Embracing Nonlinearity: Leveraging Systems Thinking to Frame an Operating Environment

A Monograph

by

MAJ Codie G. Fields
US Army

School of Advanced Military Studies
US Army Command and General Staff College
Fort Leavenworth, KS

2020

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
21-05-2020	Monograph	JUN 2019 – MAY 2020

4. TITLE AND SUBTITLE
Embracing Nonlinearity: Leveraging Systems Thinking to Frame an Operating Environment.

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Codie G. Fields, MAJ, US Army

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Advanced Military Studies Program
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027-2301

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Advanced Military Studies Program

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Despite the United States' military's power, it has struggled to achieve objectives with lasting meaning during the wars in Iraq, Afghanistan, and Syria. This has caused some national security experts to wonder if the United States has a strategy problem. Critics of United States foreign policy in the Middle East argue that the strategies executed in the region lack coherence. However, the problem with American strategy in the Middle East is not the policy aims exclusively. Instead, it is indicative of a problem regarding how the United States thinks about understanding the Operating Environment (OE) and how it applies that flawed understanding during war.

Drawing from recent experiences and through an acceptance that future wars will predominantly not be linear endeavors, the US military should consider re-orienting the enterprise towards an approach that takes into account the holistic complexity found in a given operating environment. Systems thinking offers this alternative approach. This method emphasizes acquiring situational awareness to describe the OE using a nonlinear mental methodology instead of the linear processes found in doctrine such as Political, Military, Economic, Social, Information, Infrastructure (PMESII), and the Center of Gravity (COG) analyses. This approach focuses on thinking about understanding in a manner that will aid in generating more effective versions of military strategy and operational art.

15. SUBJECT TERMS
Operating Environment, Nonlinearity, Linearity, Systems Thinking, PMESII, COG Analysis, Iraq

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
					MAJ Codie G. Fields
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)	53	

Standard Form 298 (Rev. 8-98)

Prescribed by ANSI Std. Z39.18

Monograph Approval Page

Name of Candidate: MAJ Codie G. Fields

Monograph Title: Embracing Nonlinearity: Leveraging Systems Thinking to Frame an Operating Environment.

Approved by:

_____, Monograph Director
Alice Butler-Smith, PhD

_____, Seminar Leader
Barton Johnke, COL

_____, Director, School of Advanced Military Studies
Brian A. Payne, COL

Accepted this 21st day of May 2020 by:

_____, Acting Director, Office of Degree Programs
Prisco R. Hernandez, PhD

Abstract

Embracing Nonlinearity: Leveraging Systems Thinking to Frame an Operating Environment, by MAJ Codie G. Fields, 53 pages.

Despite the United States' military's power, it has struggled to achieve objectives with lasting meaning during the wars in Iraq, Afghanistan, and Syria. This has caused some national security experts to wonder if the United States has a strategy problem. Critics of United States foreign policy in the Middle East argue that the strategies executed in the region lack coherence. However, the problem with American strategy in the Middle East is not the policy aims exclusively. Instead, it is indicative of a problem regarding how the United States thinks about understanding the Operating Environment (OE) and how it applies that flawed understanding during war.

Drawing from recent experiences and through an acceptance that future wars will predominantly not be linear endeavors, the US military should consider re-orienting the enterprise towards an approach that takes into account the holistic complexity found in a given operating environment. Systems thinking offers this alternative approach. This method emphasizes acquiring situational awareness to describe the OE using a nonlinear mental methodology instead of the linear processes found in doctrine such as Political, Military, Economic, Social, Information, Infrastructure (PMESII), and the Center of Gravity (COG) analyses. This approach focuses on thinking about understanding in a manner that will aid in generating more effective versions of military strategy and operational art.

Contents

Acknowledgements

I am incredibly grateful to my monograph director, Dr. Alice Butler-Smith, for guiding me through this process and opening my eyes to seeing the world in a new way. Additionally, I owe thanks to my Seminar leader, Colonel Barton Johnke, for keeping me on schedule and providing valuable feedback throughout the writing process. Thank you to Dr. Matthew Muehlbauer for putting me in touch with Dr. Peter Mansoor who provided first hand accounts of the planning that occurred prior to the surge in Iraq. The information provided was not readily available on the shelf of any library and proved instrumental in my research. Finally, thank you to my wife, Tara, and our four children. Without your love, support, and encouragement this would not have been possible.

Abbreviations

CC	Critical Capability
COG	Center of Gravity
COIN	Counter-Insurgency
CR	Critical Requirement
CV	Critical Vulnerability
DSRP	Distinctions, Systems, Relationships, Perspectives
JP	Joint Publication
LSCO	Large Scale Combat Operations
OE	Operating Environment
PMESII	Political, Military, Economic, Social, Information, Infrastructure
WMD	Weapons of Mass Destruction

Figures

Section One: Introduction

The United States has often found itself directly involved in the affairs of the Middle East since the conclusion of the Second World War. Reasons for this involvement vary, but there is no doubt that the region is of significant interest to the United States. These interests include those of the world economy, global security, and the strategic access enforced by the United States and further promised to the world. Yet, despite the United States' wealth and power, it has often struggled at times to achieve its policy aims in the region. These struggles to achieve objectives with lasting meaning during operations in Iraq, Afghanistan, and Syria have caused some national security experts to question whether the United States has a strategy problem.[1] Critics of United States foreign policy in the Middle East argue that the strategies being executed in the region lack coherence.[2] However, the problem with American strategy in the Middle East is not ambiguous policy aims exclusively. Instead, it is primarily a problem with the manner in which the military equips planners to understand the Operating Environment (OE) using existing doctrine.

Since 2001, United States operations in the Middle East have led to mixed outcomes at best for American policy makers and military practitioners. This is in part because of a recognition by adversaries of the United States regarding the conventional superiority of the American military and its overwhelming capability and capacity. Subsequently, adversaries of the United States in Iraq, many in the form of trans-national terrorist groups, have adopted asymmetric approaches and indirect means of fighting American forces. The US military is now a victim of its own technological overmatch as adaptive enemies seek means of fighting that exploit how Americans think about warfare. Acceptance of this nonlinear approach as the new formula

---

[1] David Axe, "The U.S. Military Has a Big Problem: It Can't Win Wars," *The National Interest*, June 7, 2019, accessed December 5, 2019, https://nationalinterest.org/blog/buzz/us-military-has-big-problem-it-cant-win-wars-61452.

[2] Daniel Depetris, "Does the US Actually Have a Coherent Foreign Policy in the Middle East?" *Washington Examiner* (October 23, 2018) accessed December 2, 2019, https://www.washingtonexaminer.com/opinion/does-the-us-actually-have-a-coherent-foreign-policy-in-the-middle-east.

for waging war against the United States ought to be the new expectation of planners moving forward. In turn, the US military should not expect another conventional operation like the Gulf War to be the norm. Instead, it will need to draw from recent experiences and accept that future wars will likely not be linear confrontations and re-orient the enterprise towards an approach that takes into account the complexity found in the OE. Additionally, this approach acknowledges the futility of isolating variables utilizing linear processes when the world is fundamentally complex in its nature. Acceptance of this point may finally result in a shift in military thought that will aid in generating more effective military strategy and operational art.

In this paper, the author will examine systems thinking as a construct for understanding an OE and compare this with the linear approaches found in US military doctrine. Furthermore, this essay links this examination to the question of why the US military has struggled in recent history to achieve objectives in the Middle East with lasting meaning. The author suggests that it is due to the manner in which the American military at large thinks about understanding the contemporary operating environment and its role within it. Systems thinking offers an alternative approach to understanding the OE for the purpose of the formulation of military strategy and operational art. This method is effective because it emphasizes holistic sensemaking to describe the OE using a nonlinear mental methodology instead of the linear processes found in doctrine such as Political, Military, Economic, Social, Information, Infrastructure (PMESII) and the Center of Gravity (COG) analyses which feint understanding through attempts to distill complexity into symmetric and reductionists constructs.

Gaining understanding of a given OE should occur before, and inform, the formulation of military strategy and its subsequent application, operational art.[3] This allows the military to apply its operations effectively within the context of the OE. Without this situational awareness,

[3] US Department of Defense. Joint Doctrine Note (JDN) 1–18, *Strategy* (Washington, DC: Government Printing Office, 2018), II-1.

strategy and operational art lack relevance. At times, nations preparing for war fail to accurately conceptualize the complex realities on the ground due to their own biases and the use of flawed processes. The United States is no exception. For example, it failed to understand the complexity and nuance at play in the Middle East leading up the invasion of Iraq. American efforts to overthrow the regime of Saddam Hussein have arguably benefitted Iran more than Iraq. The vacuum created resulted in Iraq becoming a platform from which Iran projects power into the rest of the region.[4] Thus, the United States would be well suited to acknowledge that the Middle East has a rich history and is composed of diverse demographics with competing interests and unique relationships. These demographics and relationships form a social fabric predicated on a delicate and ever shifting balance that defines the interconnectedness of its actors. Unfortunately, this description contrasts with the United States' perspectives on the role of nation states as the single most important actors in a region.[5]

This monograph includes four sections. The first section consists of the introduction accompanied by a literature review and methodology. The literature review presents the author's journey into the origins of systems theory, linear thinking and processes, and their influence on military doctrine. The methodology will then present the approach used to draw conclusions from the research into a coherent argument on the utility of systems thinking for framing and explaining the dynamics of an OE and the potential it creates for the formulation of military strategy and operational art. The second section provides an in depth look at linear thinking and systems thinking and some of their manifestations in the military profession. In this section the author expands on the linear and nonlinear concepts that influence military sensemaking in order to draw attention to how each are used and misused. The contents of the third section will briefly

---

[4] Beth L. Bailey and Richard H. Immerman, eds., *Understanding the U.S. Wars in Iraq and Afghanistan* (New York: New York University Press, 2015), 22.

[5]Samuel Tadros. "U.S. Middle East Strategy," *The Caravan*. (Palo Alto: Hoover Institution, March 28, 2019) accessed December 2, 2019, https://www.hoover.org/research/us-middle-east-strategy.

introduce the case study used as the back drop for this paper, the Iraq war. Here, the United States' war in Iraq provides context and analysis of the application of linear processes versus systems thinking in the next section. This section then examines how the United States defined the OE in Iraq and surveys the effectiveness of the approaches used. Further illuminating the problem discussed in the introduction by showing the adverse effects of flawed sensemaking on the execution of military strategy and operational art. The final section concludes this monograph and explores the relevance of the research in explaining the OE by recommending approaches for systems thinking based sensemaking and discussing the implications for the US military moving forward.

This research seeks to identify how the use of systems thinking could provide better functional explanations of a nonlinear OE. Specifically, the author's study was focused on the utility of systems thinking in comparison to the use of linear constructs such as PMESII and the COG analyses. Military planners, leaders, and practitioners face increasingly complex circumstances in the operational spaces where armed conflict occurs, but sometimes do not use all of the cognitive tools at their disposal. Has doctrine equipped them correctly? The research represented in this monograph suggests that it has not in all cases and seeks to deliver another option for the modern-day planner. It builds on the work of existing systems theorists to identify a mental model that accounts for context, character, and holism can lead to the lasting and meaningful strategic advantages described by Dolman.[6] Furthermore, it seeks to discover if systems thinking could have offered better outcomes for the United States with regards to the ongoing war in Iraq.

There is no shortage of relevant works on systems theory and its unique relevance. Dr. Ludwig von Bertalanaffy first popularized the utility of general systems theory and its use as a

[6] Everett C Dolman. *Pure Strategy: Power and Principle in the Space and Information Age* (London; New York: Frank Cass, 2005), 5.

multi-disciplinary tool through his integral offering *General System Theory: Foundations, Development, Application.*[7] This point illuminates the complexity of a given variable and its inter-connectedness to other variables and the inherent futility in isolating said variables in the hope of predicting cause and effect. This point is critical for applying systems theory in the form of systems thinking to sense making of a given problem; or in the case of this monograph describing a complex OE. The most complex and impactful variable to discern remains human beings. People can be large to contributors to the level of complexity in a given social system and play significant roles in armed conflict. Downplayed by the military's recent movement towards Large Scale Combat Operations (LSCO), humans make up the social fabric at all levels of war. People fight, plan, and make decisions and these actions require an understanding of motives. Here, Dr. Jamshid Gharajedaghi's theories on systems thinking and his iterative process of inquiry proved helpful in developing an understanding of the roles played by social systems and interdependency, self-organization, choice, and these factors contribute to sensemaking in context.[8]

The consolidated works of John Boyd serve as the connective tissue between systems theory, strategy, and warfare. The lessons provided by Boyd demonstrate the inherent nonlinearity of war and underscore the challenges that the United States faces in unconventional conflicts. His writings pair well with Clausewitz due to his acknowledgment that war is inherently a human endeavor.[9] Boyd's own trinity of "people first, ideas second, and things third" intended to drive planners and decision makers towards a better understanding of an adversary

---

[7] Ludwig von Bertalanffy. *General System Theory: Foundations, Development, Applications* (Penguin University Books. Harmondsworth: Penguin, 1973).

[8] Jamshid Gharajedaghi. *Systems Thinking: Managing Chaos and Complexity: A Platform for Designing Business Architecture*, 3rd ed. (Burlington, MA: Morgan Kaufmann, 2011), 90.

[9] John Boyd, and Grant Tedrick Hammond. *A Discourse on Winning and Losing (*Air University (US) and Press, 2018), 9.

and the environment.[10] However, it appeared to get only a small consideration during the Iraq war and seems to play an even smaller role as the enterprise pivots towards LSCO. In fact, as Boyd warned, the United States seems to prefer his trinity in reverse: first things, then ideas, and finally people when examining atmospheric conditions for war.[11]

Dr. Shimon Naveh's works on operational art weave systems thinking together with operational thinking and what he calls "operational consciousness."[12] His theories regarding operational art and systems thinking espouse seeking perspective to exploit the cognitive tensions between the intangible aims of strategy and the specific objectives of tactics.[13] In this complex space, understanding is the weapon of choice which helps planners delineate the strategic, operational, and tactical levels of war. Naveh refers to this as cognitive mediation or synthesizing understandings.[14] Here explaining the OE becomes paramount because every OE has its own unique logic. This logic is difficult to decipher using linear processes constructed using a logic framed out of context. Naveh uses this line of thought to form and identify his theory on the operational art of design that influenced this monograph.

There is a certain level of pluralism throughout the field of systems research. Bertalanaffy, Gharajedaghi, Boyd, and Naveh are only some of the many systems theorists out there, but their works weighed heavily on the content of this monograph. Because, despite this body of available knowledge there is still some ambiguity in the literature regarding how systems thinking provides an alternative sensemaking tool in support of characterizing a particular situation prior to war. For the sake of application, the book written by Dr. Derek Cabrera and Dr.

---

[10] Ibid.

[11] Boyd and Hammond, *A Discourse on Winning and Losing*, 9.

[12] Shimon Naveh. *In Pursuit of Military Excellence: The Evolution of Operational Theory* (The Cummings Center, Series 7. London; Portland, OR: Frank Cass, 1997), 9-10.

[13] Ibid.

[14] Jim Schneider, Shimon Naveh, and Timothy Challans, *The Structure of Operational Revolution* (Booz, Allen, Hamilton, 2009), 113.

Laura Cabrera, *Systems Thinking Made Simple* provides a concept for systems thinking that is quite straightforward.[15] Their Distinctions, Systems, Relationships, and Perspectives (DSRP) construct is a helpful additive to any sensemaking endeavor. Referenced in this monograph, it will serve as the central method for a systems-thinking based approach to understanding an OE.

An examination of systems thinking requires defining the alternative. For the purpose of this paper, the alternative is linear thinking and processes. For this, an exploration into the relationship between cause and effect proved beneficial. This lens offered a look at the difference between deterministic and open systems and how people confuse them.[16] This leads to the key question already stated: Can there be reductionism without the passive acknowledgement of holism? This question alludes to the paradoxical relationship between the holistic nature of things and a planner's attempt to isolate variables in the OE. This line of research paired well with the Berger and Luckman's *The Social Construction of Reality* to offer a better understanding of why actors often seek to impose certain values and policies that may not compatible with its intended environment.[17] Finally, doctrine will play a key role in this essay. It will call the processes of PMESII and COG analyses into question and identify them as linear processes disguised systems-based approaches, when in fact they are linear and network analyses.

This essay will also lean heavily on the US military's experience in Iraq as a case study. Most namely, the reasons for going to war, the logic behind De-Baathification, and an analysis of the effectiveness of the surge of forces in Iraq from 2007-2008 and how these decisions framed

---

[15] Derek Cabrera, and Laura Cabrera, *Systems Thinking Made Simple: New Hope for Solving Wicked Problems* (US: Plectica Publishing, 2015).

[16] Wesley C. Salmon. *Causality and Explanation* (New York: Oxford University Press, 1998), 25.

[17] Peter L Berger, and Thomas Luckmann, *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* (Harmondsworth, Middlesex, England Baltimore, Maryland, U.S.A. Ringwood, Victoria, Australia: Penguin Books, 1971).

by the past continue to shape the future. This frame portrays the common theme contributing to the problem: imposing linear thinking to a nonlinear world. There is no shortage of primary or secondary sources on this topic, but reports obtained from the Congressional Research Service, various think tanks, and an interview with Dr. Peter Mansoor provided valuable information.[18] Insights from the aforementioned sources helped to illustrate how the OE in Iraq was viewed and conceptualized at various times during the war. This information pairs with an examination of doctrine that focuses on describing the OE. Most namely, doctrine outlining PMESII and the COG analysis such as Joint Publication (JP) 5-0, *Joint Planning*.[19] These descriptions represent the multiple perspectives that shaped the military strategy and operational art that followed.

The scope of this monograph has limits. It does not pretend to provide a mental model or methodology that universally applies to describing all OEs for the purposes of military strategy and operational art. This is not an oversight, but instead a key assumption deduced by the author from research regarding the fallibility of universal rules applied to the conduct of war. Instead, this essay recognizes the words of Beyerchen who wrote, when referring to Clausewitz, "that every war is inherently a nonlinear phenomenon, the conduct of which changes its character in ways that cannot be analytically predicted."[20] Additionally, this monograph does not seek to fully define the behaviors, elements, or inter-workings of actual systems. Thus, a definition of a system is not hiding within these pages. Just know that systems exist, they are often complex, and woe be to the planners who does not address them prior to military activities.

---

[18] Peter Mansoor, email message to author, December 2, 2019.

[19] US Department of Defense, Joint Staff, Joint Publication (JP) 5-0, *Joint Planning*. (Washington, DC: Government Printing Office, 2017). It is important to note that Joint Doctrine uses PMESII while Army Doctrine uses the PMESII-PT (Physical Environment and Time) construct. In the context of this monograph they are interchangeable. Including PT as two additional operational variables adds little and takes nothing away from the author's argument.

[20] Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," *International Security*, vol. 17, no. 3 (1992), 59–90.

On the other hand, this monograph will address what systems thinking is according to several theorists. The author will seek to illuminate the uses of this mental model and how it contrasts with linear thinking. To benefit the reader and fellow researchers, this essay will revisit systems thinking and its utility for war. However, owing to the pluralistic nature of the subject the author will use a single set of theorists as the back drop for applying systems thinking to understanding the OE in a military context. These theorists are Derek and Laura Cabrera. Their book on systems thinking helped frame this research and will hopefully provide utility to the reader through the use of their methodology for systems thinking.[21] The consequences of not considering systems-based approaches may result in more of the unsatisfactory foreign policy outcomes seen in Iraq and Afghanistan. In these OEs, the bills are due. Flawed sensemaking has led to actions intended for one thing that have often led to something unexpected.

Section Two: Causation, Sensemaking, and Applied Thought

For every human problem there is a solution that is simple, neat, and wrong.

—H.L. Mencken

This section is about the conceptual aspects of war, not the mechanical. It seeks to explore the limitations of thinking linearly about nonlinear things. What stands out about this content is the benevolent intent of doctrine writers who promote a systems-thinking approach in the form of linear processes and its significant impacts on military operations. These processes manifest themselves as the PMESII and COG analyses prevalent in the joint planner's tool kit for describing the OE for Commanders. This helps in answering an important question posed earlier regarding whether or not military strategy or operational art can thrive if the planner's assessment of the current state is not accurate. Moreover, can the desired future state be valid under such conditions. Planning for war must encompass creativity, learning, and adaptability as a part of a larger system for evaluating a range of military operations. With this base line in place, this

[21] Cabrera and Cabrera, *Systems Thinking Made Simple*.

section begins to expand upon how a planner can seek potential from the exploitation of novel circumstances using a systems-based mental model.[22]

The definition of a mental model is an explanation of someone's thought process regarding how they interact with the world.[23] This explanation includes perspectives on reason, logic, and causation.[24] People use mental models every day to navigate their daily lives and to find approaches to a range of complex issues of a personal or professional nature. However, not everyone's mental models are the same or as efficient and certainly no mental model is without bias. These biases come from deeply held beliefs and values instilled within human beings from childhood.[25] The problem is that these biases also manifest themselves as blind spots. For the military planner, blind spots create gaps that can result in a misalignment between strategic aims and tactical operations. Because of this predicament, doctrine writers and academics have sought ways for military professionals to properly identify complexity and challenge their own contextual frames for the purpose of informing military strategy and operational art. Two popular constructs for deciphering and describing phenomena are linearity and nonlinearity. Each contrastingly provide a way of seeing the world and explaining the causation within it. The following paragraphs will demonstrate for the reader that each model has utility, but the educated practitioner must understand when each is appropriate.

---

[22] François Jullien, *A Treatise on Efficacy: Between Western and Chinese Thinking* (Honolulu: University of Hawai'i Press, 2004), 81.

[23] Peter M. Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization*, Rev. and updated. (New York: Doubleday/Currency, 2006), 164.

[24] Ibid.

[25] Berger and Luckmann, *The Social Construction of Reality*.

Linearity's Tension: Isolation in a Holistic World

The definition of linearity forms around a theory regarding causation. Linear models represent the best efforts of practitioners to understand the processes that govern various things.[26] This has to do with the fact that linear thinking's view of causation exists in a world where variables can be isolated and thus manipulated independently for a desired effect.[27] Thus, linearity involves two distinct propositions. First, that changes in a system's output are proportional to changes in inputs.[28] Second, that system outputs corresponding to the sum of two inputs are equal to the sum of the outputs arising from the individual inputs.[29] That description is that of a closed or deterministic system. If this definition were the rule, then describing and subsequently solving wicked problems would be much easier than it is in reality. However, using linearity to describe a complex OE illuminates the faulty assumption that isolating causes and effects is even possible considering the holistic nature of the world in a social or international relations context.

In these cases, linear mental models represent comfort through a false notion of predictability. This creates a tension because of a planner's temptation to describe an OE by simplifying it instead of by describing it as it is in actuality. The fundamental flaw here for warfighters is that not all warfare fits into a linear construct where conflicts are defined by a sequential progression of strategies executed at the operational and tactical levels by conventional forces.[30] In an age where there is an increased possibility for nonlinear or hybrid warfare in a

---

[26] Salmon, *Causality and Explanation*, 296.

[27] Frans P. B Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (London; New York: Routledge, 2007), 116.

[28] Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton, US: Princeton University Press, 1997), 293.

[29] Ibid.

[30] Joshua Ball, "What Is Hybrid Warfare?" *Global Security Review* (June 10, 2019) accessed November 13, 2019, https://globalsecurityreview.com/hybrid-and-non-linear-warfare-systematically-erases-the-divide-between-war-peace/.

multitude of OEs, viewing conflict from a position of linearity is problematic. In these cases, linear thinking can mix with an individual's own logic and lead them to believe that isolating variables can result in an explanation of causation or for the purpose of this monograph provide understanding of an OE. However, this methodology can lead to failure. Some OEs, especially those that are nonlinear, such as those found in the modern-day Middle East are fundamentally complex. Thus, planners leveraging linear thinking and methods end up attempting to eliminate complexity in the name of simplification resulting in a mistaken understanding of a given OE. Instead, those same planners would be better off analyzing causal inference through the interactions of multiple variables. With this nonlinear approach, practitioners accept and embrace complexity to better understand causation.[31]

Nonlinearity: Seeing the Potential in Complexity

If linearity alludes to predictable relationships between inputs and outputs in sequence than nonlinearity's characteristics are unpredictability and even inverse relationships between system inputs and outcomes. Nonlinear complex systems display complex features where connections, interactions, and interdependencies don't just dictate the effects observed in the OE, but also change the nature of the OE itself.[32] Examination of the differences between linear and nonlinear paradigms highlight a transition from the static to the dynamic.[33] This acknowledgment illuminates several key differences for planners to consider when diagramming an understanding of an OE. First, in a nonlinear system, interactions drive structures and processes and not vice versa.[34] This coincides with the Gharajedaghi's Holistic Process of Inquiry where context drives

---

[31] Celestino Perez, *PMESII-PT versus Systems Thinking -- A Classroom Experiment*, Episode 8 (Arguing the OE, April 10, 2013) accessed November 19, 2019, https://www.youtube.com/watch?v=UbcmJ79eKII.

[32] Osinga, *Science, Strategy and War*, 115.

[33] Ibid, 116.

[34] Ibid.

an understanding of functions within the system which then help to conceptually construct the structures which drive its biproduct processes.[35]

Addressing nonlinearity in warfare requires an approach that appreciates the holistic nature of things. Here systems thinking serves as the appropriate additive. Systems thinking seeks understanding without confusing understanding for simplification or categorization. Because the nonlinear OE is in a constant state of adaptation, planning and sensemaking must be a continuous and iterative process. At the technical level, the United States has largely leaned on linear procedures to describe a given OE in contrast with a nonlinear or systems-based approaches. These linear methods include step-by-step processes found in the Joint Intelligence Preparation of the Operational Environment (JIPOE) process within JP 2-01.3.[36] Step two of the JIPOE process seeks to "evaluate and describes broad courses of action and the impact of the OE on adversary, friendly, and neutral military capabilities."[37] It recommends using various methods such as PMESII and COG analyses frameworks to characterize a given OE. Here, in doctrine, there is an acknowledgment to the interconnectedness of variables and the value of utilizing a systems perspective to gain situational awareness.

While it is true that all OEs consist of systems that help to describe current states and desired future states. To truly harness the power of "systems" the concept must manifest as a new way of thinking and not just a process. However, trying to bridge this gap with PMESII and COG analyses has serious consequences. If the Joint Force remains oriented towards linearity than its staff officers will continue to the frame future OEs in ways that lack the proper depth of understanding. Implications for this include decision makers choosing courses of action

---

[35] Gharajedaghi, *Systems Thinking*, 136.

[36] US Department of Defense, Joint Staff, Joint Publication (JP) 2-01.3, *Joint Intelligence Preparation of the Operating Environment*. (Washington, DC: Government Printing Office, 2014), I-2.

[37] Ibid, III-1.

predicated on a flawed hypothesis of an OE. Flawed because they do not account for the nonlinear potential and instead default to linear and reductionist tendencies. The following paragraphs outline the current PMESII and COG analyses frameworks and expand on the role of systems thinking for sensemaking of an OE in order to demonstrate further opportunities for greater understanding.

PMESII: Synthesize or Organize

When visualizing an OE, the military practitioner has multiple options to choose from. In this monograph, the focus is on exploring the use of systems thinking for framing the OE in Iraq. In this section, the PMESII construct is analyzed in an effort to draw conclusions regarding the appropriate methods for examining an OE where the conflict will be inherently nonlinear in nature. PMESII, according to a doctrine author, intended to identify specific variables within the OE for the purpose of targeting.[38] This approach results in the isolation of variables as they are instead of considering how they interact with each other. According to Wesley Salmon, interaction is at the core of causality.[39] Thus, the isolation of variables does little to explain phenomena which is the biproduct of interaction and how it may be altered or affected through the introduction of military activity.

Linear models captured in United States military doctrine include the aforementioned tools PMESII and the COG analyses. These analytical tools are popular because their use intends to provide an added benefit to planners charged with describing a particular operating environment. The PMESII construct found in doctrine is a recommended tool for use during the JIPOE process.[40] According to JP 2-10.3 “the JIPOE process emphasizes a more holistic

---

[38] Brian Ducote, "Challenging the Application of PMESII-PT in a Complex Environment" (Masters Monograph, School of Advanced Military Studies, US Army Command and General Staff College, Ft. Leavenworth, KS, 2010), 6.

[39] Salmon, *Causality and Explanation*, 17.

[40] US Joint Staff, JP 2-01.3 (2014), I-6.

approach than the standard Intelligence Preparation of the Battlefield by analyzing and integrating a systems perspective."[41] In the Army Technical Publication 5-0.1 *Army Design* Methodology, is systems thinking addressed in a semi-meaningful manner as "a process of understanding how parts of a system work and influence each other as part of a greater whole."[42] This lack of attention to systems thinking results in PMESII becoming an analytical frame that further silos variables within the OE without synthesizing the relationships and interdependencies between them.

PMESII is little more than categorization. Planners who are short on time spend the bulk of their time organizing PMESII related information instead of understanding why it might be of strategic or operational importance.[43] Categorization of these operational variables is intended to build situational awareness according to Army Doctrine Reference Publication 5-0.[44] This situational understanding is meant to help a commander "visualize" the OE which is the first part of the Commander's Activities outlined in the Army's Operations Process.[45] However, if a Senior Leader's understanding is based on a flawed construct it may result in a poorly formed operational approach. In turn, PMESII has subsequently become an antiquated way of articulating an understanding of an OE. It is a linear process where organization is misunderstood as the synthesis of complexity. This reveals the myopic tendency of practitioners and doctrine writers to default towards planning away ambiguity in situations where complexity cannot be ignored.

---

[41] US Joint Staff, JP 2-01.3(2014), I-5.

[42] US Department of the Army, Army Technical Publication (ATP) 5–0.1, *Army Design Methodology* (Washington, DC: Government Printing Office, 2015), I-7.

[43] Perez, *PMESII-PT versus Systems Thinking -- A Classroom Experiment*, Episode 8.

[44] US Department of the Army, Army Doctrine Reference Publication (ADRP) 5–0, *The Operations Process* (Washington DC: Government Printing Office, 2012), I-7.

[45] Ibid, I-3.

COG Analysis: Multiple Interpretations of Misapplied Sensemaking

The intent behind the COG analysis is to help military planners to define a relationship between ends (why), ways (what), means (how), and risk.[46] Doctrinally speaking, a COG is "a set of characteristics, capabilities, and sources of power from which a system derives its moral or physical strength, freedom of action and will to act."[47] To conduct a COG analysis one must identify three important features about a given side: Critical Capabilities (CC), Critical Requirements (CR), and Critical Vulnerabilities (CV).[48] Put simply, CCs provide the abilities to accomplish the objective, CRs are the essential resources needed for the CCs, and the CVs are the aspects of the CRs that are vulnerable to attack.[49] The problem with the COG analysis is in its application. Often times when the COG analysis is in use in its popularized form, it is under the precept that there can be only one COG and that the COG is static rather than dynamic.[50] This fails to account for the complexity of the OE in a nonlinear conflict. Subsequently, for a COG analysis to be effective it should be applied once an iterative systems-thinking understanding of the OE is in place. This understanding provides the back drop for identifying the correct COG and its three aforementioned components in context.

Like PMESII, the COG analysis, at its doctrinal core, seeks to characterize a system using a linear process. Thus, there exists false hope that by identifying a single COG and then

---

[46] Michael Evans, "Centre of Gravity Analysis in Joint Military Planning and Design: Implications and Recommendations for the Australian Defence Force," *Security Challenges* vol.8, no. 2 (Winter 2012), 81–104.

[47] US Joint Staff, JP 5-0 (2017), IV-23.

[48] Ibid, IV-25.

[49] Ibid.

[50] Jonathan Klug, "Behind the Mosaic: Insurgent Centers of Gravity and Counterinsurgency," *Addressing the Fog of COG: Perspectives on the Center of Gravity in US Military Doctrine*, ed. Celestino Perez (Fort Leavenworth, Kansas: Combat Studies Institute Press, 2012), 1.

destroying or controlling it that victory will be inevitable. While this description may be more applicable to a symmetric battlefield, it constrains friendly forces in a nonlinear environment. Subsequently, there are three poor assumptions regarding COGs that lead to faulty mental models that result in not seeing the environment for what it is. One, going back to Boyd's thoughts regarding people first, then ideas, and then things, COGs are often limited at the operational and tactical level to just "things" which do not describe the OE accurately.[51] Planning based on analysis that sees the COG as nothing more than a noun to be addressed via targeting using conventional means misses the opportunity to shape the environment based on its context.[52] Second, the enemy's COG is far more fluid than it gets credit for. Therefore, there can certainly be more than one COG for any side and it can change or multiply in order to avoid defeat. Therein, by reducing it to a singular person, thing, or idea creates a false assurance that the enemy will fall if this one variable is defeated.

The third and final faulty assumption contrasts with the first and pairs with the second. Since the beginning of the Global War on Terror, Counter-Insurgency experts have sold the COG as something much more than just a noun. Here, the COG is broadly sold as "the will of the people."[53] While this concept of the COG aligns in part with Boyd's emphasis on people and ideas it is far too nebulous for operational relevance.[54] If a COG analysis is to be of any use it should focus less on what the enemy uses to conduct operations and more on how they use them.[55] In total, the COG is conceptually controversial due to the multiple interpretations regarding its use and definition. Whether it be a source of power or the cohesive element of a

---

[51] Boyd and Hammond, *A Discourse on Winning and Losing*, 9.

[52] Dale C. Eikmeier, "Center of Gravity Analysis," *Military Review* (July-August 2004), 5.

[53] Mark Ulrich and Peter Mansoor, "Linking Doctrine to a New COIN Center of Gravity Analysis," *Military Review* LXXXVII, no. 5 (2007), 46.

[54] Boyd and Hammond, *A Discourse on Winning and Losing*, 9.

[55] Holly Sun, *Center-of-Gravity Analysis in COIN. A New Way to Problem-Solve* (Fort Huachuca, AZ: University of Military Intelligence, 2009), 4.

side, it's an oft disputed topic deriving most of its relevance from metaphorical passages written in a one hundred-fifty-year-old unfinished book. If the COG is to provide future utility to planners it should be redesigned to incorporate systems thinking to reorient the definition of a COG towards an understanding of the enemy as a system.

DSRP: Systems Thinking Applied

The key to better descriptions of the contemporary OE is not to discard these tools completely. Instead, it should be to put them in the hands of planners who are systems thinkers. Systems thinking, as defined by Dr. Cabrera is the following:

> Although it may seem obvious, it warrants stating that in the term *systems thinking*, *systems* is an adjective *describing* the noun, *thinking*. In other words, systems thinking is about thinking.[56]

Systems thinking is not a new mental model. In fact, it is in its essence the antithesis of modeling and processes. Instead, it helps with recognizing the role that mental models play in professional decision making and everyday life.[57] This, in turn, allows systems thinkers to adapt their perspectives in accordance with a particular context. The adoption of this type of agile thought leads to greater understanding. It is an acknowledgement of bias explained by Berger and Luckman's theory on social construction where the path ahead requires stripping away one's primary socialization for the purpose empathetic critical thought.[58] This appreciation that one's understanding of the world may not apply universally can manifest as a paradigm shift described by Kuhn resulting in a revolution of thought for an individual.[59] The relevance here is that the United States military operates almost exclusively in another country amongst other cultures where the dynamics of the native social construct are unfamiliar and seem illogical. Thus,

---

[56] Cabrera and Cabrera, *Systems Thinking Made Simple*, 24.

[57] Ibid, 31.

[58] Berger and Luckmann, *The Social Construction of Reality*.

[59] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 3rd ed. (Chicago, IL: University of Chicago Press, 1996).

planners and leaders must be able to adapt their perspectives to avoid misinterpreting the unique logic of an OE.

An alternative option to using PMESII and a COG analysis alone is the Cabrera's DSRP method. DSRP is not a process, but instead an outcome.[60] Subsequently, providing a conclusive definition of systems thinking is not as important as applying the simple rules that draw out an OE's defining and emergent properties.[61] This lens looks to identify characteristics of a complex adaptive system using simple rules. The basis of this concept is the belief that "autonomous agents follow simple rules based on what's happening around them, the collective dynamics of which lead to the emergence of complex behavior."[62] This idea is reminiscent of John Lewis Gaddis's concept of "zooming in and out."[63] Here Gaddis observes that to gain understanding of a specified phenomenon one must adjust their perspective from the macro to the micro levels. Zoomed all the way out one can observe complex behaviors, but cannot understand the interdependent interactions that contribute to said complexity. However, by zooming in it is easier to decipher which actions are contributing to the observed complexity. Yet, it is important to remember that these simple rules are not a catch all for defining causation. What they are is a way to describe the variables that govern the interaction between actors.

The first rule of DSRP is Distinctions. The Distinctions rule offers that "any idea or thing can be distinguished from the other ideas or things it is with."[64] Despite what it may sound like, this is not a reductionistic approach. It instead, is an acknowledgement that a "part" is a part of a sum of parts and can be independently observed for the purposes of understanding that particular

---

[60] Cabrera and Cabrera, *Systems Thinking Made Simple*, 45.

[61] Ibid.

[62] Ibid, 38.

[63] John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (New York: Oxford University Press, 2002).

[64] Cabrera and Cabrera, *Systems Thinking Made Simple*, 52.

idea or thing. Distinction, by this definition, has two elements. First, the idea or thing itself and second, the recognition that this idea or thing is part of something larger.[65] This is a valuable aspect of DSRP systems thinking that demonstrates the utility of isolation without losing sight of holism. Using Distinction for sense making shows that all things are distinguishable. This helps systems thinkers understand that ideas and things can be simple and that it is the interactions of distinguishable things that creates complex phenomena and ambiguity. Alone, the rule of Distinction, like linear thinking, can introduce over-simplifications into the thoughts of planners. Subsequently, there must be awareness that Distinctions is not an intent to permanently place ideas or things into separate bins, like PMESII, and that it is only the first rule of four for DSRP systems thinkers.

Rule two of DSRP is Systems. Systems organizes distinct ideas and things into parts and wholes of something else. How things are organized constructs or deconstructs the ways in which things attach meaning.[66] The concept of Distinction identifies parts while Systems sorts these parts into something larger. Systems addresses the holism between interconnected parts. This holism illustrates the true state of a grouping of ideas or things and allows for further analysis. Here DSRP starts at the micro level with Distinctions and begins zooming out to Systems in order to provide context in its raw and organic form.

The next rule is that of Relationships. Relationships are not to be confused with Systems. While Systems groups, categorizes, and clusters, Relationships decipher why these collective sets of Distinctions matter. Their meaning originates from their mutual effects on one another. Here systems thinkers can begin to analyze causation, feedback, influence, and many other mechanisms that demonstrate the relationships between interactive parts.[67] Examining

---

[65] Cabrera and Cabrera, Systems Thinking Made Simple , 58.

[66] Ibid, 48.

[67] Ibid.

Relationships is particularly useful for understanding complexity in a given OE. Social, political, and economical dynamics often connect due to the fact that there is always a human in the loop. Human interactions are often not predictable due to the interplay between people's "thoughts (cognition), feelings (emotion), and motivations (conation)."[68] Relationships serve as the key to understanding the multidirectional causality found in an OE where the effects of human beings is prevalent and often does not present as deterministic causal outcomes.[69]

The final rule of DSRP is Perspectives. This rule has much to do with a person's point of view and unconscious biases. Fundamentally, perspectives are the manner in which people see ideas and things and the idea and thing itself.[70] The ways that people examine things is often based on their institutionalization and thus biases in a person's own point of view often go unrealized and can lead to an inaccurate vision of one's world.[71] The concept of Perspectives seeks to coax the systems thinker into changing the way that they look at things by shifting one's viewpoint. By altering one's frame of reference they are able to better empathize within the context of the OE. This alternative viewpoint provides a new lens into connections, causation, and influence. Thus, Perspective is the rule demanding constant and iterative application when using DSRP because it serves as the prerequisite additive to enriching the way in which Distinctions, Systems, and Relationships form in the mind.

The framework for systems thinking, in accordance with DSRP and outlined in the previous passages, intended to provide a thorough explanation regarding how the systems thinking school of thought can potentially benefit the military planner and leader. The DSRP method can be extremely beneficial to planners as a sensemaking tool for characterizing the OE,

---

[68] Cabrera and Cabrera, Systems Thinking Made Simple, 49.

[69] Andrew Stigler, "Assessing Causality in a Complex Security Environment," *Joint Forces Quarterly* 1st Quarter (2015).

[70] Cabrera and Cabrera, *Systems Thinking Made Simple*, 50.

[71] Berger and Luckmann, *The Social Construction of Reality*.

but it is not the replacement for PMESII. Instead, DSRP and systems thinking in general could serve to augment the PMESII construct. PMESII in its base form, at best, is a process meant to articulate Distinctions and possibly Systems. Distinctions separated and binned along with like typed variables do not properly demonstrate the Systems resident in the OE. Most certainly, they do not denote the Relationships that create tension and balance while accounting for the Perspectives represented that govern behavior and decision making.

Similarly, systems thinking challenges the reason behind the COG analysis process. While the COG analysis seeks to identify a single source of power it is also another instance of reductionism at work. Derived from Clausewitz's opus *On War*, the concept of a COG leads to faulty assumptions that the control or destruction of one thing can lead to the capitulation of an adversary.[72] Again, this idea contradicts with the holistic nature of an OE. The COG analysis itself uses the three factors of critical capabilities, critical requirements, and critical vulnerabilities for examination to distill a single source of power.[73] This unconsciously acknowledges the complexity of the system and the multiplicity of factors contributing to various outcomes. However, this process suggests that by using a reductionist logic complexity can be repeatedly isolated until it demonstrates a deterministic causation. The danger posed here is that the COG analysis creates a false sense of understanding and certainty.[74]

PMESII and the COG analysis documented in the military's current joint doctrine are incomplete sense making models. To illustrate this point further, the following chapters focus on the trials and tribulations of the US military during the ongoing Iraq war. In many cases, it is unclear what types of mental models or processes were used for describing the Iraqi OE. With

---

[72] Carl von Clausewitz, Michael Howard, and Peter Paret, *On War* (Princeton, N.J: Princeton University Press, 1976).

[73] US Joint Staff, JP 5-0 (2017), IV-24.

[74] Dale C. Eikmeier, "The Center of Gravity: Still Relevant After All These Years?" *Military Review* (2017).

that said, the following chapters seek to illustrate two points. One, the challenges faced by military leaders and planners in formulating effective military strategy and operational art when the OE is poorly defined. Two, how systems thinking, in the form of DSRP, could have provided clearer descriptions of the OE than a PMESII or a COG analyses.

Section Three: The United States in Iraq: A Case Study

The case study for this monograph is the United States' war in Iraq that began in 2003. This example helps to make the authors' point about uncovering potential in complicated circumstances using systems thinking as a sense making tool. Needless to say, the OE in Iraq is fundamentally complex. Internally, Iraq's governance comes in various forms of formal, informal, and sectarian based entities each vying for power. Externally, regional powers and meddling neighbors seek to influence the Iraqi state and the actors within it for their own hegemonic interests.[75] Additionally, all of these internal and external factors coexist with the political concerns of the United States and the international community. Very little happens in a vacuum and international relations and war are not exceptions. Finally, the war in its current state has endured through many adaptations which allows researchers to assess the strategic aims of the war at different milestones. This context provides the proving ground for the validity of systems thinking expressed in this research.

The combination of an examination of systems thinking and linear processes in the context of the American war in Iraq highlight stark differences in how each is measured. A shift from linear processes to systems thinking requires a pivot away from quantitative measures towards qualitative measures.[76] This is not a comfortable change for most leaders who recognize that quantitative measures are easier to track and articulate while qualitative measures are not. However, empirical evidence should not be a barrier between planners and the qualitative results

---

[75] Tadros, "U.S. Middle East Strategy."

[76] Osinga, *Science, Strategy and War*, 116.

that systems thinkers aspire to. The success of military strategy and operational art should be based on qualitative measures concerned with the alignment of strategic objectives to a desired future state, the effects of military strategy and operational art on popular support, and the achievement of outcomes that are lasting and meaningful.

Military strategy seeks to achieve the national objectives, referred to as ends, using various elements of military capabilities, known as ways and means, while considering risk to mission, force, and reputation. These objectives provide the foundation for the continuous advantage described by Dolman.[77] The formulation of military strategy occurs at the highest level of the military enterprise and serves as the guidance by which operations and assets are distributed in the arrangement of operational and tactical actions for war. Military strategy exists in between the concepts of grand strategy and operational art. In this space, it occupies the unenviable space where political desires meet reality in the form of a thinking enemy and a complex OE. It is here that planners must reconcile these differences and employ patterns of thought to make the seemingly impossible possible.

Operational art as defined by doctrine is the cognitive approach by commanders and staffs — supported by their skill, knowledge, experience, creativity, and judgment — to develop strategies, campaigns, and operations to organize and employ military forces by integrating ends, ways, and means.[78] It can be a product of the operations process which includes the iterative process of planning, preparing, executing, and assessing.[79] This process is driven by a commander whose activities include understanding, visualizing, describing, directing, leading,

---

[77] Dolman, *Pure Strategy*, 6.

[78] US Department of Defense, Joint Staff, Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: Government Printing Office, 2016), 174.

[79] US Department of the Army, Army Doctrinal Publication (ADP) 5–0, *The Operations Process.* (Washington, DC: Government Printing Office, 2012), IV.

and assessing.[80] Key to this paper and any military operation is the "understanding" portion. Understanding drives operational art by establishing the context of a potential operation. This is large part of the conceptual planning that occurs before the detailed, without which the plan is likely to be ineffective. Military activities predicated on poor understanding can lead to catastrophe further underscoring the importance of getting it right. It requires a thorough analysis of the OE and consideration of the ways and means at a commander's disposal applied using critical and creative thinking.

When T.E. Lawrence considered the strategic design of a war of detachment, he took into account the army at his disposable, their psychology, the terrain, and the enemy.[81] This contextual understanding of the OE found in modern day Jordan helped him see the Bedouin conflict against the Turks for what it was and what it was not. His army was too small and lacked the tactical prowess for sustained conventional fighting against a superior Turkish force. His hypothesis regarding the Turks concluded that they lacked the forces to occupy all of Arabia. Subsequently, his partnered Bedouin tribes would be wise to strike the enemy where they were weakest.[82] Without hopes of defending the entirety of the desert, the Turks would slowly capitulate without the ability to mass on the invisible Bedouin. This is an example of the utility in understanding the true nature of an OE. Lawrence paired this contextual knowledge with a "tolerable" understanding of military strategy to design a military strategy capable of translating into effective operational art.[83] Contemporary military operations in the Middle East require the same level of imagination and contextual understanding incorporated by Lawrence.

---

[80] US Army, ADP 5-0, IV.

[81] T. E. Lawrence, *Seven Pillars of Wisdom: A Triumph* (New York: Anchor Books, 1991), 194.

[82] Ibid.

[83] Ibid.

Drawing conclusions regarding a given OE, especially those found in the Middle East, requires shifting towards a paradigm of nonlinearity. In the example of the war of detachment, Lawrence brings Boyd's ideas regarding people, ideas, and things into focus.[84] Instead, of concentrating on defeating Turkish forces in a pitched battle, Lawrence reoriented on the psychological impacts of destroying their material basis for support. This resulted in a Turkish lack of confidence in their ability to hold occupied territory and met the desires of the Bedouin who sought to expel the Turks from their land.[85] This served as the negative feedback described in Dörner's *The Logic of Failure*, where an increase in guerilla tactics by the Bedouin ended up costing the Turks considerably.[86] It cannot be overstated how important it is see the OE for what it is and to correspondingly exploit it accordingly through an understanding that applies an interior and exterior synthesis demonstrating knowledge of one's self, one's enemy, and context. Mistakes made by an ill-informed military strategy in Iraq underscore this point.

When the United States decided to go to war in Iraq for a second time it was in the name of ensuring that the regime of Saddam Hussein did not have any Weapons of Mass Destruction (WMD). More specifically, WMDs that could be used directly by Iraq or fall into the hands of malevolent non-state actors. While it is now known that Hussein's Baathist regime likely did not possess any WMDs, at that time, this fact was anything but clear. Following the attacks on September 11, 2001, the United States and many of its allies felt a dramatic change in the security environment. The perceived reach of global terrorist organizations became the new pacing threat. It is within this context that the United States and a limited number of allies chose to go to war in Iraq. This, obviously, was not the first time that the United States and its allies had fought a war

---

[84] Boyd and Hammond, *A Discourse on Winning and Losing*, 9.

[85] Lawrence, *Seven Pillars of Wisdom*, 194.

[86] Dietrich Dörner, *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations* (New York: Basic Books, 2010), 74.

against a Saddam Hussein led Iraq. However, it seems now that for a moment the United States forgot why it didn't seek regime change in 1991.

At the conclusion of Operation Desert Storm, President George H.W. Bush decided against pursuing policy objectives beyond the withdrawal of Iraqi forces from Kuwait and the restoration of Kuwait's government outlined in National Security Directive 45.[87] His reasons, ironically outlined by former Vice President and Secretary of Defense Dick Cheney, were that "seeking regime change would have been too costly in the ways of American lives due to the type of warfare required in Baghdad."[88] A type of warfare which he claimed "US forces were not familiar [with], or comfortable fighting."[89] Cheney, as a member of the first Bush administration, seems to be referring to asymmetric warfare and possibly even Counter-Insurgency (COIN) operations. However, twelve years after the former Vice President made these comments, the United States decided to invade Iraq which inherently resulted in regime change and the asymmetric COIN conflict that followed.

PMESII and De-Baathification: Cutting Our Feet to Fit the Shoes

Judging whether regime change was strategically the right or wrong decision should be based on the complex variables found in and around Iraq. In turn, strategy should be a composite of the desired ends in the context of the enemy and environmental realities. However, this is not to say that Operation Iraqi Freedom was not consistent with the strategic guidance at the time. Following the fall of the Soviet Union, Post-Cold War Grand Strategy was comprised of four pillars: dissuading the rise of a hostile rival, spreading democracy, promoting American economic

---

[87] The White House. *The National Directive 45* (Washington DC:1990) accessed October 14, 2019, https://fas.org/irp/offdocs/nsd/nsd_45.htm.

[88] Charles Pope, "Cheney Changed His View on Iraq," *Seattlepi.Com* (September 29, 2004) accessed January 7, 2020, https://www.seattlepi.com/national/article/Cheney-changed-his-view-on-Iraq-1155325.php.

[89] Pope, "Cheney Changed His View on Iraq."

values, and confronting the spread of WMDs.[90] Additionally, following 9/11, fighting global terrorism rose to be a first rank priority as well.[91] Thus, the question is not whether a strategy even existed that steered the war in Iraq, but instead was the strategy applicable. Hindsight says that it probably was not. Success and failure, however, cannot just be perpetually associated to the *why* regarding the reasons that the United States went to war. It is also important to the consider the *how* with regards to way the United States approached it.

United Nations Resolution 1441 authorized the investigations into Iraq's WMD program and outlined that serious consequences would be forthcoming if Saddam's Iraq did not comply.[92] In response, Iraq provided information to the United States that claimed that the nation did not possess a WMD capability. This turned out to be only half true, although WMDs never turned up there was irrefutable evidence that Iraq had funded a multibillion-dollar effort to develop them over the course of two decades.[93] This lack of trust for the regime may have helped foster a climate where the malignance of Saddam the dictator manifested as a distrust of all things related to the Baathists party he led. The same party that ran the government and the military. Thus, when the Coalition Provisional Authority sought to establish a new legitimate government one of its first orders of business was De-Baathification and to disband the Iraqi military.[94] Perhaps a greater understanding of Iraq could have prevented a decision that has been costly to reverse.

It is not evident whether or not the coalition planners who recommended De-Baathification were using PMESII as a sensemaking tool. Yet, it serves as a good representation

---

[90] Bailey and Immerman, *Understanding the U.S. Wars in Iraq and Afghanistan*, 102.

[91] The White House. *The National Security Strategy* (Washington DC: 2002) accessed November 3, 2019, https://georgewbush-whitehouse.archives.gov/nsc/nss/2002/.

[92] United Nations. "United Nations Security Council Resolution 1441" (New York City, NY, 2002) accessed November 3, 2019, https://www.un.org/Depts/unmovic/documents/1441.pdf.

[93] George W. Bush, *Decision Points* (New York: Crown Publishers, 2010), 262.

[94] Ibid, 258.

of why the process can lead to failure. Viewing the Baath party on its own it may appear to be just a political entity that affiliated with and backed the Saddam Hussein regime. Subsequently, De-Baathification became a part of the overall strategy in Iraq that delayed the achievement of the United States' desired end state in Iraq. It is now known that Baath party membership was often a requirement for civil servants.[95] Thus, disbanding the Baath party caused significant ripple effects in Iraq. Politically the Baath party represented an oppressor to US decision makers, but the reach of this political party extended into the military, economic, and infrastructure sectors. Due to a failure to see the relationships between the Baathists and the holistic governance of Iraq the United States limited itself in its ability to create stability following the invasion. This policy resulted in the degradation of essential services and Iraqi led security and sent many Baath party members underground where they ended up as supporters of the ensuing insurgency.[96]

Applying systems thinking here may have led to an analysis that went beyond an isolated view on the distinctions of the PMESII elements and towards a more holistic view recognizing that the Baath party was an essential part of the system bolstered by Saddam Hussein. Each sector had a relationship with the Baath party which contributed to an acceptable level of governance. Perspectives of Baath party members were framed by a history where under Saddam's rule upward mobility was impossible without being a Baathist. The United States' linear viewpoint perpetuated a scenario where Baath party members were seen as the cause of large-scale human rights violations in Iraq.[97] However, this was not the case and represents poorly formed hypothesis that failed to fully appreciate the Saddam Hussein's influence on the Baath party.

---

[95] Cherish M. Zinn, "Consequences of Iraqi De-Baathification," *Cornell International Affairs Review* no. 2 (2016).

[96] Ibid.

[97] US Department of State. "Coalition Provisional Authority Order No 1" (Washington, DC: 2003) accessed February 7, 2020, https://nsarchive2.gwu.edu/NSAEBB/NSAEBB418/docs/9a%20-%20Coalition%20Provisional%20Authority%20Order%20No%201%20-%205-16-03.pdf.03.

Seeing the Baath party as the cause in a deterministic system where the effects caused grave consequences for all of Iraqi society is inaccurate. While both Saddam and the Baath party were elements of the political sphere, they both separate as well. Each were responsible for their own crimes, but unfortunately it may never be known how the effects of ousting Saddam the dictator without disbanding the Baath party in Iraq would have ended up. Nevertheless, it could be suggested a systems-based understanding of Iraqi governance may have resulted in a different approach geared towards Baath party reconciliation.

It is evident now that a lack of understanding regarding the complex social and political terrain in Iraq created strategic blind spots. These blind spots led to the belief that an overly aspirational post-Cold War strategy of spreading democracy was possible in countries like Iraq where that manner of governance is foreign. Blind spots such as these can also manifest as problems when conducting operational art. When Defense Secretary Donald Rumsfeld stated that "you go to war with the army you have, not the army you might want or wish to have at a later time,' he was referring to the difficulties of predicting the future.[98] Much like his oft referenced quote regarding "unknown unknowns," he seems to acknowledge that achieving a desired future state is anything but certain when the enemy has a vote..[99] Fatefully, these words carried significant meaning and cryptically described the trouble when sensemaking goes wrong as it did during the war in Iraq following the 2003 invasion. Soon after, the United States found itself embroiled in a sectarian war far from its conventional comfort zone described by Cheney. The lesson here being that the war in Iraq was not what United States decision makers thought it

[98] Eric Schmitt, "Iraq-Bound Troops Confront Rumsfeld Over Lack of Armor," *The New York Times* (December 8, 2004) accessed November 8, 2019, https://www.nytimes.com/2004/12/08/international/middleeast/iraqbound-troops-confront-rumsfeld-over-lack-of.html.

[99] A. J. Justo, "The Knowns and Unknowns Framework for Design Thinking," *UX Collective* (February 17, 2019) accessed November 8, 2019, https://uxdesign.cc/the-knowns-and-unknowns-framework-for-design-thinking-6537787de2c5.

would be. Further, proving that without a proper understanding of the OE a military ends up fighting the conflict it has instead of the one that it wants.

The COG Analysis and The Surge: Reducing Options for Simplicities Sake

In 2006, long after a sign reading "Mission Accomplished" appeared on the deck of the USS Lincoln, the United States realized that they there was a need for a change of direction in Iraq. Levels of violence and rising casualty levels punctuated the deterioration of stability in Iraq leaving some to wonder whether or not victory was possible in Iraq.[100] As a result, national security professionals and government leaders commissioned, prepared, and submitted several formal opinions regarding the what the nation should do to resurrect the situation in Iraq. These reports included various recommendations. The report by the Iraq Study Group promoted an external and internal approach.[101] This focused on diplomatic efforts to stabilize the region and an increase in energies towards improving the Iraqi government's ability to operate on its own.[102] Another option considered was known as the "Chiarelli Plan." This idea included moving American forces out of urban areas to focus primarily on training Iraqi Security Forces.[103] In the end, neither of these proposals were adopted by the second Bush administration.

Instead, the President George W. Bush opted for an increase in troop strength that would come to be known as The Surge. This plan would provide an additional five brigade combat teams to secure the urban capital of Baghdad in an effort to quell sectarian violence. This, in turn, would create enough stability to allow the Iraqi government and security forces to assume a larger

---

[100] Brian Knowlton, "Kissinger Says Victory in Iraq Is Not Possible," *The New York Times* (New York: November 19, 2006) accessed December 28, 2019, https://www.nytimes.com/2006/11/19/washington/19cnd-policy.html .

[101] "Iraq Study Group Report: Executive Summary." *NPR.Org* (December 6, 2006) accessed January 17, 2020. https://www.npr.org/templates/story/story.php?storyId=6586565.

[102] Ibid.

[103] Robin Wright and Ann Scott Tyson, "Joint Chiefs Advise Change in War Strategy," *Washington Post* (Washington, DC: December 14, 2006) accessed January 17, 2020, http://www.washingtonpost.com/wp-dyn/content/article/2006/12/13/AR2006121301379.html.

role, thereby permitting the United States to assume a smaller one. National leadership chose General David Petraeus to lead this effort due to his outstanding reputation as a warrior-scholar and experience as a division commander in Northern Iraq years earlier. His understanding of COIN and his execution of a strategy called "Clear, Hold, Build" would guide the new direction for US forces in Iraq and drive operational art during The Surge.

It has been over a decade since the conclusion of the 2007 Iraqi Surge conducted primarily by United States Soldiers and Marines. Named the "New Way Forward," the plan promised victory that would lead to the eventual withdrawal of United States forces and a renewed stability in Iraq. In many American's eyes, the Surge was a success.[104] In 2012, US forces vacated Iraq and the sectarian violence prevalent in the mid-2000s seemed a distant memory. However, the rise of the Islamic terrorist group Daesh in 2014 resulted in the return of United States combat forces to Iraq. At that time, violence in Iraq threatened the nation's sovereignty and refugees began spilling into neighboring countries creating regional instability. These events should challenge the proclamation that The Surge was an unbridled success and call into question what the architects of The Surge got wrong. The potential for this eventuality was apparent to even General David Petraeus during The Surge, who when asked, "How does this end?" admitted "I don't know how… you can only see so far."[105] The assertion that The Surge failed to provide lasting success in Iraq drives the following content which seeks to identify how outcomes could have been different if the United States had a better understanding of the environment in Iraq and Iraq in a regional context.

---

[104] Ken Dilanian. "Progress in Iraq Reshapes Debate over War" *USATODAY.com* (2008) accessed October 30, 2019, https://usatoday30.usatoday.com/news/washington/2008-02-17-Iraqcongress_N.htm.

[105] Thomas E. Ricks, *The Gamble: General David Petraeus and the American Military Adventure in Iraq, 2006-2008* (New York: Penguin Press, 2009).

While it is again impossible to specifically ascertain whether or not the designers of The Surge conducted a COG analysis prior to 2007 it is worth examining. The concept of the COG originates from Carl von Clausewitz's opus *On War* where it is described as a singular description of enemy's source of power.[106] However, as previously mentioned there can actually be several COGs that take form during war.[107] Here it seems that Clausewitz understood that war was, and is, an unpredictable phenomena reflecting the violent manifestations of political and military interactions.[108] In the case of The Surge, politics drove a need for change in the war's course. The Bush Administration's view of the COG was that it was the domestic support for the war.[109] Without which, the war would fail. However, military leaders and their subordinate planners were left to decide how and where renewed efforts should be directed in order to avoid strategic and operational failure. Subsequently, under the auspices of the "Clear, Hold, Build" approach the United States and Iraqi Security forces were to clear Baghdad's insurgent strongholds and hold these areas to ensure that these areas did not fall back into the control of the enemy.[110] This would then allow the Iraqi government to build durable national institutions that could stand on their own.[111]

In the context of the "Clear, Hold, Build" construct, one can deduce that the military architects of The Surge saw the COG differently than their political masters. This second COG, at the operational level of war, would become the support of the Iraqi people for the war effort to be

---

[106] Clausewitz, Howard, and Paret, *On War*.

[107] Evans, "Centre of Gravity Analysis in Joint Military Planning and Design: Implications and Recommendations for the Australian Defence Force."

[108] Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War."

[109] Michael R. Gordon, "Troop 'Surge' Took Place Amid Doubt and Debate," *The New York Times* (August 30, 2008) accessed October 18, 2019, https://www.nytimes.com/2008/08/31/washington/31military.html.

[110] Catherine Dale, *Operation Iraqi Freedom: Strategies, Approaches, Results, and Issues for Congress* (Washington, DC: Congressional Research Service, 2009).

[111] Ibid.

achieved through using the "Clear, Hold, Build" operational approach. Here two COGs emerge simultaneously that support one another. However, each describe an entity that is difficult to influence considering the complexity resident in the Iraq OE. Even more ambiguous is the undertaking of defining how each can be affected by military operations predicated on isolating the problem to just one of security. In reality, the execution of The Surge required a multi-pronged effort to not just provide security, but to also accelerate and arbitrate the reconciliation between the Shia population oppressed under the rule of Saddam and the Sunni population now disenfranchised following De-Baathification.

This example demonstrates the futility of the COG analysis when complexity cannot be distilled as a single variable. Further highlighting the costs of misdiagnosing the real problem and the flawed assumption that there is a singular entity upon which forces can focus to attain certain victory. Additionally, it demonstrates how by defining a COG as something as large as popular support anchors operational thought to a concept where causation cannot be isolated due to its inherent complexity. This limits strategic and operational options that can be provided to a commander.[112] The utility of systems thinking here serves as a reminder to the military planner that while the COG analysis may have a role in sensemaking it is lacking with regard to describing the holism lending to a given power source. In accordance with the DSRP systems thinking construct, the COG is only a distinction, or at best, a system. Instead, the true source of an adversary's power come from the actions that derive from its relationships and perspectives of actors that influence an OE.

Section Four: Conclusion

A Case for Understanding and Framing for Strategic and Operational Design

[112] Kurt Vandersteen, "Center of Gravity: A Quest for Certainty or Tilting at Windmills?" *Addressing the Fog of COG: Perspectives on the Center of Gravity in US Military Doctrine*, ed. Celestino Perez (Fort Leavenworth, Kansas: Combat Studies Institute Press, 2012), 59.

If there are only two types of war, conventional and nonlinear, and they each have their own grammar, then not all sensemaking constructs can be equal when seeking to understand the factors at play on a nonlinear and asymmetric battlefield.[113] Defining where systems thinking may best fit and offer the most benefits to planners is an important part of the process which recognizes that not every tool works for every job. Case in point, in Iraq there were times where there was a misalignment of tools and models used for defining the OE and these choices had consequences. Therefore, the author of this monograph concludes that systems thinking offers a substitute and/or additive approach to understanding the OE for the purpose of the formulation of military strategy and operational art. By matching a nonlinear mental methodology to nonlinear situations, planners have an alternative to the linear processes found in doctrine such as PMESII and the COG analyses. Thus, the following passages and figures seek to present methods for using systems thinking in a practical manner.

Recommendations: Systems Thinking in Practice

A recommended method is shown using Figure One to demonstrate an additive approach where DSRP's use in conjunction with PMESII provides usefulness. This graphical depiction shows how a novel use of PMESII has potential to extract a more relevant view of the OE.

[113] Antulio Echevarria, *The Evolution of Operational Art: From Napoleon to the Present*, ed. John Andreas Olsen and Martin Van Creveld (Oxford: Oxford University Press, 2011).

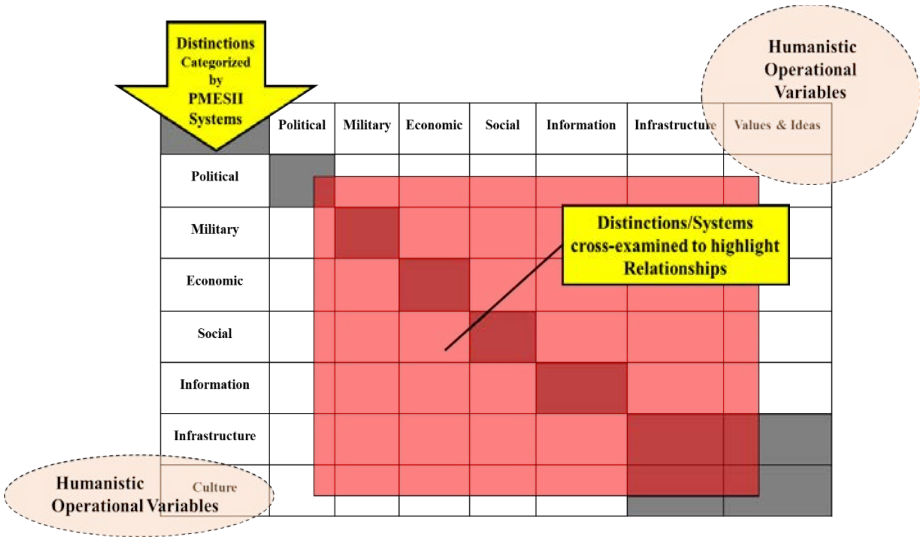

Figure 1. DSRP and PMESII.

Here, a planner can use PMESII in the standard way to list Distinctions as elements of a greater part of a system (Political, Military, etc.). It gains value however, when it is applied against itself or against applicable human centered variables such as ideas, values, and culture in an effort to delineate relationships between the systems through a coupled vertical and horizontal analysis. This process can then be repeated iteratively as a planner zooms in and out at echelon (city, nation, region, etc.) to identify meaning, context, and emergent properties that could contribute to unintended events.

Gaining perspective requires the thoughtful empathetic reflection of the planner using a contextual understanding of the OE. Perspectives are the driving influences behind the interactions of a distinct system of actors predicated on their relationships with one another. Figure Two shows how these

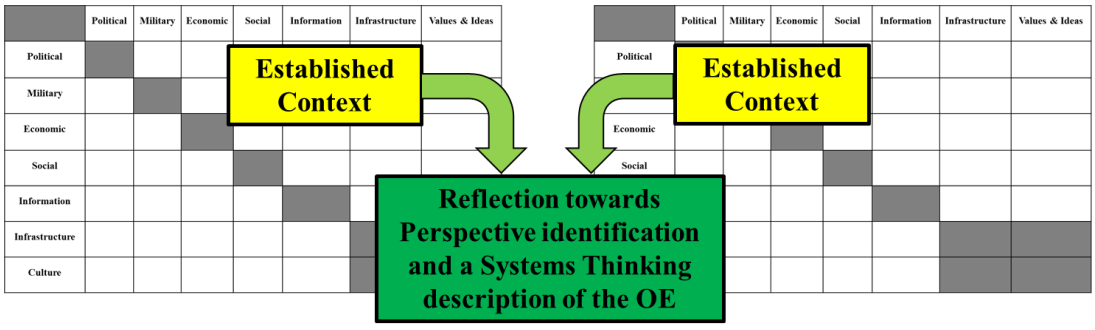

Figure 2. Cross-Walking Distinctions, Systems, and Relationships to Understanding Perspectives.

factors drive understanding which help in developing a systems-based hypothesis of the OE that possesses meaning. Nonetheless, these comparisons and analytical frames can also demonstrate the shortcomings of PMESII which may prove them irrelevant under certain circumstances. Hence, the prior examples present a way of using systems thinking that is additive. The next graphical example shows how melding DSRP with Gharajedaghi's Iterative Pattern of Inquiry can provide utility when conducting sensemaking of an OE.[114]

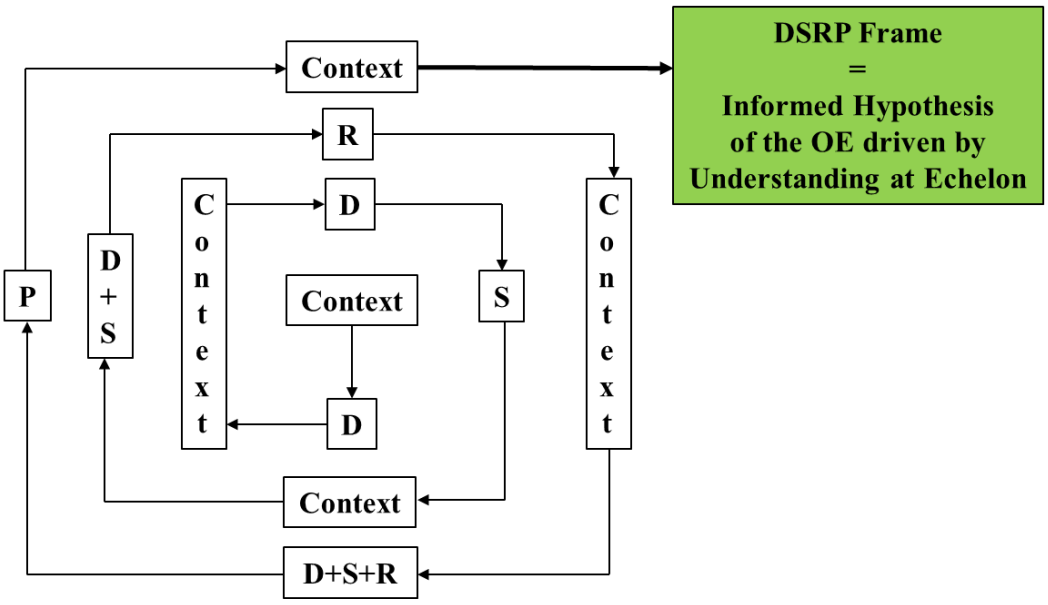

Figure 3. DSRP based Iterative Process of Inquiry.

The purpose of Figure Three is to graphically depict how thinking about understanding is done using systems thinking in a deliberate manner. This shows how conceptual understanding builds through repetition and a thoughtful consideration regarding viewpoints of different variables in time, space, and logic. Like PMESII, to enhance the COG analysis through systems thinking requires a planner to network the meaning and logic prevalent in an OE. The fourth and

[114] Gharajedaghi, *Systems Thinking*, 93.

final figure presented here intends to depict in greater detail how a COG analysis can be improved by tracing CCs, CRs, and CVs to the interdependencies in the OE.

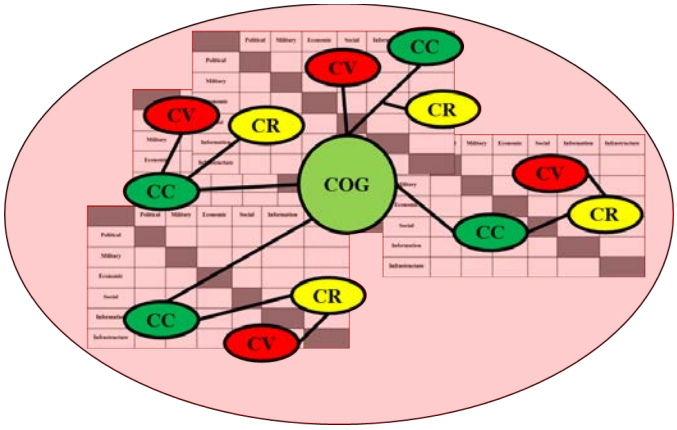

Figure 4. Systems Analysis of the COG in Context.

In this graphic, the outputs of a COG analysis are overlaid against the systems thinking take on PMESII described earlier. This teases out the importance of identifying the drivers behind the CCs, CRs, and CVs. These drivers represent the motivations of various distinct actors and systems that influence the motivations, actions, and interactions relevant to the COG. This level of fidelity increases the likelihood that planned operations will achieve the desired effects while mitigating risk and second and third order effects.

If the design of the COG analysis defines what the power source is and seeks to describe its most integral elements than the application of systems thinking to this process aims to expand on why the COG matters within the OE in the first place. If the COG in a nonlinear OE is something as ambiguous as popular support it may be useful to acknowledge that the meaning of popular support can be different depending on perspective. This calls for further analysis to define what the contextual definitions of popular support are. This may prove that there are several indicators that influence motivations across a spectrum of demographics calling into question the methods used to affect the COG. Complex adaptive systems, like those found in Iraq, prove that the desired effects on the COG may result in unintended consequences. Especially, if

the COG analysis is executed without an appreciation for the holistic interdependencies found in the OE.

Implications: Systems Thinking's Relevance in the Future

In 2017, the United States Army released its updated version of *Field Manual 3-0, Operations*. The changes to this doctrinal publication signal the Army's desire to position itself for Large Scale Combat Operations (LSCO) in the face of great power competition.[115] Some military practitioners are now debating whether or not the Army's renewed focus on LSCO is occurring at the expense of the lessons learned during the COIN centric wars fought in Iraq and Afghanistan.[116] However, both sides to this argument are not articulating the larger problem. While it is evident that Russia and China pose significant threats owing to modernized weaponry and revisionist aspirations. It is also true, as recent history demonstrates, that LSCO may not be the prevalent type of armed conflict likely in the future.[117] This point highlights that the United States defense enterprise's struggles to predict and define the OE that it may find itself in. The relevance of this essay to all planners seeking to develop their minds for war is recognizing the faults in popular sensemaking processes that lead towards fighting an unconventional threat with conventional capabilities or vice versa.

In light of this research and a paradigm shift towards nonlinear great power competition, it has become increasingly clear that the US military does not a have a glaring problem formulating military strategy. The nation's leaders often know what objectives they wish

---

[115] US Department of the Army, Field Manual 3-0 (FM), *Operations* (Washington, DC: Government Printing Office, 2017).

[116] Stephen Tyminski. "Preparing for the Future: Insurgents Get a Vote." *Small Wars Journal* (2018) accessed December 27, 2019, https://smallwarsjournal.com/jrnl/art/preparing-future-insurgents-get-vote.

[117] Thomas S. Szayna, Stephen Watts, Angela O'Mahony, Bryan Frederick, and Jennifer Kavanagh. "What Are the Trends in Armed Conflicts, and What Do They Mean for U.S. Defense Policy?" (Washington, DC: RAND, 2017) accessed December 26, 2019, https://www.rand.org/pubs/research_reports/RR1904.html.

to achieve based on their understanding of a given problem. What is now increasingly evident is that United States may often address the wrong problem and in doing so create more problems than they solve as was done in Iraq. This situation is why a revolution of thought amongst military leaders and planners is overdue. This revolution comes in the form of systems thinking. As shown, by using systems thinking, potentially even in the form of DSRP, there is potential for a greater depth of understanding that can be used to explain an OE. This methodology can serve as an additive or completely replace PMESII and COG analyses shown to be inherently linear and lacking. The risk from the continued use of these tools is that they wish away complexity using categorization and reductionism. This of course will not help the United States in the present or future as the nation reflects on lessons learned in Iraq and addresses multi-domain threats posed by China and Russia.

Bibliography

Axe, David. "The U.S. Military Has a Big Problem: It Can't Win Wars," *The National Interest*, June 7, 2019. Accessed December 5, 2019, https://nationalinterest.org/blog/buzz/us-military-has-big-problem-it-cant-win-wars-61452.

Bailey, Beth L., and Richard H. Immerman, eds., *Understanding the U.S. Wars in Iraq and Afghanistan*. New York: New York University Press, 2015.

Ball, Joshua "What Is Hybrid Warfare?" *Global Security Review* (2019). Accessed November 13, 2019, https://globalsecurityreview.com/hybrid-and-non-linear-warfare-systematically-erases-the-divide-between-war-peace/.

Berger, Peter L., and Thomas Luckmann. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Harmondsworth, Middlesex, England Baltimore, Maryland, U.S.A. Ringwood, Victoria, Australia: Penguin Books, 1971.

Bertalanffy, Ludwig von. *General System Theory: Foundations, Development, Applications*. Harmondsworth: Penguin Books, 1973.

Beyerchen, Alan. "Clausewitz, Nonlinearity, and the Unpredictability of War." *International Security*, no. 3 (1992): 59–90.

Boyd, John, and Grant Tedrick Hammond. *A Discourse on Winning and Losing*. Air University (U.S.), and Press, 2018.

Bush, George W. *Decision Points*. New York: Crown Publishers, 2010.

Cabrera, Derek, and Laura Cabrera. *Systems Thinking Made Simple: New Hope for Solving Wicked Problems*. US: Plectica Publishing, 2018.

Clausewitz, Carl von, Michael Howard, and Peter Paret. *On War*. Princeton, N.J: Princeton University Press, 1976.

Dale, Catherine. *Operation Iraqi Freedom: Strategies, Approaches, Results, and Issues for Congress*. Washington, DC: Congressional Research Service, 2009.

Depetris, Daniel "Does the US Actually Have a Coherent Foreign Policy in the Middle East?" *Washington Examiner*. Accessed December 2, 2019. https://www.washingtonexaminer.com/opinion/does-the-us-actually-have-a-coherent-foreign-policy-in-the-middle-east.

Dilanian, Ken. "Progress in Iraq Reshapes Debate over War" *USAToday.com*, 2008. Accessed October 30, 2019. https://usatoday30.usatoday.com/news/washington/2008-02-17-Iraqcongress_N.htm.

Dolman, Everett C. *Pure Strategy: Power and Principle in the Space and Information Age*. London; New York: Frank Cass, 2005.

Dörner, Dietrich. *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations*. New York: Basic Books, 2010.

Ducote, Brian. "Challenging the Application of PMESII-PT in a Complex Environment." Masters Monograph, School of Advanced Military Studies, US Army Command and General Staff College, Ft. Leavenworth, KS, 2010.

Echevarria, Antulio. *The Evolution of Operational Art: From Napoleon to the Present*. Edited by John Andreas Olsen and Martin Van Creveld. Oxford: Oxford University Press, 2011.

Eikmeier, Dale C. "Center of Gravity Analysis," *Military* Review. (July-August 2004).

———. "The Center of Gravity: Still Relevant After All These Years?" *Military Review*. (2017).

Evans, Michael. "Centre of Gravity Analysis in Joint Military Planning and Design: Implications and Recommendations for the Australian Defence Force." *Security Challenges*, no. 2 (Winter 2012): 81–104.

Gaddis, John Lewis. *The Landscape of History: How Historians Map the Past*. Oxford; New York: Oxford University Press, 2002.

Gharajedaghi, Jamshid. *Systems Thinking: Managing Chaos and Complexity: A Platform for Designing Business Architecture*. Burlington, MA: Morgan Kaufmann, 2011.

Gordon, Michael R. "Troop 'Surge' Took Place Amid Doubt and Debate." *The New York Times*, August 30, 2008. Accessed October 18, 2019. https://www.nytimes.com/2008/08/31/washington/31military.html.

"Iraq Study Group Report: Executive Summary." *NPR.Org*, December 6, 2006. Accessed January 17, 2020. https://www.npr.org/templates/story/story.php?storyId=6586565.

Jervis, Robert. *System Effects: Complexity in Political and Social Life*. Princeton, US: Princeton University Press, 1997.

Jullien, François. A Treatise on Efficacy: Between Western and Chinese Thinking. Honolulu: University of Hawai'i Press, 2004.

Justo, A. J. "The Knowns and Unknowns Framework for Design Thinking," *UX Collective*. February 17, 2019. Accessed November 8, 2019, https://uxdesign.cc/the-knowns-and-unknowns-framework-for-design-thinking-6537787de2c5.

Klug, Johnathan. “Behind the Mosaic: Insurgent Centers of Gravity and Counterinsurgency,” *Addressing the Fog of COG: Perspectives on the Center of Gravity in US Military Doctrine*. Edited by Celestino Perez. Fort Leavenworth, Kansas: Combat Studies Institute Press, 2012.

Knowlton, Brian. “Kissinger Says Victory in Iraq Is Not Possible.” *The New York Times*, November 19, 2006. Accessed December 28, 2020. https://www.nytimes.com/2006/11/19/washington/19cnd-policy.html.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press, 1996.

Lawrence, T. E. *Seven Pillars of Wisdom: A Triumph*. New York: Anchor Books, 1991.

Mansoor, Peter. Email message to author, December 2, 2019.

Naveh, Shimon. *In Pursuit of Military Excellence: The Evolution of Operational Theory*. The Cummings Center Series 7. London; Portland, OR: Frank Cass, 1997.

Osinga, Frans P. B. *Science, Strategy and War: The Strategic Theory of John Boyd*. London; New York: Routledge, 2007.

Perez, Celestino. *PMESII-PT versus Systems Thinking -- A Classroom Experiment*, Episode 8. Arguing the OE, April 10, 2013. Accessed November 19, 2019, https://www.youtube.com/watch?v=UbcmJ79eKII .

Pope, Charles. “Cheney Changed His View on Iraq.” *Seattlepi.com*. September 29, 2004. Accessed January 7, 2020. https://www.seattlepi.com/national/article/Cheney-changed-his-view-on-Iraq-1155325.php.

Ricks, Thomas E. *The Gamble: General David Petraeus and the American Military Adventure in Iraq, 2006-2008*. New York: Penguin Press, 2009.

Salmon, Wesley C. *Causality and Explanation*. New York: Oxford University Press, 1998.

Schmitt, Eric. “Iraq-Bound Troops Confront Rumsfeld Over Lack of Armor.” *The New York Times*, December 8, 2004. Accessed November 8, 2019. https://www.nytimes.com/2004/12/08/international/middleeast/iraqbound-troops-confront-rumsfeld-over-lack-of.html.

Schneider, Jim, Shimon Naveh, and Timothy Challans. *The Structure of Operational Revolution*. Booz, Allen, Hamilton, 2009.

Senge, Peter M. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday/Currency, 2006.

Stigler, Andrew. “Assessing Causality in a Complex Security Environment.” *Joint Forces Quarterly 76*, 1st Quarter, January 2015 (December 30, 2014).

Sun, Holly. *Center-of-Gravity Analysis in COIN. A New Way to Problem-Solve*. Fort Huachuca, AZ: University of Military Intelligence, 2009.

Szayna, Thomas S., Stephen Watts, Angela O’Mahony, Bryan Frederick, and Jennifer Kavanagh. “What Are the Trends in Armed Conflicts, and What Do They Mean for U.S. Defense Policy?:” Washington, DC: RAND, 2017. Accessed December 26, 2019. https://www.rand.org/pubs/research_reports/RR1904.html.

Tadros, Samuel. “U.S. Middle East Strategy,” *The Caravan*. Palo Alto: Hoover Institution, March 28, 2019. Accessed December 2, 2019, https://www.hoover.org/research/us-middle-east-strategy.

The White House. *The National Directive 45*. Washington DC, 1990. Accessed October 14, 2019, https://fas.org/irp/offdocs/nsd/nsd_45.htm.

———. *The National Security Strategy*. Washington DC, 2002. Accessed November 3, 2019, https://georgewbush-whitehouse.archives.gov/nsc/nss/2002/.

Tyminski. Stephen. “Preparing for the Future: Insurgents Get a Vote." *Small Wars Journal* (2018). Accessed December 27, 2019, https://smallwarsjournal.com/jrnl/art/preparing-future-insurgents-get-vote.

Tyson, Robin Wright and Ann Scott. “Joint Chiefs Advise Change in War Strategy,” *Washington Post*. Washington, DC: December 14, 2006. Accessed January 17, 2020, http://www.washingtonpost.com/wp dyn/content/article/2006/12/13/AR2006121301379.html.

Ulrich, Mark, and Peter Mansoor. “Linking Doctrine to a New COIN Center of Gravity Analysis.” *Military Review* LXXXVII, no. 5, October 2007.

United Nations. “United Nations Security Council Resolution 1441.” New York City, NY: 2002. Accessed November 3, 2019, https://www.un.org/Depts/unmovic/documents/1441.pdf.

US Department of the Army. Army Doctrine Publication (ADP) 5–0, *The Operations Process*. Washington, DC: Government Printing Office, 2012.

———. *The Operations Process.* Army Doctrine Reference Publication (ADRP) 5–0, *The Operations Process*. Washington, DC: Government Printing Office, 2012.

———. Army Technical Publication (ATP) 5–0.1, *Army Design Methodology*. Washington, DC: Government Printing Office, 2015.

———. Field Manual (FM) 3-0, *Operations*. Washington, DC: Government Printing Office, 2017.

US Department of Defense, Joint Staff. Joint Doctrine Note (JDN) 1–18, *Strategy*. Washington, DC: Government Printing Office, 2018.

———. Joint Staff. Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*. Washington, DC: Government Printing Office, 2016.

———. Joint Staff. Joint Publication 2-01.3, *Joint Intelligence Preparation of the Operating Environment*. Washington, DC: Government Printing Office, 2014.

———. Joint Staff. Joint Publication 5-0, *Joint Planning*. Washington, DC: Government Printing Office, 2017.

US Department of State. “Coalition Provisional Authority Order No 1.” Washington, DC, 2003. Accessed February 7, 2020. https://nsarchive2.gwu.edu/NSAEBB/NSAEBB418/docs/9a%20-%20Coalition%20Provisional%20Authority%20Order%20No%201%20-%205-16-03.pdf.

Vandersteen, Kurt. “Center of Gravity: A Quest for Certainty or Tilting at Windmills?” *Addressing the Fog of COG: Perspectives on the Center of Gravity in US Military Doctrine*, ed. Celestino Perez. Fort Leavenworth, Kansas: Combat Studies Institute Press, 2012.

Zinn, Cherish M. “Consequences of Iraqi De-Baathification.” *Cornell International Affairs Review* no. 2 (2016). Accessed February 6, 2020. http://www.inquiriesjournal.com/articles/1415/consequences-of-iraqi-de-baathification.