefit from a suitable mindset, or "mental model," when navigating the complexities of the modern battlefield. Stoic thought describes one such method.

Military leaders have long found solace and wisdom in the Greco-Roman philosophy of stoicism.[53] Originating in the Hellenistic period of ancient Greece, it is a philosophy that holds that errors in judgment are caused by negative emotions and are made when the individual's will is in discord with nature. In *The Enchiridion*, Epictetus remarks, "Men are disturbed, not by things, but by the principles and notions which they form concerning things."[54] In his *Meditations*, Marcus Aurelius writes, " If your distress has some external cause, it is not the thing itself that troubles you, but your own judgment

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[51] Jennifer Kavanagh, "Stress and Performance: A Review of the Literature and Its Applicability to the Military," (Santa Monica, CA: Rand, 2005), 17–19.

[52] Ibid., 49.

[53] Nancy Sherman, *Stoic Warriors*,(Oxford: Oxford University Press, 2005), 2.

[54] Epictetus, *Enchiridion*, http://philosophy.tamu.edu/~sdaniel/Notes/enchiridion.pdf, 2.

of it—and you can erase this immediately."[55] The implication for the combat leader is that he may need to detach from the chaos of the moment, to mentally pull back from the surface confusion, and find a place where a holistic view of the situation is possible.

The stoic practice of *praemeditatio malorum* can be tranlated as "preparing the mind in advance to cope with adversity."[56] This describes is a mental exercise in which the practitioner imagines the worst possible outcomes of whatever endeavor he is undertaking. For the GFC, this means envisioning the enemy's MDCOA (Most Deadly Course Of Action), along with the various contingencies that can occur during the course of an operation, from mine strikes and personnel injuries, to damaged vehicles and helicopters.

In her treatise on stoic warriors, Nancy Sherman summarizes Seneca's views on negative visualization, a technique that came up repeatedly in my interviews. She writes:

> Given the overwhelming grip fear has on the non-wise person, Seneca urges that we take measures to fortify ourselves against it. At the top of his list is a frequent and thorough rehearsal of likely future events, which for a soldier would presumably include one's own violent death. For the inexperienced, "a large part of evil," he explains, "consists in its novelty." But "if evil has been pondered beforehand, the blow is gentle when it comes." Continual reflection on the unfamiliar, no matter how imposing the evil, makes for a kind of bulletproofing.[57]

Over and over, interviewees described themselves adopting a stoic approach, engaging in visualization and negative visualization. For instance:

> Visualization—I'd run through the op, the night before or just prior to the operation. The same thing I did before football games in my mind. I'd also run through all the contingencies.
>
> —A Naval Special Warfare Officer

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[55] Marcus Aurelius, *Meditations (*New York: Penguin Books, 2006), 79.

[56] Donald Robertson, *The Philosophy of Cognitive Behavioral Therapy: Stoic Philosophy as Rational and Cognitive Psychotherapy* (London: Karnac Books, 2010), 208.

[57] Sherman, *Stoic Warriors, 117*.

> I'd think about probable actions during the operation and the enemy's most deadly course of action. The 'Aw shits" basically—reviewing negative events and possible responses.
>
> —An Army SOF Officer

> On the helicopter ride or the foot patrol in, I'd go through every scenario, negatively visualizing. I'd ask myself, "Right now, what would I do in this situation?" Even if the situation you envision doesn't happen, it still primes your brain to think about events.
>
> —A Naval Special Warfare Officer

## B. VICARIOUS EXPERIENCE

> But as to exercise for the mind, the prince ought to read history and study the actions of eminent men, see how they acted in warfare, examine the causes of their victories and defeats in order to imitate the former and avoid the latter, and above all, do as some men have done in the past.[58]
>
> —Machiavelli, *The Prince*

> I read biographies of U.S. Grant, Sherman, Forrest, MacArthur, Hackworth, Rommel, Gap, Mao, Lawrence of Arabia, and Beckwith. I learned a ton about leading by example and when to take action—to have a bias for action but balancing that with pulling back and doing a detailed reading of the environment.
>
> —An Army SOF Officer

Vicarious experience refers to the idea that one can learn through the actions and decisions of others.[59] Vicarious experience can be transmitted directly by a senior commander or mentor in distilled fashion, in the form of prescriptive advice; reading first-hand historical accounts written by commanders, typically in the form of some sort of war memoir; or through direct observation of peers and superiors. For instance:

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[58] Niccoló Machiavelli, *Machiavelli: The Prince* (New York: Oxford University Press, 1952), 82–83.

[59] Gary A. Klein, *Sources of Power: How People Make Decisions* (Cambridge, MA: MIT press, 1999), 179.

> My father was a big role model for me—he was a Scout leader. He shared his military experiences with me. He wasn't afraid to be outdoors in adverse conditions. Not all adults are comfortable in inclement weather and darkness. He was a church leader, and I watched him speak forcefully when needed. I could count the times on one hand he yelled at someone. He led without volume. Sometimes there is pressure to show confidence in your position by how loud you are.
>
> —An Army SOF Officer

Over half of my interviewees cited combat memoirs as being helpful to their professional development as GFCs. Works they mentioned by name are listed in Appendix B. The reading of combat memoirs, or any sort of first-person account, allows access to the mind and perspective of another human being. Memoirs provide extra experiential data that can be accessed, data that can be used to find an appropriate analogue for whatever situation the GFC finds himself facing.

> [Through reading memoirs] you see what happens when decorum/etiquette breaks down in hard combat, so you can appreciate what being prepared can do for you. You see the damage that ego and overconfidence can bring.
>
> —A Naval Special Warfare Officer

> [Through reading memoirs] you see units similar to your own, in scenarios you could be faced with. You see how things made sense to leaders at the time, how they reacted.
>
> —A Marine Corps Officer

The renowned Prussian theorist of war Carl Von Clausewitz, was a strong proponent of vicarious experience. According to the historian Jon Sumida,

> Clausewitz has observed that during the Napoleonic Wars, intuition had been improved by experience. He thus reached two primary conclusions. First, the primary objective of officer education should be the enhancement of intelligent intuition. And second, the only effective means of doing so during peace is to have officers replicate the experience of

> decision-making by a commander in chief through historical reenactment of command decisions and to reflect on that replicated experience.[60]

Clausewitz called this process of reenactment and reflection "critical analysis."[61] Sumida boils it down to the following equations: Verifiable Historical Fact (VHF) + Theory-Based Historical Surmise (THS) = Synthetic Experience (SE). Then, Synthetic Experience (SE) + Reflection on Synthetic Experience (RSE) = Improved Capacity for Judgment (ICJ), or Improved Intuition.[62] Essentially, reading the well-written memoir of a leader can provide the synthetic experience on which a GFC can reflect, thereby gaining improved capacity for judgment. Figure 2 illustrates the formula:

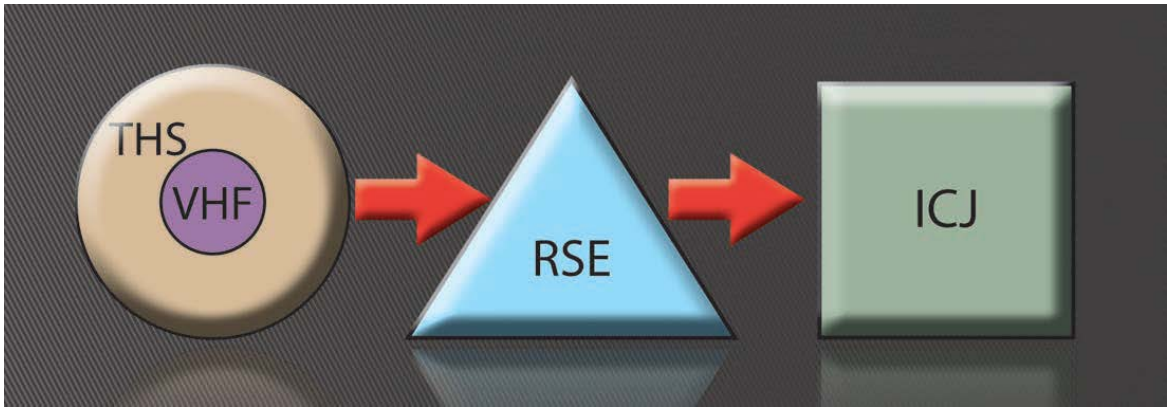


Figure 2. Clausewitz's Process for the Cultivation of Intelligent Intuition, According to Sumida.[63]

Another method of obtaining synthetic experience in GFC decision making is to observe them in action. Several of my respondents served on staffs prior to assuming a tactical command position and regarded these tours as integral to their successes as GFCs. Among other things, a position within a Joint Operation Center (JOC) allowed junior officers to learn how "business is done" at the task-force level, which thereby

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[60] Jon T. Sumida, "The Clausewitz Problem," *Army History*, Fall 2009, 18.

[61] Carl Von Clausewitz, *On War, Indexed Edition* (Princeton: Princeton University Press, 1984), *156*.

[62] Sumida, "The Clausewitz Problem," 19.

[63] Source: Sumida, "The Relationship of History and Theory in On War," 19.

exposed them to how to best leverage larger, organizational assets once they took command.

> The biggest thing for me was I deployed immediately after training. I got to serve as assistant ops. I battle-tracked GFCs from the JOC and got to watch the squadron commander the entire time. I went on operations with the GFC— I had a whole deployment preparing to be a troop commander. It was hugely valuable, and by the time I actually deployed as a troop commander, my commanding officer considered me a really experienced guy.
>
> —A Naval Special Warfare Officer

In addition, a tour of this type provides a front row seat to observe GFCs in action on the battlefield, to listen to them make radio calls, and to see them make decisions in real time. Understanding how a GFC is viewed from the JOC's perspective further facilitates the junior officer's ability to "paint the picture" back to his commander once he is a GFC.[64] Finally, staff tours allow prospective GFCs to observe how senior officers in command roles navigate the complexity of the modern battlefield.

> Before I deployed in a combat leadership position I served as JOC [Joint Operation Center] battle captain, learning the approval/de-confliction process for operations, the chain of command, the force laydown, the targeting process, the mission calls, the difference between the strike forces, OPORDs, planning, briefing, and execution.
>
> —A Naval Special Warfare Officer

> I did two staff rotations in a deployed JOC before I ever took command. I listened to GFCs make decisions on the radio, and battle tracked their elements. I got to see firsthand how others in leadership positions made decisions.
>
> —An Army SOF Officer

[64] Stephen M. Fiore, Karol G. Ross, and Florian Jentsch, "A Team Cognitive Readiness Framework for Small-Unit Training," *Journal of Cognitive Engineering and Decision-Making* 6, no. 3 (September 1, 2012): 332.

One way to provide vicarious experience to new leaders is through the ShadowBox method. As developed by Neil Hintze, the ShadowBox method is designed to "allow trainees to shadow the thinking of experts in a given field."[65] According to Gary Klein,

> The trainees work through scenario based materials, entering their information and decision priorities in a series of one-inch-square boxes. At the end of each scenario the trainees calibrate their interpretations with the conclusion of a panel of experts. Thus, the method does not require a subject-matter expert to facilitate the training. Hintze used this ShadowBox method to increase expertise of firefighters, and it is currently being applied to a DARPA project for developing social interaction skills.[66]

The ShadowBox method could easily be adapted by the military. New leaders and perspective GFCs could read through a tactical scenario in a workbook tailored to GFC development, and then record their views as to what pieces of information were critical to resolving the scenario. They could then have the opportunity to compare their responses with those of experienced GFCs. This method is a cost-effective and self-paced training aid with great potential to improve the decision-making abilities of new leaders and prospective GFCs.

## C. COMPLEX, REPETITIVE TRAINING

> The best form of welfare for the troops is first class training, for this saves unnecessary casualties.[67]
>
> —Field Marshal Erwin Rommel

> You have to build in uncertainty. Create uncertainty in training, cultivate chaos/uncertainty. Some people thrive, but others don't handle an ill-structured environment well. Doctrine is just the opening playbook to

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[65] Gary Klein, Neil Hintze, and David Saab, "Thinking inside the Box: The ShadowBox Method for Cognitive Skill Development," *Proceedings of the 11 The International Conference on Naturalistic Decision-Making (NDM 2013). Paris, France: Arpege Science Publishing*, 2013, 1.

[66] Ibid., 1.

[67] Peter G. Tsouras, *Warriors' Words: A Quotation Book: From Sesostris III to Schwarzkopf 1871 BC to AD 1991* (London : New York: Arms & Armour Press, 1992), 440.

> adjust to. Put surprise events into the training schedule—no notice recalls and tasks.
>
> —An International Officer

I distinguish complex, repetitive training from standard, tactical-level unit training—which is focused primarily on battle drills, immediate action drills, or simply "actions at the objective." The aim of complex, repetitive training is to simulate the cognitive "strains" a GFC will experience during actual combat. This is training that is complex because it often incorporates civilian and enemy role-players, and contains scenarios rife with ambiguity. If actual supporting assets cannot be employed, they can at least be simulated on the radio. The training needs to be repetitive in order to facilitate unit cohesion and to drill instinctive, intuitive, coordinated action. Complexity needs to infuse every repetition to the greatest extent possible to build integrated responses.

> You have to understand the complexity of the whole thing. Layers of ISR [Intelligence, Surveillance, Reconnaissance], RW [Rotary Wing], FW [Fixed Wing] air. It's not something to throw someone into. Training must replicate this, and you must have guys observe things before getting into the seat.
>
> —An Army SOF Officer

The combination of complexity and repetition allows unit personnel to create a "shared situational awareness."[68] Stephen Fiore, Karol Ross, and Florian Jentsch address this dynamic:

> At issue is whether current training theory can appropriately address the need for adaptive thinking and coordinated flexible action in response to unique and evolving conditions across the full range of military missions. Traditional training solutions and their theoretical underpinnings effectively support the attainment of proficiency in immediate action drills. However, they do not necessarily produce the types of highly skilled teams capable of efficiently adapting in unpredictable, high-stress situations. Furthermore, it is not entirely clear that the theory and training

[68] Preston B. Cline, "Risk Management for U.S. Army Special Operations: Addressing the Need to Continuously Adapt to a Changing Problem Set," February 6, 2013, 16.

> solutions focus on the individual and team cognitive factors required for team-level readiness.[69]

"Team cognition" refers to knowledge that is shared among team members so that advanced techniques and procedures can be automatically employed, especially when conditions are uncertain and time constraints exist. Team cognition is best described as an emergent property that derives from the interplay of the individual cognition of each team member *and* combined team behaviors.[70] This shared situational awareness, or SSA, grows over time and as familiarity builds among team members.[71] Improvement in team performance results from realistic training scenarios and feedback processes that spread lessons to the entire group.

> [What works are…] High-intensity, iterative training scenarios. No hand holding—you work as a cohesive, small unit, developing internal SOPs [Standard Operating Procedures]. Inter-team communications help you anticipate the actions of your subordinate leaders. This allows you to build efficiency and resilience in your tactical unit. You have to demand from TLs [Team Leaders] and your Troop Chief [TC] what you need in training, in terms of communicating. If you don't rep it in training, [TLs/ TC] won't give it to you in combat. Once you establish it, you won't have to ping them constantly.
>
> —A Naval Special Warfare Officer

Interviewees reported delegating tasks to subordinates during the execution of an operation, as well as consulting closely with them. However, team cognition consists of more than just simple delegation. It can be described as a sort of "over-mind," an unspoken anticipatory understanding shared by the group as members navigate the

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[69] Stephen M. Fiore, Karol G. Ross, and Florian Jentsch, "A Team Cognitive Readiness Framework for Small-Unit Training," *Journal of Cognitive Engineering and Decision-Making* 6, no. 3 (September 1, 2012), 326.

[70] Nancy J. Cooke, et al. "Advances in Measuring Team Cognition," *Team Cognition: Understanding the Factors That Drive Process and Performance* (Washington, DC: American Psychological Association, 2004), p239-40.

[71] Preston B. Cline, "Risk Management for U.S. Army Special Operations: Addressing the Need to Continuously Adapt to a Changing Problem Set," p16-17.

uncertainty of the battlefield. Many interviewees reported that this type of understanding was shared among the GFC, Communicator, JTAC, and Senior Enlisted Leader (SEL).

> You have to trust your subordinates—PL [Patrol Leader] and Sergeant running the ground tactical piece, the JTAC [Joint Tactical Air Controller] controlling the air assets, your Communicator talking back to the JOC. Delegate authority. Think out loud about what's going on. As the GFC, you are a facilitator of situational awareness. Inject over the radio when and where needed.
>
> —An Army SOF Officer

In *The Talent Code*, Daniel Coyle investigates the root causes of world-class expertise among those proficient in sports and at playing musical instruments.[72] He considers deep practice, ignition, and masterful coaching to be key. *Deep practice* refers to "chunking" the process into smaller, more manageable sub-tasks, repeating them, and "feeling it" or learning how to detect deviations from ideal performance. *Ignition* refers to fostering a high level of internal motivation to succeed and alludes to the drive to prevail over all obstacles. According to Coyle, for an organization to foster ignition, it must create an environment conducive to fellowship, striving, and mutual respect in the pursuit of a group goal or objective.[73] Finally, *master coaching* refers both to expert advice from older veterans in a given discipline, and to coaching that specifically targets an individual's personal development. As Coyle puts it, "the world of your organization is shaped like a mountain with a kind of paradise on top. Everyone strives together to scale the mountain."[74] Striving together is essential to creating team cognition.

One difference to be noted between the experts Coyle studied and GFCs is that there is nothing that begins from a baseline steady state in a combat environment—except shared standard operating procedures (SOPs) and a common over-mind. Consequentially,

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[72] Daniel Coyle, *The Talent Code: Greatness Isn't Born. It's Grown. Here's How (*New York: Bantam, 2009), 7.

[73] Ibid., 147.

[74] Ibid., 149.

complex, repetitive training is critical for creating the cohesive glue and implicit trust among team members that leads to effective performance as a combat unit.

> The GFC can't do it all. The relationship with your Troop Chief and Team Leaders will define how things will go. It's not just about the shooters; it's about the staff, enablers—the intelligence analysts, etc. Their success is measured by your success. You must recognize their input. Create a shared understanding of the situation with your JTAC and communicator.
>
> —A Naval Special Warfare Officer

## D. LINKING THE THEMES

One of the final interview questions I asked was, "In your opinion, can you name a quality, attribute, or trait that separates the best Ground Force Commanders you have observed from the rest?" By culling key words and key phrases, I was able to generate the following list and a word cloud based on the full answers I received.

- audacity
- purposeful
- calm
- tactical patience
- measured
- authentic
- calm
- trust
- calm
- decisive
- tactical patience
- coup d'oeil
- calm
- calm
- listen, think, pause, respond

- confidence, calm
- confidence
- calm
- cool head
- calm under pressure
- auftragstaktik


Figure 3. Word Cloud of Answers to Question 19.[75]

[75] Source: "Wordle," http://www.wordle.net/.

As revealed by the word cloud, "calm" was the word mentioned most often. While some aspect of calmness—or lack of emotional arousal—is undoubtedly personality-based, calm as a state of being *can* be cultivated through training.

> The trick to this is a little bit of acting—act like the calmest person you could be. There's nothing cooler than gunfire in the background and a calm guy on the radio. Go overboard with this calm act; make it just over-the-top lackadaisical, so it's almost humorous on the other end of the radio. Act calm so you can get calm.
>
> —A Naval Special Warfare Officer

## E. CONCLUSION

Not surprisingly, perhaps, the three themes that emerged from my interviews all help GFCs and future GFCs develop the ability to stay calm in volatile, uncertain, complex, and ambiguous (VUCA) environments. To recap, mental preparation refers to the mental models GFCs use to fortify themselves prior to and during operations. Vicarious experience refers to the idea of learning via the actions and decisions of others, and can be achieved through direct transmission from a senior commander or mentor, from reading firsthand historical accounts, or from direct observation of peers and superiors. Finally, the combination of complex and repetitive training allows teammates to develop a "shared mind." This type of training also allows the commander to practice being under a strain similar to that which he will face in actual combat.

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# III. BEST PRACTICES AND LESSONS LEARNED

In this chapter I address my second research question: what are the best practices for pre-deployment training and mission execution? In addition, I highlight a collection of hard-earned lessons learned by my interviewees. Several of the best practices identified in the following sections relate directly to the key themes discussed in Chapter II: mental preparation, vicarious experience, and complex, repetitive training.

## A. PRE-DEPLOYMENT TRAINING

Many interviewees mentioned the utility of tactical decision games (TDGs), or "sand table" exercises. A TDG or sand table exercise is described as a scenario-based exercise that puts the student in the role of a commander facing a challenging problem.[76] TDGs are employed by military, law enforcement, and firefighting agencies to help inexperienced leaders prior to their actual engagement in a tactical situation. In *The Prince*, Machiavelli highlights the importance of conducting TDGs. He writes,

> Philopoemen, prince of the Achaei, among other praises bestowed on him by writers, is lauded because in times of peace he thought of nothing but the methods of warfare, and when he was in the country with his friends, he often stopped and asked them: If the enemy were on that hill and we found ourselves here with our army, which of us would have the advantage? How could we safely approach him maintaining our order? If we wished to retire, what ought we to do? If they retired, how should we follow them? And he put before them as they went along all the contingencies that might happen to an army, heard their opinion, gave his own, fortifying it by argument; so that thanks to these constant reflections there could never happen any incident when actually leading his armies for which he was not prepared.[77]

There are several benefits to TDGs for the Ground Force Commander (GFC). First, they allow mental simulation of a prospective situation before the GFC is likely to encounter it. Gary Klein, an influential researcher in the field of decision making,

[76] John F. Schmitt, *Mastering Tactics: A Tactical Decision Game Workbook*, 1994, 3.

[77] Machiavelli, *The Prince*, *82*.

highlights mental simulation as an activity that experts employ when evaluating their potential courses of action.[78] When TDGs are conducted in the presence of superiors, peers, and even subordinates, this puts added "pressure" on GFCs to perform proficiently. At the same time, the GFC can learn how other members of his unit view a problem set, thereby helping him assess their capabilities. Seeing everyone else's reactions can foster team cognition. Meanwhile, TDGs that concentrate on ethical dilemmas can assist a GFC and his team to more effectively navigate the moral quandaries so prevalent on the battlefield. Finally, at the conclusion of a TDG, peers, subordinates, and superiors can offer feedback and alternative perspectives.

> [I benefited greatly from] lots of tactical decision games—it is difficult to think through problems around peers. It makes it competitive. It's even more challenging around subordinates—you don't want to let them down. That motivates you.
>
> —A Marine Corps Officer

> We do an O-6 level exercise every three months, and there is always a ton of uncertainty in the scenarios—lots of map exercises with the commanders. While the operators go to the range and shoot, the GFCs do planning, decision-making, reporting, and briefing. There's lots of leeway down to lowest level of leadership. All the exercises have uncertainty built in. We'd do sand table exercises, talk about it, and then talk about what the GFCs in that situation actually did in real life.
>
> —An International Officer

> During my conventional infantry time, my battalion commander held leadership development seminars. We did tactical decision games and ethics-based ones as well.
>
> —An Army SOF Officer

[78] Klein, *Sources of Power*, 26.

> There were more TDGs in USMC conventional infantry versus my time in Marine Special Operations Command. We need moral TDGs—shoot/no shoot is easy; we need ambiguous ones—legal, ethical, moral, so guys can learn boundaries.
>
> —A Marine Corps Officer

Several interviewees emphasized the importance of ensuring that suitable individuals are selected to deploy as GFCs and those who are unsuitable are weeded out. Some noted that not every military officer is temperamentally suited to perform under the stress of a volatile, uncertain, complex, and ambiguous (VUCA) environment.[79]

> Regarding tactical decision-making: 50 percent is you either have it or you don't. 50 percent is to take your experience and training and build upon on it. You need a good selection process for the first part.
>
> —An Army SOF Officer

> Personality is 50 percent—be careful in selection. It's not just the type of training, but selection is very important. Less than 50 percent of this job can be teachable.
>
> —An International Officer

## B. MISSION EXECUTION

Many military thinkers have written about the primacy of intuitive, non-linear decision making over more rational, linear styles in the heat of battle.[80] Many of my interviewees described engaging in pattern-matching and mental simulation schemas, consistent with recognition-primed decision-making (RPD).[81] When asked, some were

[79] This is corroborated in Isaac B. Tyler and Ariel C. Tyler, "Decision-Making in Chaos" (Thesis, Monterey, California: Naval Postgraduate School, 2015), p20-21.

[80] Kelly A. Wolgast, "Command Decision-Making: Experience Counts" (DTIC Document, 2005), 10; Dennis T. Gyllensporre, "Decision Navigation: Coping With 21st-Century Challenges in Tactical Decision-Making," *Military Review* 83, no. 5 (2003), p27-28.

[81] Klein, Calderwood, and Clinton-Cirocco, "Rapid Decision-Making on the Fire Ground," p4-5.

able to describe their use of System One over System Two thinking, and they could articulate their having had "non-rational" feelings during an operation.

> Yes—Going into Indian country on an operation in Afghanistan, I got the feeling we went too far into a valley and decided to turn back. I got AWT [aerial weapons team] overhead. We had almost walked into an L-shaped ambush. I just didn't have a good feeling about it.
>
> —An Army SOF Officer

> Many times—it just felt right. I attribute this to TDGs, it's hard to tell. I used pattern matching from prior experiences. Situations just didn't seem right and I had to make a quick decision.
>
> —A Marine Corps Officer

> Yes, my hair stands up—I think it's keying in on certain environmental factors. It is an accumulation of all the experiences you have had. By the time I was a GFC, I'd been on 200–300 operations. This one operation, I made the call to back off a barricaded shooter in a house. I got criticized for it, but later on we discovered the guy had a suicide vest on. It was just a gut call.
>
> —An Army SOF Officer

Here is how some interviewees described their decision-making 'method' when asked the following question:

*Think back to an operation where you encountered a great deal of uncertainty (conflicting/ambiguous/lack of information). How did you weigh competing priorities when making a decision?*

> If you can't develop the situation further, then you must make a decision. Can we come back another day? Can we continue?
>
> —An International Officer

> You have to figure out quickly, what is the most important thing? You're not going to be multi-tasking; you have to figure out the priorities. Delegate what is not important. #1 is safety of force, TIC [troops in contact], injury to personnel—it should drown out the rest, and you can circle back later.
>
> —A Naval Special Warfare Officer

> Number one, what is the danger to guys? Number two, is the partner force capable of handling this? Finally, number three, is it worth it?
>
> —An Army SOF Officer

Like everyone else in a small tactical element, the GFC is under a great deal of stress, primarily caused by situations that are novel, unpredictable, and uncontrollable.[82] In addition, his cognitive load—that is, his cognitive processing capacity—is strained by the VUCA environment of the battlefield.[83] Both his stress levels and cognitive load can be mitigated by experience and mental preparation.[84] As we have seen, personal experience is comprised of both direct, individual experience and the vicarious experience gleaned from TDGs, staff tours, reading military memoirs, as well as from previous training.

Respondents were asked, *Please describe the mindset/mental model that you typically employ to handle stress and uncertainty during an operation; In particular, was there something you did to avoid information overload?* Here are two telling responses:

> Focus on keeping things in perspective. After a sudden change, immediately ask yourself "What can I do to control this/make it better?" Initiate that, and then seek more information. For example, say you observe one of your mobility elements hit a huge IED [improvised explosive device] strike. First, you call for air, then turn back to get

[82] John Coates, *The Hour Between Dog and Wolf: How Risk Taking Transforms Us, Body and Mind* (New York: Penguin Books, 2013), 217.

[83] Fred Paas et al., "Cognitive Load Measurement as a Means to Advance Cognitive Load Theory," *Educational Psychologist* 38, no. 1 (2003), p63-64.

[84] Gyllensporre, "Decision Navigation," p27-28.

> updates on the situation. Something just happened; you raise your readiness and then bring other forces and assets to bear. What information do I really need, right now? Do we need Medevac, assets, QRF [Quick Reaction Force], etc.?
>
> —A Naval Special Warfare Officer

> One of my instructors in the Alpha course used to say, 'You don't want to have a helmet fire.'[85] Delegate as much as possible, to your communicator, your JTAC [Joint Terminal Air Controller], and your Team Sergeant.
>
> —An Army SOF Officer

Regarding the training, mentorship, experiences, or tools that helped individuals avoid information overload:

> A Master Chief at BUD/S [Basic Underwater Demolition/SEAL training]—he talked a lot about mental toughness, controlling your breathing, pulse, talking about philosophy. During Pool Comp at BUD/S—you're put under lots of physiological stress.[86] Can you stick to the game plan in face of all the surf hits? This is why we have such an anal attention to detail. You're not expected to invent something totally new in the heat of battle—execute your emergency action plan. Buy yourself time and space, and *then* think of something new.
>
> —A Naval Special Warfare Officer

> I can't pinpoint it, but [I learned from] watching different leaders, repetitively over time. How they handle things differently. You observe right and wrong. Over time, it becomes part of you. It becomes more tools for your proverbial toolbox.
>
> —An International SOF Officer

[85] The Alpha course is part of the training pipeline for Army Special Forces Officers.

[86] Pool Comp is a training evolution during 2nd Phase of basic SEAL training.

> Some of it is engrained in training but also through 100 firefights. A part comes with time and experience. Some of it is the structure of the job, what you need to report to higher. Guys know what needs to be passed over comms immediately, and what can wait. A lot of this can be done in training.
>
> —A Marine Corps Officer

## C. LESSONS LEARNED

> Guys need to read AARs [After Action Reports]! We pride ourselves on creating them, but guys just don't read them. At a minimum, it helps you create more precise questions to ask prior to turnover.
>
> —An Army SOF Officer

There are venues in which both unclassified and classified lessons are published, but few Special Operations Force (SOF) personnel review them.[87] The broad consensus from interviewees is that the knowledge-management software currently employed by SOF is not utilized at the tactical unit-level. It is unclear from my research whether this is due to ignorance about how to leverage this resource, whether the software itself is prohibitively unwieldy, or whether the information it holds is considered unhelpful. However, it is common around units, though, to hear GFCs say:

> I wrote them [AARs], but they're probably lost somewhere out in the ether.
>
> —A Naval Special Warfare Officer

> Your AAR just goes into a black hole.
>
> —An Army SOF Officer

[87] "Center for Army Lessons Learned | U.S. Army Combined Arms Center," http://usacac.army.mil/organizations/mccoe/call; "Marine Corps Center for Lessons Learned," http://www.tecom.marines.mil/Units/Directorates/MCCLL.aspx; "Joint Lessons Learned Information System," https://www.jllis.mil/apps/index.cfm.

> AARs aren't focused on the GFC perspective—it's typically mission and tactics. But, as a good GFC you *can* glean insights into the leader's thinking from their writing.
>
> —A Naval Special Warfare Officer

However, as this last quote indicates, even when AARs from other units *are* read, there is no section that focuses on how the commander made decisions, what factors he prioritized over others, or whether hindsight caused him to reflect on anything he could have done better.

Over the course of an operational career, GFCs make many decisions and develop a great deal of subject-matter expertise related to combat leadership. Unfortunately, unless a GFC has a follow-on tour in a training command, no one but his immediate subordinates will benefit from what he has learned about decision-making, prioritizing, and delegating under stress. Even worse, should the GFC leave the military, this hard won "experience capital" leaves with him. What he has internalized becomes lost to tactical units and the larger parent institution.

The following excerpts exemplify just some of the knowledge that is not being captured in any systematic way. Interviewees were asked to speak on the topic of errors, mistakes, or lessons learned pertaining to decision making while conducting an operation:

> There was a vehicle we had stopped at a static checkpoint with an HVT [high value target] inside, but we didn't have approval to arrest the guy, so we let him go. In hindsight it would have been better to detain him, and then risk the consequences afterward. I should have recognized the narrow, fleeting opportunity that we really had for such an elusive figure.
>
> —A Naval Special Warfare Officer

> The biggest one is failure to think—stop, think, and then speak. Then you usually go with your first blush gut instinct. During most engagements guys will get tunnel vision on the problem. They forget about the assets they have, focus on solving it yourself—they need to be more holistic. In my first combat experience, we took an RPG to the front of our Humvee, and I was too amped up. In training I always asked, "Is there another way?" Speak slowly; speak clearly on the radio—see ahead of what you're

saying instead of being the guy having a mouth spasm. I slowed back down a lot after that first op.

—An Army SOF Officer

There is a preset template, which gets to an 80 percent solution—target fidelity, weather, etc. When the template says go, there is still 20 percent of the op that is a judgment call—susceptible to emotion and swaying by other guys. So of that 20 percent, maybe half of that is a bad call—you accept that and hope that 10 percent of operations is not a mass casualty. Take as much decision-making out of the way so it's not emotional.

—A Naval Special Warfare Officer

[Just a general] lack of tactical patience, not setting conditions for the next phase. If things aren't ready, don't rush it.

—An Army SOF Officer

During pre-mission planning you can minimize, at least bound the intuitive decisions that have to be made, by making good contingency plans. Essentially, you're making decisions in advance through planning.

—A Naval Special Warfare Officer.

Take the extra time to think through decisions, not a lot—even just a few more seconds. Things seem like they are happening faster than they are. Take a slight pause to get all the information that you need. Talk less, listen more. Figure out what information you need to take in and what you need to pass up.

—A Marine Corps Officer

You can make all the right calls and things will still go bad—this is war. On the ops that went well, I stuck to hard and fast requirements: go/no go criteria, minimum force. The times things got hairy, either the intelligence, weather, or environment were near the minimum thresholds. I never went unless my Troop Chief said yes to an op.

—A Naval Special Warfare Officer

> [I've seen a] lack of experience leading to anxiety, a desire to do something, or a sense of urgency to do something. Being bored, overwhelmed and complacent in routine by default. Just getting in "copy and paste" mode from past situations.
>
> —An International Officer

> The GFC thinking he's out there alone. They treat the JOC [Joint Operations Center] as people they are doing a job for. The mindset should be "[The JOC] works for you." There are hundreds of people and assets that work for you. Tell them; direct them to what you need. Don't ask permission, give the squadron commander your intent—drive the train in the rear, and make the squadron commander change the plan if he wants to.
>
> —A Naval Special Warfare Officer

> Realizing that flexibility is the most important thing. Intensity cannot last-apathy is the other extreme. Balance between intensity and apathy. Some of it is personality—some is experience. You must have a sense of ease, an understanding of the environment. A lot of this comes from experience. As time goes by, more things make sense. Be mentally aggressive, staying flexible for contingencies. This has to start early in career, prior to pre-mission training.
>
> —An International Officer

## D. CONCLUSION

This chapter has focused on best practices for the GFC, for both pre-mission training and mission execution. It has highlighted the importance of Tactical Decision Games in preparing a GFC to deal with the uncertainty and time constraints he will encounter on the battlefield. Ground Force Commanders already use a number of techniques to avoid becoming overwhelmed by the cognitive strain of combat. They also amass implicit, or tacit, knowledge. Unfortunately, right now, no real emphasis is placed on shaping and refining these techniques, this tacit knowledge. Nevertheless, we are in the midst of the longest period of sustained conflict in American history. Surely, there is

more that can be done to capture and transmit decision-making tactics, techniques, and procedures so as to better to prepare and assist the next generation of GFCs.

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# IV. CONCLUSION, RECOMMENDATIONS, AND FURTHER RESEARCH

> If the mind is to emerge unscathed from this relentless struggle with the unforeseen, two qualities are indispensable: first, an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to the truth; and second, the courage to follow this faint light wherever it may lead. The first of these qualities is described by the French term, *coup d'oeil*; the second is determination.[88]
>
> —Clausewitz, *On War*

## A. CONCLUSION

This thesis has focused on the decision-making of Special Operations Force (SOF) Ground Force Commanders (GFC). My goal has been to address how to improve tactical-level decision making under conditions of uncertainty to better prepare combat leaders for current and future operating environments. Through my research I have sought to identify the characteristics of effective GFC decision making. I have also sought commonalities across the experiences of the GFCs I interviewed, who combined have conducted over 5,000 operations. My aim has been to identify best practices for pre-mission preparation and mission execution. Finally, a tremendous amount of implicit knowledge resides in those who have experience as GFCs. Their knowledge needs to be more systematically captured *and* transmitted.

Three themes emerged from my interviews with 21 experienced GFCs. Mental preparation, vicarious experience, and complex, repetitive training are critical to effective GFC decision making.

"Mental preparation" refers to the mental models which GFCs use to prepare themselves to interact with the uncertainty of the battlefield—how they fortify their perspectives and thoughts to enable decisive command in chaotic environments. "Vicarious experience" refers to the idea of learning through the actions and decisions of

[88] Clausewitz, *On War*, Indexed Edition, 102.

others. It can be achieved through direct transmission from a senior commander or mentor, from reading first-person accounts written by commanders, or from direct observation of peers and superiors in senior leadership positions. Finally, "complex repetitive training" allows GFCs and prospective GFCs to create a "shared reality" among their team members. This training also allows commanders to place themselves under a cognitive strain similar to the strain they will experience in actual combat.

## B. RECOMMENDATIONS

The following recommendations are organized according to their level of implementation, whether by the larger institution, the tactical-level unit, or the individual GFC.

### 1. Institutional Level—Record first-hand accounts from combat leaders.

New members of combat units are hungry to learn the ins and outs of their chosen community. A program designed to capture and pass along lessons learned by experienced enlisted and officer leaders in video format would be an easy way to transmit knowledge. It would require little effort and no coordination beyond the initial recording. The videos could be made readily accessible, and users could view them whenever convenient. Essentially, they would serve as a self-paced reference, a set of "video memoirs" that unit members could access for professional development. This could be done at the classified level and put on secure servers so operational minutiae could be adequately captured.

> [We should] figure out why people made bad decisions—what were the factors/situation? Build TDGs [Tactical Decision Games] based on real events. This stuff is hard to convey in AARs [After Action Report]/Lessons learned templates.
>
> —A Marine Corps Officer

### 2. Institutional Level—Employ the ShadowBox method to develop GFC cognitive skills.

Tactical-level units' parent organizations should develop a ShadowBox tool kit based on their experienced leaders' responses to scenarios to help incoming leaders work through these same scenarios. This is a cost-effective method to transmit implicit knowledge from experienced GFCs to prospective ones, providing a window into expert thinking in various combat scenarios.[89] As with the "video memoirs," ShadowBoxes could be made available organization-wide so that units and individuals could make use of them during off-duty hours, and could refer back to them while deployed.

### 3. Institutional and Unit Level—Ensure that training is holistic.

Many times, units are forced by budgetary and time constraints to focus on singular aspects of mission requirements. Units must resist the urge to train sequentially on only one or two tactics, techniques, or procedures (TTPs) for the sake of simplicity and expedience. It is imperative that commanders train under simulated complexity—ideally the same kind of complexity they will face in the deployed environment. This means VUCA-like scenarios with role-players and OPFOR, the execution of mission contingencies, the employment of multiple air assets and supporting elements, and reporting requirements by an intrusive higher headquarters. Much of this complexity can be simulated by role-players on the radio. This must all also be done repetitively in order to drill the GFC and his unit to respond intuitively, and with *coup d'oeil*.

> We need to maintain realistic training scenarios, more realistic assets for operation, we need to train accurately for multiple theaters, and return to large-scale C2 [Command and Control] ops.
>
> —A Naval Special Warfare Officer

[89] Klein, Hintze, and Saab, "Thinking inside the Box," 1–2.

### 4. Unit Level—Increase use of TDGs.

Although many units already employ TDGs and sand table exercises, in general they are under-utilized when it comes to preparing a GFC to deal with the pressures and uncertainties of the battlefield. This assertion is based both on my personal experience as a GFC and on the interview data. TDGs force timely decision making under pressure, but also promote team awareness by revealing how GFCs and their teammates are likely to react under different conditions. They also provide a venue in which seniors can pass tacit practical knowledge onto subordinates. In the past, Naval Special Warfare has attempted to foster the use of TDGs by including them in each issue of *Ethos* magazine.[90] Emphasis from senior leaders and time granted for TDGs would doubtless spur more interest in them by tactical level elements.

### 5. Individual Level—Emphasize reading for professional development and mental preparation.

This is not a novel recommendation, but important nonetheless. In professional courses, reading is encouraged and recommended at every stage of a leader's career. It is up to individuals to discipline themselves to accomplish this task during their off-duty hours. The cultivation of a detached mindset and negative visualization *can* and should be developed by individuals to prepare for the fog and friction of war. This is the building block of unit success, and only individuals can do this for themselves; no one else can do this for them.

[90] Navy SEAL + SWCC Scout Team Command Naval Special Warfare, "Naval Special Warfare Ethos Magazine - SEALSWCC.COM," *Official website U.S. Navy SWCC*, www.sealswcc.com/navy-swcc-ethos-magazine.html, Issue 22, 27.

## C. FURTHER RESEARCH

> What caused you to reach overload/OBE [Overcome By Events]? Too many inputs? Where is the line and what caused you to be overwhelmed?
>
> —An Army SOF Officer

Future research should determine how far GFCs can be pushed before they experience cognitive failure. A better understanding of the situational and dispositional factors involved in information overload would help all of us recognize the warning signs of its onset. Ideally, pushing current and future GFCs into information overload can be done under field (training) conditions rather than in a laboratory setting to better simulate the rigors of combat, and test warning signs and gauge breaking points.

In the fictionalized vignette that opened this thesis, CK, Harper, Jonas, Rick, and the rest of their force performed well in the chaotic, VUCA environment of combat. Why they did so should now be apparent. CK's SEAL platoon had conducted complex, repetitive training prior to deployment, which led to implicit trust among team members and cohesive mission execution. On deployment, they drilled their Afghan counterparts constantly, and rehearsed contingencies before every operation. They conducted sand table exercises to anticipate enemy actions. CK also handled the cognitive strain as well as he did because he "trained like he fought." He prepared himself mentally to deal with worst-case scenarios he had already envisioned in his head. Thanks to a prior staff tour, CK had vicarious experience he could draw from. From reading memoirs and poems like "Arithmetic on the Frontier" about the British experience in Afghanistan in the 1878 Anglo-Afghan war, he had analogues and context to refer to. These are some of the key factors that, together, helped CK and his platoon succeed on the battlefield.

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# APPENDIX A. INTERVIEW QUESTIONS

1. Please think back to any pre-military experiences you had in making decisions under stress: street fights, sports- any difficult and uncertain situations that you can recall. What lessons did you draw from them?

2. Whom do you admire as a leader (military or non-military) and why?

3. What lessons have you adapted from those leaders into your own style?

4. Prior to deploying overseas, what was the most helpful part of training with regard to decision making as a Ground Force Commander (GFC)?

5. Can you describe anything you did prior to deployment to increase your readiness, outside of work, such as reading or research?

6. Please describe any professional development/mentoring (if any) that your unit leadership or training cadre conducted with you pertaining to decision-making prior to or during deployment.

7. During pre-deployment/mission training, do you feel your unit and training cadre spent adequate time on the GFC portion of full mission profiles? What could be done to make pre-deployment/mission training better and/or more effective for GFCs?

8. Did you have any pre-mission rituals to facilitate your performance and focus during an operation (mental dirt dives, music, meditation, or prayer)?

9. Think back to when you've either made a decision or contributed to a decision on whether or not to launch on an operation. If in retrospect it was the correct call, how did you come to that conclusion? If it was the wrong call, can you identify an error in your thought process?

10. Are you familiar with dual process theory for cognition (*Thinking, Fast and Slow*. System 1—fast, implicit, unconscious, System 2—slow, explicit, conscious)? Did you ever use your intuition or a "non-rational" feeling while conducting an operation? What did that feel like? What made you decide to favor your intuition over a more conscious, rational process?

11. On Mission: Think back to an operation where you encountered a great deal of uncertainty (conflicting/ambiguous/lack of information). How did you weigh competing priorities when making a decision during the operation?

12. Please describe the mindset/mental model that you typically employ to handle stress and uncertainty during an operation. In particular, was there something you did to avoid information overload?

13. What training, mentorship, experiences, or tools helped you arrive at this strategy?

14. What are some mistakes pertaining to decision-making that either you have made or seen made by other GFCs while conducting an operation?

15. What do you feel needs to be captured about the experience of SOF GFCs over the past 15 years to ensure that lessons learned will not be lost or forgotten?

16. Did your unit have a process or means of capturing lessons learned from the GFC perspective, besides some sort of hotwash/group AAR? What was useful or not useful about it?

17. What readings/books have proven valuable for professional development pertaining to decision making as a SOF leader?

18. What were key takeaways from it/them?

19. In your opinion, can you name a quality, attribute, or trait that separates the best Ground Force Commanders you have observed from the rest?

20. Thinking back on your experience as a leader, from the first operation you led until now, what lessons have you learned about tactical decision making that perhaps aren't obvious? What would you tell your younger self before you stepped off the FOB or conducted an operation for the first time?

21. What am I missing? Is there anything else you'd like to add before we finish?

# APPENDIX B. RECOMMENDED GFC READING LIST


Aurelius, Marcus. *Meditations*. Mineola, N.Y: Dover Publications, 1997.

Axelrod, Alan. *Patton on Leadership*. 1st ed. Paramus, NJ: Prentice Hall Press, 2001.

Blaber, Pete. *The Mission, the Men, and Me: Lessons from a Former Delta Force Commander*. Reprint edition. New York: Berkley, 2010.

Brees, Drew, Mark Brunell, and Chris Fabry. *Coming Back Stronger: Unleashing the Hidden Power of Adversity*. Carol Stream, Ill.: Tyndale House Publishers, Inc., 2011.

Campbell, Donovan. *Joker One: A Marine Platoon's Story of Courage, Leadership, and Brotherhood*. Reprint edition. New York: Random House Trade Paperbacks, 2010.

Carnegie, Dale. *How to Win Friends & Influence People*. New York: Pocket Books, 1998.

Cialdini, Robert B. *Influence: The Psychology of Persuasion*. Revised edition. Harper Business, 2006.

Constance, Harold, and Randall Fuerst. *Good to Go: The Life And Times Of A Decorated Member Of The U.S. Navy's Elite Seal Team Two*. Avon, 2014.

Covey, Stephen M. R., Stephen R. Covey, and Rebecca R. Merrill. *The Speed of Trust: The One Thing That Changes Everything*. Reprint edition. Free Press, 2008.

Epictetus. *Enchiridion*. Translated by George Long. Mineola, NY: Dover Publications, 2004.

———. *The Discourses of Epictetus - The Handbook - Fragments*. Edited by Christopher Gill and Richard Stoneman. Translated by Robin Hard. Subsequent edition. London : Rutland, Vt: Everyman Paperback, 1995.

FitzGibbon, Spencer. *Not Mentioned in Dispatches*. Cambridge England : New York: Lutterworth Press, 2001.

Gates, Robert M. *A Passion for Leadership: Lessons on Change and Reform from Fifty Years of Public Service*. 1st ed. New York: Knopf, 2016.

Gladwell, Malcolm. *Blink: The Power of Thinking Without Thinking*. 1st ed. New York: Back Bay Books, 2007.

———. *The Tipping Point: How Little Things Can Make a Big Difference*. Boston: Back Bay Books, 2002.

Grossman, Dave. *On Killing: The Psychological Cost of Learning to Kill in War and Society*. Revised edition. New York: Back Bay Books, 2009.

Grossman, Dave, and Loren W. Christensen. *On Combat, The Psychology and Physiology of Deadly Conflict in War and in Peace*. 3rd ed. Warrior Science Publications, 2008.

Hackworth, Colonel David H., and Julie Sherman. *About Face: The Odyssey of an American Warrior*. New York, NY: Touchstone, 1990.

Heinlein, Robert A. *Starship Troopers*. Ace, 1987.

Hoisington, T. J. *If You Think You Can!: Thirteen Laws That Govern the Performance of High Achievers*. New York, NY: Aylesbury Publishing, 2005.

Isaacson, Walter. *Steve Jobs*. Reissue edition. Simon & Schuster, 2015.

Kahneman, Daniel. *Thinking, Fast and Slow*. Reprint edition. New York: Farrar, Straus and Giroux, 2013.

Levitt, Steven D., and Stephen J. Dubner. *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*. 1st original edition. New York: William Morrow Paperbacks, 2009.

Macdonald, Charles B. *Company Commander: The Classic Infantry Memoir of World War II*. Revised edition. Short Hills, NJ: Burford Books, 1999.

Malone, Dandridge M. *Small Unit Leadership: A Commonsense Approach*. Novato, CA: Presidio Press, 1983.

McChrystal, General Stanley, Tantum Collins, David Silverman, and Chris Fussell. *Team of Teams: New Rules of Engagement for a Complex World*. New York, New York: Portfolio, 2015.

McDonough, James R. *Platoon Leader: A Memoir of Command in Combat*. New edition New York: Presidio Press, 2003.

McKay, Gary. *Sleeping with Your Ears Open: On Patrol with the Australian SAS*. Crows Nest, N.S.W.: Allen & Unwin Pty., Limited, 2002.

Mcraven, William H. *Spec Ops: Case Studies in Special Operations Warfare: Theory and Practice*. Unknown edition. New York: Presidio Press, 1996.

Moore, Harold G., and Joseph L. Galloway. *We Were Soldiers Once...and Young: Ia Drang – The Battle That Changed the War in Vietnam*. May 30, 2004 edition. Presidio Press, 2004.

Naylor, Sean. *Not a Good Day to Die: The Untold Story of Operation Anaconda*. Reprint edition. New York: Berkley, 2006.

Nolan, Keith. *Ripcord: Screaming Eagles Under Siege, Vietnam 1970*. 59819th edition. New York: Presidio Press, 2003.

Powell, Colin. *It Worked for Me: In Life and Leadership*. Reprint edition. Harper Perennial, 2014.

Puckett, Ralph. *Words for Warriors*. Tucson, Ariz: Wheatmark, 2007.

Rommel, Marshall Erwin. *Infantry Attacks*. Cork: bnpublishing.com, 2014.

Ross, Hamish. *Paddy Mayne: Lt Col Blair "Paddy" Mayne, 1 SAS Regiment*. New edition. Stroud: The History Press, 2004.

Rowe, Peter G. *Design Thinking*. Reprint edition. The MIT Press, 1991.

Seneca, Lucius Annaeus. *Letters from a Stoic*. Translated by Robin Campbell. Reprint edition. Harmondsworth: Penguin Books, 1969.

Shore, Zachary. *Blunder: Why Smart People Make Bad Decisions*. 1st edition. Bloomsbury, 2010.

Sides, Hampton. *Ghost Soldiers: The Epic Account of World War II's Greatest Rescue Mission*. New York: Anchor, 2002.

Thompson, George J., and Jerry B. Jenkins. *Verbal Judo: The Gentle Art of Persuasion, Updated Edition*. Updated edition. New York: William Morrow Paperbacks, 2013.

Tse-Tung, Mao, and Mao Zedong. *On Guerrilla Warfare*. Translated by Samuel B. Griffith. Santiago, Chile: BN Publishing, 2007.

Wentz, Gene, and B. Abell Jurus. *Men in Green Faces: A Novel of U.S. Navy SEALs*. Reprint edition. New York: St. Martin's Griffin, 2012.

West, Bing. *The Village*. 58467th edition. New York, NY: Pocket Books, 2003.

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# LIST OF REFERENCES


Aurelius, Marcus. *Mediations*. New York: Penguin Books, 2006.

Bennett, Nathan, and G. James Lemoine. "What VUCA Really Means for You." *Harvard Business Review*, January 1, 2014. https://hbr.org/2014/01/what-vuca-really-means-for-you. Accessed May 15, 2016.

"Center for Army Lessons Learned | U.S. Army Combined Arms Center," http://usacac.army.mil/organizations/mccoe/call. Accessed May 15, 2016.

Clausewitz, Carl von. *On War, Indexed Edition*. Translated by Michael Eliot Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1989.

Cline, Preston B. "Risk Management for U.S. Army Special Operations: Addressing a Need to Continuously Adapt to a Changing Problem Set." February 6, 2013.

Coates, John. *The Hour Between Dog and Wolf: How Risk Taking Transforms Us, Body and Mind*. New York: Penguin Books, 2013.

Command, Navy SEAL + SWCC Scout Team, Naval Special Warfare. "Naval Special Warfare Eos Magazine - SEALSWCC.COM." *Official website U.S. Navy SEAL & SWCC*. Accessed May 15, 2016. http://www.sealswcc.com/navy-seals-eos-magazine.html#.VzeAv2a9b3U.

Cooke, Nancy J., et al. "Advances in Measuring Team Cognition." *Team Cognition: Understanding e Factors That Drive Process and Performance*. Washington, DC. American Psychological Association, 2004.

Corps, U.S. Marine. "Command and Control." *Marine Corps Doctrine Publication* 6, 1996.

Coyle, Daniel. *The Talent Code: Greatness Isn't Born. It's Grown. Here's How.* New York: Bantam Dell, 2009.

*Department of Defense Dictionary of Military and Associated Terms*. JCS Pub. Washington, DC, United States Joint Chiefs of Staff, 2011.

Epectitus. *The Enchridion*. Texas A&M Department of Philosophy. Accessed May 15, 2016. http://philosophy.tamu.edu/~sdaniel/Notes/enchiridion.pdf.

Fiore, Stephen M., Karol G. Ross, and Florian Jentsch. "A Team Cognitive Readiness Framework for Small-Unit Training." *Journal of Cognitive Engineering and Decision-Making* 6, no. 3, 2012.

Fiore, Stephen M. and Eduardo Salas, "Advances in Measuring Team Cognition," *Team Cognition: Understanding e Factors That Drive Process and Performance*. Washington, DC. American Psychological Association, 2004.

Gigerenzer, Gerd, and Daniel G. Goldstein. "Reasoning e Fast and Frugal Way: Models of Bounded Rationality." *Psychological Review* 103, no. 4, 1996.

Gigerenzer, Gerd, and Reinhard Selten. *Bounded Rationality: The Adaptive Toolbox.* Cambridge, MA: MIT Press, 2002.

Gyllensporre, Dennis T. "Decision Navigation: Coping Wi 21st-Century Challenges in Tactical Decisionmaking." *Military Review* 83, no. 5, 2003.

Horace. *The Odes of Horace*. Baltimore, MD: Johns Hopkins University Press, 2008.

Human Dimension Capabilities Task Force. "Cognitive Biases and Decision-Making: A Literature Review and Discussion of Implications for e U.S. Army." U.S. Army Mission Command Center of Excellence. October 6, 2014.

Jacobs, Owen T. *Strategic Leadership: The Competitive Edge*. National Defense University, Industrial College of the Armed Force, 2002.

"Joint Lessons Learned Information System." Accessed May 15, 2016. https://www.jllis.mil/apps/index.cfm.

*JP 1-02, Department of Defense Dictionary of Military and Associated Terms, 8 November 2010 (As Amended Through 15 February 2016)*. http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

Kahneman, Daniel. *Thinking, Fast and Slow*. New York: Farrar, Straus, and Giroux, 2011.

Kahneman, Daniel, and Gary Klein. "Conditions for Intuitive Expertise: A Failure to Disagree." *American Psychologist* 64, no. 6, 2009.

Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica: Journal of Econometric Society* 1979.

Kavanagh, Jennifer. "Stress and Performance." Santa Monica, CA: Rand Corporation, 2005.

Kipling, Rudyard. "Arimetic on the Frontier." Accessed May 15, 2016. http://www.kiplingsociety.co.uk/poems_ari.htm.

Klein, Gary. “Making Decisions in Natural Environments.” Research and Advanced Concepts Office. U.S. Army Research Institute for Behavioral and Social Sciences. February 1997.

———. “Naturalistic Decision-Making.” *Human Factors: The Journal of the Human Factors and Ergonomics Society* 50, no.3, 2008.

Klein, Gary A. *Sources of Power: How People Make Decisions*. Cambridge, MA: MIT Press, 1999.

Klein, Gary A., Roberta Calderwood, and Anne Clinton-Cirocco. “Rapid Decision-Making on e Fire Ground.” In *Proceedings of e Human Factors and Ergonomics Society Annual Meeting*. SAGE Publications, 1986.

Klein, Gary, Neil Hintze, and David Saab. “Thinking inside e Box: The ShadowBox Method for Cognitive Skill Development.” In *Proceedings of e 11 International Conference on Naturalistic Decision-Making (NDM 2013).* Paris, France: Arpege Science Publishing, 2013.

Krulak, Charles C. “Cultivating Intuitive Decisionmaking.” *Marine Corps Gazette* 83. 1999.

Machiavelli, Niccoló. *The Prince*. New York: Oxford University Press, 1952.

“Marine Corps Center for Lessons Learned.” Accessed April 21, 2016. http://www.tecom.marines.mil/Units/Directorates/MCCLL. Accessed May 15, 2016.

McCloskey, Michael J. “An Analysis of Uncertainty in e Marine Corps.” In *Proceedings of e Human Factors and Ergonomics Society Annual Meeting*. SAGE Publications, 1996.

“MCDP 1 Warfighting.” Washington, DC. Headquarters of the United States Marine Corps, 1996.

Napoleon. *Military Maxims of Napoleon*. New York: Wiley and Putnam, 1845.

National Research Council. “Improving the Decision-Making Abilities of Small Unit Leaders.” Washington, DC. National Academies Press, 2012.

*Naval Doctrine Publication 6. Naval Command and Control*. Washington, DC: Office of e Chief of Naval Operations, 1995.

Orasanu, Judi, and Terry Connolly. *The Reinvention of Decision-Making.* Westport, CT: Ablex Publishing, 1993.

Paas, Fred, Juhani E. Tuovinen, Huib Tabbers, and Pascal WM Van Gerven. “Cognitive Load Measurement as a Means to Advance Cognitive Load Theory.” *Educational Psychologist* 38, no.1, 2003.

*Readings Defense Resource Management*. Boston, Massachusetts: Pearson Learning Solutions, 2014.

Robertson, *The Philosophy of Cognitive Behavioral Therapy: Stoic Philosophy as Rational and Cognitive Psychotherapy*, London: Karnac Books, 2010.

Ross, Karol G., et al. “The Recognition-Primed Decision Model.” *Military Review*. August 2004.

Schmitt, John F. *Mastering Tactics: A Tactical Decision Game Workbook*. Quantico, VA: Marine Corporation Assn Bookstore, 1994.

Shambach, Stephen A. “Strategic Leadership Primer. Second Edition.” Carlisle, PA: U.S. Army War College, 2004.

Shattuck, Lawrence G., Nita Lewis Miller, and Kacey E. Kemmerer. “Tactical Decision-Making under Conditions of Uncertainty: An Empirical Study.” *Proceedings of e Human Factors and Ergonomics Society Annual Meeting* 53, no.4. October 1, 2009.

Sherman, Nancy. *Stoic Warriors: The Ancient Philosophy behind e Military Mind*. Oxford: Oxford University Press, 2005.

Simon, Herbert Alexander. *Models of Man: Social and Rational- Mathematical Essays on Rational Human Behavior in a Social Setting*. New York. John Wiley and Sons, 1957.

Sumida, Jon T. “The Clausewitz Problem.” *Army History*, no.73, 2009.

———. “The Relationship of History and Theory in On War: The Clausewitzian Ideal and Its Implications.” *The Journal of Military History* 65, no.2, 2001.

Training and Doctrine Command. “Pam 525–3-1 Army Operating Concept, Win In A Complex World.” U.S. Government Printing Office: Fort Eustis, VA. October 31, 2014.

Tsouras, Peter G. *Warriors’ Words: A Quotation Book: From Sesostris III to Schwarzkopf 1871 BC to AD 1991*. London: Arms & Armour Press, 1992.

Tversky, Amos, and Daniel Kahneman. “Availability: A Heuristic for Judging Frequency and Probability.” *Cognitive Psychology* 5, no. 2, 1973.

Tyler, Isaac B., and Ariel C. Tyler. *Decision-Making in Chaos*. Monterey, California: Naval Postgraduate School, 2015.

U.S. Army. "The Human Dimension White Paper: A Framework for Optimizing Human Performance." United States Army Combined Arms Center, 2014.

Williams, Blair S. "Heuristics and Biases in Military Decision-Making." *Military Review*, September 2010.

Wolgast, Kelly A. "Command Decision-Making: Experience Counts." Carlisle, PA: U.S. Army War College, 2005.

"Wordle." Accessed May 15, 2016. http://www.wordle.net/.

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