# Beyond the Pale

## Designing Military Decision-Making Anew

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*Dedicated to Jill*
*without whom none of this*
*could ever have been possible*

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# Foreword

*If you don't like change, you are going to like irrelevance even less.*

—GEN Eric Shinseki, US Army, Retired

As the US Army and the joint force passed from the twentieth to the twenty-first century, Gen Eric Shinseki recognized that the character of warfare was shifting. He understood that such change was neither isolated nor centered on specific weapons. Instead, he intuitively recognized that the confluence of economic, social, political, and technological changes around the globe would alter the security environment and that those who manage violence for political effect must change the ways they think about war. Two decades later, those contextual changes are increasingly obvious, and yet the call to adapt has gone largely unheeded. Ben Zweibelson, himself a Soldier, takes on this challenge. Throughout this work, he does not shy away from the philosophical, the paradoxical, or even the provocative. Indeed, he wields these as tools to disrupt the status quo and offer an alternative approach to the wicked problems posed by a world that is increasingly dangerous and disorderly. Naturally, many academic fields address the challenges of revolutionizing organizational culture and competing in a globalized world. While the most valuable of these ideas are included in his eclectic set of novel and creative proposals, Ben's work never loses sight of his primary audience: those designing for advantage in the security environment. This is where the stakes are the highest, where the context is the most fluid, and where a unique approach to design is emerging.

Admittedly, some may find this intellectual journey to be overwhelming. We have grown accustomed to "byte-sized" pieces of information that confirm our biases and leave our worldview intact. Indeed, some will not want to invest the time and energy to immerse themselves in this current work. Ultimately, however, they will bear the burden of irrelevance later.

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## About the Author

Ben Zweibelson is the director of US Space Command's (USSPACECOM) Strategic Innovation Group (SIG), Peterson Space Force Base, Colorado. Previously, he was the lead design educator/facilitator for US Special Operations Command (USSOCOM) through the Joint Special Operations University as a full-time contractor from 2015 to 2022. Dr. Zweibelson provided design education and real-world facilitation assistance across the special operations community, for numerous international militaries, and at the national policy level for defense and security concerns.

He has lectured on design, innovation, and strategic change to the US Air Force, Army, Marine Corps, and Naval War Colleges, National Defense University, and advanced military schools and regularly engages internationally with security forces, including the French, Australian, Canadian, Dutch, Swedish, Polish, Danish, British, Hungarian, and NATO forces and partners. His design work is widely published in major military and civilian academic journals, edited books, and social media (e.g., YouTube, Medium, TEDx Talks, podcasts). Dr. Zweibelson's book *Understanding the Military Design Movement: War, Change and Innovation* was published in 2023 (Routledge).

A retired US Army infantry officer and veteran of combat tours in Iraq and Afghanistan, he earned the Combat Infantryman's Badge, Expert Infantryman's Badge, Master Parachutist Badge, Pathfinder Badge, Air Assault Badge, Ranger Tab, and international devices. He was awarded four Bronze Star Medals during combat deployments in addition to other awards and citations. Dr. Zweibelson has a doctorate in philosophy from Lancaster University, UK; master's degrees from Louisiana State University (MA), Air Command and Staff College (Master of Military Operational Art and Science), and the US Army School of Advanced Military Studies (Master of Military Art and Science); and a bachelor of arts degree from the University of Connecticut. He currently resides in Colorado Springs with his wife, three sons, and spoiled white Labrador Retriever named Chandler.

# Preface

Today's modern military is clearly in some sort of transition. Our warfighting communities of practice are frustrated for varied reasons and have little to commend regarding recent conflict outcomes or the near-term prospects of extending existing efforts. Yet beyond this point, we tend to diverge on the exact problem(s) and how the military profession ought to navigate out of this funk. This dissonance creates debate on why things have become so disappointing for the most technologically advanced, well-trained, and educated professional military force in history. This book attempts to frame for serious military professionals why—despite advanced technology and sophisticated professional development and training—our military forces are increasingly fragile and impotent in security applications beyond immediate or localized tactical contexts.

This book is provocative in aggressively critiquing prevailing military theory, methods, and models and the overarching institutionalized framework. I do not hide from scrutinizing this all-pervasive mindset governing nearly all military organizational form, function, and purposeful warfighting actions as defined today in our doctrine, education, and training and their real-world utilization. This work is not another attempt to incrementally improve existing legacy concepts, defend them with slight modifications, or seek to reform the institutionally approved content in some new variation with a "here is what they really meant, and this is the new road map to fix what is failing us today." I seek to disrupt, challenge, and, when necessary, destroy some cherished warfighter beliefs that are irrelevant today and were questionably useful when first implemented. This book may overturn many applecarts—some that readers will delight in and others that may lead readers to reflect on whether their unsettled response might illuminate their own biases.

Over the last decade of theorizing, experimenting, facilitating, and riting on systemic design, strategy, operational planning, and organizational change, I have often been confronted with two demands concerning these powerful and disruptive topics ofinstitutional transformation. First, many opposed to suchcontroversial ideas—in an indirectly anti-intellectual approach—insist that the "high level of theory required to explain such things is too difficult for the entire organization. You must simplify it down—use the Keep it Simple, Stupid or KISS principle. Otherwise, your ideas are not worth considering!" I encounter this reaction whether at war colleges, leadership engagements, and conferences and workshops; in academic reviews; or online and across social media.

The second most popular form of resistance is "you cannot throw the baby out with the bathwater. Much of what is already institutionalized has shown a pretty good track record, and there is no proof at all that these new concepts would be any better than us sustaining what is already set into practice." The "baby" is apparently what the war-fighter values and considers good and important, while the "bath-water" is what the institution will tolerate debate about and possibly eliminate as decided within the hierarchy.

What is baby-centric is ideological (one shall not dare question), while any bathwater draining usually requires some quantitative, clear, and objective proof to allow any change. I would like to address both aspects here and invite readers willing to explore beyond a self-imposed, institutionally protective stance to read on.

Systems designer Jamshid Gharajedaghi articulates perhaps the most elegant rebuke of the first institutional trope concerning this fixation of the military (and many communities outside defense) to "keep everything simple" to avoid "fancy" concepts and other high-brow theory. To paraphrase his response, a common organizational understanding is not the beginning of a developmental or transformative process: it is the *last step*. If every time an organization sought to critically self-reflect, implement transformative concepts, and experiment with difficult theory and new learning by first achieving a shared understanding across the largest population of that institution or field, nothing "fancy" would be allowed in the building. Gharajedaghi remarks, "I assure you that we will fast fall to the lowest level of banality. Life would proceed with setting and seeking attainable goals that would rarely escape the limits of the familiar."[1] Thus, military doctrine must be the last stop on the long journey of organizational transformation for military affairs, never the first (despite many examples that sadly counter this tenet). KISS provides institutional relevance tomorrow—always at the expense of war-fighter innovation or improvisation.

Israeli military operational designer Shimon Naveh is blunt on this issue, declaring in an interview that "wars are very hard to fight and yet we go and fight them. If indeed this is crucial and important, it is not an option. We should go and do it. . . . All you need is some intellectual stamina, some energy. If you're serious about your profession, then you'll go through it."[2] Naveh suffers no fools, and while his framing of this tension hits like a sledgehammer, war is a most serious business. If the military profession is indeed a modern one, we must contemplate where experimentation, critical thinking, innovation, and change are to be cultivated and encouraged in the vast enterprise. Not everything should be reduced to standardized doctrine, and not every idea requires translation to the lowest possible denominator. Novel advantage in the next war will never be obvious today, nor will operators relying on following the recipe ever stumble on the game-changing new opportunity.

In the last decade of teaching and theorizing on systemic design, I have engaged with tens of thousands of military professionals. Those who appear most unable and unwilling to consider new war theory are not unintelligent. Rather, they have internalized some theories (e.g., Clausewitz, Svechin, Sun Tzu), models (e.g., Boydian OODA [observe, orient, decide, act] Loop, center of gravity analysis, SWOT analysis—identifying organizational strengths, weaknesses, opportunities, and threats), and methods (e.g., joint planning process, Military Decision-Making Process) to the extent they are now ideological and tied to their identity as a warfighter. This deep connection becomes the greatest obstacle to institutional change. The problem is not, as Gharajedaghi clarifies, that the broad base of your institution lacks an understanding of novel ideas. Rather, it is that the experts positioned above them do not have a shared understanding. Learning new things is intrinsically easier for the organization than getting experts to unlearn what they have often assimilated and even ritualized well beyond what any theories, models, or methods are intended to do for a profession.

This circumstance leads to the second institutional point of resistance (which also hints of anti-intellectualism in war): the baby is in the bathwater, and radical transformation risks losing everything we hold dear. We identify the baby in that metaphor as our military profession; without certain concepts, beliefs, and behaviors, we might become erased as a military force or rendered into some nonfunctional entity incapable of accomplishing anything. This view again barely elucidates the shadowy hands of institutional self-preservation at all costs. This book explains how a single, entirely consuming war paradigm governs the military force, discouraging any operator to think or act outside of its imposed limits without risking alienation, marginalization, or worse still, a declaration of heresy and exile. We mindlessly attempt to keep the baby, and if anything, we ought to incrementally switch out the bathwater over time without disturbing the baby. Yet resistance to new paradigms is wrongheaded and partially why the modern military is stuck today.

Sometimes, we initially placed the baby in dirty bathwater without realizing it, or at the time, other options were even less useful. To carry the metaphor to the end, institutional change requires healthy debate. Shifting an organization is hard; attempts to radically transform one are revolutionary and often highly disruptive. Thus, does the institution prefer the sharp, immediate pain of seeking transformation before a future war occurs, where there is tremendous risk and uncertainty? That is, the baby is pulled out of one bath (design) into quite a different one. Or is it better if the institution endures the slower pain and destruction of gradually failing in a future war—using the same largely unchanged constructs most members agree to in the name of institutional stability and uniformity (poor choice of bathwater)—because dealing with the devil we know is better than the one we do not?

This book begins with part 1 framing the problems with how modern militaries think and act in complex warfare. The bathwater we wash our baby in is what is sickening the child (and the parent). Yet the institution is so committed to ways of doing things that its momentum makes it increasingly difficult to consider alternatives that involve changing the water. This book identifies how social paradigms develop in groups and how the modern military uses a particular paradigm to think and act in war.

Next, in part 2, I use systemic design to outline ways to disrupt, challenge, and transform how militaries think and act, allowing the exploration of a different range of options and a far more comprehensive war frame. Part 3 features the introduction of what will likely be alien concepts to most readers. Ideas such as rhizomes, multiple futures, systemic thinking, and emergence, for example, will help establish fresh ways to consider purposeful military thought and action. Some concepts may be used to modify current decision-making methodologies and others to break the existing frame so that designers might create an alternative. However, these new war designs will not extend any of the old war frame's promises of greater certainty, prediction, or control or the ability to reverse engineer from an uncertain future a clear and linear path to navigate from today. Complexity is . . . complex. How we became convinced that simplified, linear-causal logic might plot paths for us in complex warfare is a mystery that also will be unraveled in this section.

Finally, in part 4, I offer an olive branch with ways systemic design might start to be formalized within this legacy war frame that modern militaries cling to. Absolving ourselves of some of the more rigid, obsolete concepts in warfare will realistically take a generation or more. Individuals have been conditioned into the institution from head to toe and from our highest levels of education down to the most basic doctrinal principles. The metaphor fails in that our modern military cannot distinguish *where the baby ends and the bathwater even begins*. We are nonreflective and continue to recycle specific tools repeatedly without the ability to rise above our frame and conduct some extensive reflection and reform outside our socially governed limits. That said, not all is ominous—many modern military concepts are valuable for what we need to take forward. Much of what is useful now will continue to be so in future conflicts.

This book is not intended for every military professional. Indeed, some may prefer to set in strong defenses and protect their idea of the military institution at all costs. German physicist Max Planck said that science advances one funeral at a time. More precisely, "a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."[3] For the curious and those feeling a tinge of dissatisfaction with the curation of current warfighter knowledge and the institutional exercise of form, function, and purpose today, this book may be a rewarding investment. The next generation of warfighters will develop in the shadow of military failure in Iraq, Afghanistan, and elsewhere. Yet in those shadows, there is also light.

**Notes**

(All notes appear in shortened form. For full details, see the appropriate entry in the bibliography.)

1. Gharajedaghi, *Systems Thinking*, 63.
2. Naveh, "Interview with BG (Ret.) Shimon Naveh."
3. Planck, *Scientific Autobiography.*

# Introduction

## Of Strategists, Planners, and Changing the Weather in War

*Most corporate planning is like a ritual rain dance; it has no effect on the weather that follows, but it makes those who engage in it feel that they are in control. Most discussions of the role of models in planning are directed at improving the dancing, not the weather.*

—Russell Ackoff

*Mechanistic explanations perpetuate the divide between the world as experienced by actors vis-à-vis the world as functionally explained by an outside, allegedly objective, observer. In classic physics, time is either ignored or thought to be an illusion. In the deterministic Newtonian world past and future play the same role. . . . Prediction is symmetrical with explanation.*

—Haridimos Tsoukas

The modern military organization is perhaps best known for a particular reputation that sets it apart from most other professions. Security forces are legendary for uniformity, reliability, and efficiency in accomplishing intricate and dangerous activities within chaotic settings. Militaries do this through technologically enabled and sophisticated capabilities, using regimented drills, patterns of behaviors, and intricate decision-making methodologies underpinned by well-curated doctrine and training. Mainstream societal, commercial, political, and cultural perspectives on military organizations, war, and associated artifacts reflect combinations of these symbols, values, assumptions, and meanings. Unlike other professions or institutions where American polling of trust remains low (e.g., television news, big business, politics), the American military maintains exceptionally high levels of public trust.[1] This opinion continues despite decades of controversial, high-cost counterinsurgency operations and counterterrorism activities that might alter the public's view of security forces.

Military organizations themselves are composed of dedicated, well-trained military professionals loyal to their nation. They are recruited, trained, educated, and fostered in highly particular warfighter methods for professionalization of the force. Indeed, the mystique and allure of military culture has for the better part of the last century become monetized in commerce, industry, and entertainment. Militaries have been loved and feared throughout civilization, yet modern security forces hold a special place among other professions and disciplines. From heroic tales and epic legends in antiquity to mainstream country music, rap, and rock ballads, militaries and war are an enduring theme. They reveal the narratives, values, belief systems, and cultural identities of most every population, living or dead.

Examining the armed forces will unavoidably provide insights into the society that fosters this instrument of national power. Yet this is not a study of what the military profession might represent in the societies it defends or a historical treatment of what militaries have accomplished (or failed to accomplish) for these societies. Why do militaries think and act as they do, and how does the military's shared, curated, and exercised warfighting frame produce the outcomes that a society witnesses over time in often extraordinarily complex security contexts? Could militaries be misunderstood in how and why they think and act about war and also be unwittingly stuck in a warfighting frame that precludes critical reflection, deviation, and innovation beyond institutionalized limits? That is, if militaries are the rain dancers attempting to change the weather, might they be trapped within "dancing the dance"? Or perhaps militaries extend deeper societal belief systems so that we all are part of the unwitting rain dance ritual, causing any critical introspection of war and society to fall short.

This line of inquiry quickly might be considered provocative—indeed, heretical—to deeply established institutions, such as military forces and related policymakers, the industrial defense complex of supporting commercial enterprise, and a society preferential to glamorized depictions of war itself. To explain the military as an institution, we must move away from descriptive analysis to clarify the reasons, beliefs, mental models, and deeper frameworks that underpin existing decision-making methodologies. If the military wishes to develop in warfare as a community of practice and modern profession, it is obligated to perform as other communities, fields, and disciplines do for real development. The practice of philosophy is necessary for the development of philosophy itself, as originally stated by E. A. Singer Jr., and any profession desiring real development simply cannot accomplish this goal with mere methodological adjustments or tweaks to doctrines and best practices.[2]

To explain why modern military forces believe, think, and act in a particular purposeful manner, we need to understand philosophically how and why they realize complex reality through a distinct war framing—or what will be explained as a socially constructed *war paradigm*. This discussion unavoidably becomes a philosophical inquiry where "why-centric" examination leads further from "what-centric" descriptive analysis. While there are many modern armed forces to choose from, United States and North Atlantic Treaty Organization (NATO) armed forces were selected for their prominence and influence.[3] If we agree at a societal level that the world is increasingly complex and chaotic, we must turn to philosophy first (and process later) so that we might examine the inadequate concepts we currently use to explain reality.

This discussion goes beyond analyzing the nuances of prevailing, institutionalized decision-making methods of NATO as an intergovernmental military alliance and of US armed forces (joint, multiservice formations) as the preeminent global power of Western societies. It contrasts why modern military forces arrange their thinking and organization in selective ways with how earlier conflict settings reflected convergence or divergence from these institutionalized frames for making sense of war. Are the traditional decision-making methodologies appropriate for how complex security contexts now appear to manifest and transform? Should incremental, evolutionary, and institutionally protective modes be the exclusive strategy for institutional self-examination, experimentation, and development of modern security forces over the next decade? Or might complex reality beyond immediate technological, local, and/or tactical military settings prove incompatible and counterintuitive to existing institutionalized decision-making frames of modern armed forces? These are profound issues with no clear or simple answers. This book seeks to establish why modern military decision-making functions as it does, how that frame is valuable in some respects and detrimental in others, and where security design might offer transformative alternative paths.

Security design is creating that which is needed for development within war (the application of organized violence), but it is merely a subset of what is broadly framed as how humanity designs to change how it experiences and enables societal change in complex reality.[4] Designers create what is new, different, and necessary for fighting tomorrow's war; they go beyond verifying how legacy processes functioned well in the last war. Drawing from earlier design pioneers like

Ackoff, Horst Rittel, and Herbert Simon, Gharajedaghi offers this excellent design summary:

> Image building and abstraction are among the most significant characteristics of human beings, allowing them not only to form and interpret images of real things, but also to use these images to create images of things that may not exist. These images are then synthesized into a unified, meaningful mental model and eventually into a worldview. Man feels hunger, observes the fleeing prey, and realizes his inability to capture it. After discovering other related objective realities (wood, stones, etc.), he thinks about and eventually creates a subjective image of a tool, one yet to be, that would help him secure food. Transformation of this subjective image into an objective reality results in the bow and arrow, which in turn will be a reproducer of yet another image, and so on. This dialectic interaction between objective and subjective realities lies at the core of a process called *design thinking*, which is responsible for the dynamic development of human societies.[5]

Security design focuses on how humans shape societal development in the application of security, defense, and organized violence. We design our war frames and then employ them in an attempt to transform our subjective conceptualizations into objective goals and outcomes of our war enterprises. Over the last three centuries, the rise of a particular warfighting frame for decision-making (through education, training, and doctrine) comes with distinct advantages but also combats impairments and institutional vulnerabilities. We design these war frames yet must break free from those no longer useful or constructive in achieving an objective manifestation of our subjective constructions. Doing so requires us to design the disruption, deconstruction, and destruction of some frames to allow formation of novel ones.

In contemporary practice, militaries using modern decision-making methodologies are increasingly frustrated, confused, or defeated due to complex security contexts not conforming to such methodological form and function. The recent fall of Kabul to the Taliban after decades of immense NATO and American military investment into the Afghan security forces is only one example. America's involvement in the Vietnam War was just a generation prior to the 9/11 attacks. Yet since 1945, a broad pattern of arguably increasingly frustrating and alarming security contexts has shown powerful resistance to even the most well-educated, highly trained, and technologically equipped forces the world has seen.

The defense community of practice—with the emergence of *systemic design for military contexts* over the last two decades—is now perhaps primed to examine beyond the superficial or process orientation (hence performance of individuals) of institutional convergence and reinforcement of deeply held beliefs and practices. The systemic design movement since the late 1990s has become a controversial, disruptive, but transformative pathway that in the last decade appears to be gaining international acceptance and momentum, to include the attention of outside academia.[6] We will examine what systemic design is and how it is becoming a valuable alternative methodology and a broader mindset for realizing different war frames.

Recognizing one's own institutionalized war frame is paramount for an organization to shift toward innovation and break through institutional barriers that otherwise will compel operators to continue the rain dances unwittingly (or even unwillingly). Doing so illuminates an institutional shift toward *what military forces are seeking organizationally and behaviorally next that liberates them from thinking about warfare in a limited, linear fashion*. The NATO Operations Planning Process (NATO-OPP), the joint planning process (JPP), and similar methodologies as practiced today may counterintuitively be part of an institutional barrier to breaking out of one's war frame. Unwittingly, our own institutions may be preventing the rapid military innovation, imagination, creativity, and experimental mindset necessary for emergent security challenges now plaguing Western societies. We know we need to change but struggle with how to do so and what sort of change is worth the disruptive risk.

Change is difficult, particularly when innovative experimentation comes with no guarantees other than the axiom that doing more of the same will result in the same outputs. Strategic and operational failings in Afghanistan, Iraq, and elsewhere for NATO, the United States, and allies reliant on the same decision-making methods have once again opened a brief window for institutional reflection, just as after the Vietnam War. What our militaries do with this opportunity will shape future security forces and whether they prepare for future unrealized and unimagined conflict contexts or return to fixating on winning the last wars for tomorrow and beyond. We must risk releasing tried and proven concepts not because they did not work but because clutching them limits our willingness to consider options paradoxical or counterintuitive to what we believe already works fine. Innovation is messy, and war is the most dangerous and chaotic of any human enterprise. Designing a new way to act in war requires our design of how and why we think. Doing so allows us to innovate ways to consider the unimagined, unrealized, and unexplored just outside our current frame.

## Arrangement of Discussion: The Breadcrumbs beyond the Pale

The old English saying "beyond the pale" is useful here for summarizing the book's overall structure and how readers will navigate this journey. As a metaphor, it also portrays the work's fundamental theme and foremost challenge for modern military forces. The greatest hurdle institutions face in encouraging innovation is not complexity, cunning adversaries, or even societal or political obstacles but themselves. Going beyond the pale symbolizes far more than a physical barrier used centuries ago to prevent barbarian invaders. It represents the deepest institutional resistance to the alien, the unimagined, and the indescribable and thus what the institution fears most: change.

In the fourteenth and fifteenth centuries, the English invaded and attempted to fortify settlements in Ireland while also holding the non-Norman "barbarians" outside. In the controlled settlements, the English lived under the king's protection, and along the perimeter of the Louth, Meath, Dublin, and Kildare counties in the east, the English built a formidable barrier comprising a ten-foot-deep ditch with eight-foot banks on each side, complemented by dense thorn and brush hedges. The barrier was not necessarily a formal wall but nevertheless served as a serious deterrent to raiders, cattle thieves, and other outside threats of the "untamed wildernesses" beyond the English king's realm. Historically, this era predated the Age of Imperialism by several centuries, yet it also marked the first seeds of European expansion under industrialization, capitalism, colonization, and other annexing and assimilating of large tracts of the world. Many barriers before and after the pale would demark the declared boundaries of an empire, state, or institution—physically and through the social constructions erected by people within these societies.

As the ditch took on a pale color, settlers in those colonies adapted the phrase of being safe "within the pale," but once you passed beyond the pale you were now "outside the authority and safety of English law, and subject to all the savageries of rural Ireland."[7] The cultural idiom would gain additional meanings beyond the original physical metaphor over time, with the English adding social and cultural concepts. Going beyond the pale meant that one was going outside the limits of acceptable behavior or exhibiting unsavory, unsanctioned, or disturbing ideas that ran against societal norms. In this original case, the English shunned anything Irish, with their Gaelic language banished and intermarriage with the Irish also illegal. More to the point of this discussion on innovation, any traveler or trader who went beyond the pale into Ireland and returned was met with suspicion, along with any strange goods or concepts brought back from the outside wilderness. "The pale" took on an underlying fear of disruption, change, and risk even up to existential fears of that society's annihilation (or at least that which formed its identity).

When members of any organization seek innovation and attempt to experiment with new concepts, they too are going beyond the pale by departing the institutional boundaries of the socially constructed frame used to make sense of reality. For military organizations, innovators do just this when venturing outside of the interiority of the institution; interiors are rich with doctrine, approved language, formal and codified behaviors (such as a shared decision-making methodology), and recognizable models. Innovators go beyond the pale by exploring the exteriority of the institutional frame and, in doing so, generate skepticism and resistance when returning across the framed barriers to offer novel or unimagined concepts disruptive to the ordered, regulated interiority. Innovation thus occurs on the outskirts of the institution conceptually, even when the declaration that "we want innovation" is prominently placed in the center of the organizational structure or highlighted in vision statements or quarterly progress reports.

The act of innovating breaches the norms of what the institution knows, values, and accepts. The experimentation and exploration that lead to *true innovation* occur beyond the pale, and once more, each innovator must battle resistance to transfer these new concepts into the interiority of an institution resisting every step of the way. Sociocultural systems manifest strong resistance to change beyond that of individual operators due to how groups of humans socially construct and curate their belief systems. Sometimes, this phenomenon acts as a defensive mechanism and "structure-maintaining" function to make cultures resilient and sustainable. Other times, it is precisely what creates systemic failure of a social system to learn, innovate, and adapt to change.[8]

Readers will take this journey by following the breadcrumbs in this book that gradually lead to discovering how and why the institution forms a frame and subsequently protects it with barriers, rules, and encoded behaviors for traveling between the interior and foreign exterior of barbarians and outsiders. The first section presents the concepts of single-loop, double-loop, and triple-loop thinking for organizations. While single- and double-loop thinking orient operators on process preservation, regulation, and uniformity to make sense of reality, triple-loop thinking breaks from this precept. It permits the concept of reflective practice to move beyond the institution's pale and explore the exteriority of reality. Reflective practice is a cornerstone of systemic design and will be introduced as a conceptualization activity exclusive to triple-loop thinking. Institutional barriers function to prevent this sort of critical and creative divergence from the subscribed war frame, which again provides the backdrop of how and why military decision-making converges operators into single-loop and, at times, double-loop thinking alone.

Single-, double-, and triple-loop thinking frame the *how* of military decision-making as strategists employ their chosen methodology. Regardless of what particular method they subscribe to (whether a joint process or one enforced within an armed service's doctrine), operators exercise it while remaining in a single-loop or perhaps double-loop mode of thinking and learning. Yet modern militaries create their own warfighting frame (or what will be introduced as a social paradigm—the *war paradigm* of a given organization) that explains how and why they interpret complex reality as they do. Readers are provided a philosophical schema that describes how modern militaries construct their institutional frame. Why do they draw from particular theories and not others? How do they combine theory with conceptual models to generate select methodologies? How do they use their terminology, metaphoric devices, and dominant belief system and culture to produce this collective frame for interpreting warfare in a complex reality?

Readers were introduced earlier to the single-double-triple loop construct to understand the how of military decision-making and then learned about the why of modern military war frame construction and employment. The concept of systemic design as a methodology enabled through reflective practice (triple-loop thinking) is presented next together with a host of other constructs that remain beyond the pale of the modern military institutionalized frame. Using systemic design, readers will gain new tools to deconstruct, disrupt, improvise, and adapt war frames that deviate from the traditional, indoctrinated forms used by NATO and joint forces in the Department of Defense. First, readers will take a systemic design expedition to examine the existing institutionalized war frame of modern armed forces critically and creatively. Doing so involves inquiring about the origins of contemporary military theory selection and how and why certain conceptual models are established to render decision-making methodology actionable.

Modern militaries have for the last three centuries undergone a modernization and professionalization that reflects the impacts of natural science development; industrialization and acceleration of advanced technology across the modern, developed world; and adaptation of modern managerial and organizational theories into how and why militaries today think and act in complex security contexts. The strong influence of a Newtonian style is explained as are terms such as *reductionism, positivism, technical rationalism, and systematic logic* and why militaries might be more *pseudoscientific* than scientific in approaching warfare. A series of sections will unpack these essential concepts and how and why the modern military frame has deep roots in a mechanistic, linear-causal, and often socially constructed appropriation of other scientific fields, disciplines, and professional communities of practice outside warfare.

The single-loop and double-loop procedural structuring in modern military decision-making methodologies is next highlighted with a systemic design treatment of NATO and joint planning doctrine. The "ends-ways-means" formulaic sequencing of strategic and operational planning is examined, and readers will be encouraged to draw from the first sections of this book to deeply consider how and why contemporary doctrine, military training, and education continue to emphasize an exclusively single-loop or double-loop cycle of thought and action. The reflective practice offered in triple-loop thinking and systemic design should allow readers to explore beyond the pale of contemporary institutional limitations for the complex warfighting contexts of today and tomorrow. If leaders demand innovation today so that we might better fight tomorrow's war not yet fought, should the organization not encourage innovation and critical introspection beyond adherence and compliance to institutionalized processes and theoretical frameworks often never seriously challenged? Part of this resistance is based on identity and the military belief system operating under the surface.

Modern militaries fixate on scientific processes, technological developments, and a rationalization of warfare so that modern military applications gain a certain objectivity, stability, and order. This tendency is "technical rationalism" and is thoroughly covered in this book through systemic design. Gharajedaghi states, "During the past century, we increasingly specialized in one language, the language of analytical science. As we emphasized one language to the exclusion of all others, we became unidimensional—and boringly predictable. . . . When one game states the rules for all games, it does not matter how many new games you create, they are all the same kind."[9] Analytical rationalization of all aspects of warfare is endemic across the modern military war paradigm and also explains how single- and double-loop thinking use this analytical rigidity to prevent any reflective practice.

One phenomenon of technical rationalism is the rise of effects-based operations (EBO) since the 1990s to become a dominant mindset for modern warfighters across all services and coalition arrangements. This predilection continues today despite senior leadership retiring the formal concept and associated doctrine and policy in 2009. The "ghost of EBO" haunts the institution and enforces the barriers to introspection and systemic design. This discussion highlights why this remains significant and troubling to militaries that struggle today with complexity, uncertainty, confusion, and surprise when the best intended strategies and plans fail regardless of surgical revision and reapplication.

As the modern military frame contains theories and models that collectively establish the methodological applicability for the war frame in security contexts, this book deconstructs and critiques several popular models in NATO and joint planning methods. Often labeled with clever acronym-naming conventions, modern militaries use models such as SWOT analysis—identification of organizational strengths, weaknesses, opportunities, and threats, center of gravity (COG) analysis, the CARVER—criticality, accessibility, recuperability, vulnerability, effect, and recognizability—targeting technique, the "iceberg model for culture, values, and complex meaning," and a host of others. These models are often employed—and at times often misapplied—to enable military operators to engage their decision-making methodologies toward warfare. This book explains how these models convey theory and enable methodologies to be developed and exercised. These models also potentially limit their implementation, as we also explore in detail.

This book focuses on the more popular methods, theories, and models and through systemic design invites readers to challenge their dominance critically and creatively. In certain circumstances, some models may be advantageous. Any model, according to organizational theory experts Richard Daft and Karl Weick, is itself "a somewhat arbitrary interpretation imposed on organized activity. Any model involves trade-offs and unavoidable weaknesses."[10] However, modern military decision makers direct their chosen model's universal and timeless relevance to any and all military challenges, which demonstrates the problematic single- and double-loop cycle of systematic logic encoded in a single, dominant war paradigm. "What has become the dominant language of our time produces only a partial understanding of our reality," as systems theorist Gharajedaghi observes, and "relates only to parts of our being, not the whole of it."[11] We become trapped conceptually and organizationally in how we think and act in war.

Readers will, in reaching the halfway point of this expedition, continue the remainder of the journey exploring beyond the pale where alien concepts and paradoxical disciplines, fields, and theories are introduced as disruptive alternatives to the aforementioned dominant structures found across the modern military decision-making frame for warfare. By reinventing a new frame entirely, systemic designers can disrupt the original (legacy) war frame of the modern military and instead consider diverse ways of creating strategy and operational plans outside the limits of institutionalized practice. In the remaining sections of the book, readers will learn about silent transformation and complex system emergence as well as nonlinearity and how systemic differs from systematic in profound ways. This book counters the centralized COG foundational to modern military decision-making at the operational and strategic levels with the rhizome concept, which has no COG-like characteristics yet is found everywhere except the modern military frame.

Systemic design challenges the primacy of the singular, linear-causal arrangement of ends-ways-means linking time and space to a single, idealized "future" by introducing scenario planning. When the military shifts to thinking about complex, emergent systems through a range of multiple and often paradoxical future states of potentiality, the limitations of single- and double-loop cycles in modern military decision-making are further illuminated. Breaking from goal-oriented thinking, systemic design with reflective practice (entering the triple loop) offers a different and disruptive manner to view how and why an organization might think and act with new and cunning purpose within a security context. Readers will learn about one heuristic aid used in generating these futures quickly and through reflective practice where structured facilitation by design pushes operators outside institutional limits. Beyond the pale, the organization learns to design outside systematic logic or within the narrow confines of the institutionalized framework of how warfare *must* be waged.

Pushing the envelope further, this book invites readers to consider some radical constructs that systemic design can provide. These concepts exist in many modern disciplines and are used by different communities of practice for a range of applications, but they do not exist within the military realm due to the self-imposed frame limits and institutional need to preserve and protect the established order. A postmodern example of "Deleuzian folds" is presented as a unique method to make sense of complex warfare outside the traditional and modern military war paradigm. Whether this concept is superior to how NATO and joint forces currently strategize or plan operations and campaigns is not argued. Rather, that the accessibility of such an alien concept is routinely denied to the operators of the modern military frame is what is paramount for discussion and reflection. Why are so many theories, models, methods, language, and metaphoric devices eliminated as beyond the pale through the exercise of the modern war paradigm? How might the military change this in education, training, and doctrine?

For these last few organizational questions, readers are presented with a viable way for large military organizations to consider permanently integrating systemic design in a formal, realized way into organizational decision-making and battle rhythms. In this way, leaders and the entire enterprise might benefit from reflective practice becoming a deliberate, recognized, and perpetual activity conducted as the organization thinks and acts in complex warfare situations. The book articulates and visualizes a broad, abstract cycle where systemic and systematic thinking become complementary. Design with disruptive innovation is built into how the organization reflects, innovates, experiments, revises, and reforms as it "sensemakes" in highly dangerous, difficult, and confusing security settings important for the needs of a society.[12] This design produces a number of conclusions that this book ends on.

### Notes

1. Gallup, "Confidence in Institutions."
2. Gharajedaghi, *Systems Thinking*, xii.
3. As the American military strategizes, plans, and organizes with a multiservice or joint configuration along with external nation partners, this book addresses the joint level of US military decision-making methodology including doctrine. When appropriate, it will mention influential service-specific concepts and doctrine.
4. As applied to security affairs and military organizations, design has been labeled under many terms. Often, terminology has a branding or control aspect where a military service, specific group, or company seeks to monopolize a term to control the process. However, the security design community of practice is vast and diverse. This book features the term *security design* to clarify designing for warfare. Within war applications, the author uses *systemic design* to further distinguish the reflective practice of security design from what will be explained as nonreflective practice. Some militaries opt to place design as a subordinate, optional step in the prevailing military decision-making methodology, indicating a systematic mode of design that is not systemic. See Grigsby et al., "Integrated Planning"; Kem, *Design: Tools of the Trade*; Graves and Stanley, "Design and Operational Art"; and Grome et al., *Army Design Methodology*.
5. Gharajedaghi, *Systems Thinking*, 60.
6. Wrigley, Mosely, and Mosely, "Defining Military Design Thinking."
7. Jennings, "What 'Beyond the Pale' Actually Means."
8. Gharajedaghi, *Systems Thinking*, 62.
9. Gharajedaghi, 25–26.
10. Daft and Weick, "Toward a Model of Organizations as Interpretation Systems," 12.
11. Gharajedaghi, *Systems Thinking*, 26.
12. Weick, *Sensemaking in Organizations*.

# PART 1

# Thinking about Our Thinking in Single, Double, and Triple Loops

Chapter 1

# Why Should the Military Care about Its Paradigms?

Modern military organizations seek a particular overarching approach to arranging decisions and activities in time and space, from broad strategic designs to subordinate, hierarchically compartmentalized operational and tactical actions. For example, entire combatant commands or a service component will establish a "strategic vision," then use a standardized, mechanical approach to identify, evaluate, prioritize, and arrange sequences of engagements/activities. This process converges to a desired end state (strategic goal). Typical phrases in these strategic documents include "achieving objective returns on investments," "optimiz[ing] planning and execution," "establish[ing] a standardized approach to identifying and prioritizing decisions," and "connecting the Command's objectives through planning steps, execution and assessment through a repeatable, structured process."[1] These dominant methodologies and conceptual models—and the very terminology used to convey these concepts—reflect what this book introduces as *single-loop* and *double-loop* learning and strategizing. Such approaches are ultimately nonreflective in that an organization quickly becomes trapped in a cycle of doing the same things while expecting different outcomes. Thinking in loops has been conceptualized and reinterpreted by a range of theorists across such disciplines as sociology, cognitive science, and organizational theory. Recognized pioneers in this field include Donald Schön and Chris Argyris along with Jamshid Gharajedaghi, Russell Ackoff, and Karl Weick.[2] For military applications, Christopher Paparone provides a sociological treatment of military culture, while Peter Pirolli and Stuart Card address how military intelligence analysts might improve their conceptualization of adversaries.[3]

Determining how and why military organizations plan activities in time and space as they do requires the conversation to move above and out of purely procedural arguments. Such discussions include whether planners are properly following the latest planning doctrine or if certain terms should be replaced with new ones to clarify the theoretical, practical, and technical assumptions underpinning current military strategy-making and planning efforts. Instead, only a *philosophical i*nquiry can examine why militaries as a profession appear obligated to particular warfighter frames for decision-making in complex reality and, further, why those institutionalized frames filter out paradoxical or antithetical constructs challenging organizational conventions.

Thus, this book establishes a war philosophy framing of how modern militaries seek to render a dynamic, complex reality into a simplified snapshot. Specifically, predetermined ends that match institutionally sanctioned beliefs and values are conceptualized to pair with ways and means of the military's authorities and capabilities. As is explained, underlying this mindset is a Newtonian-inspired, mechanistic, and linear-causal formulation of thought and action validating the existence of the military force as the instrument of national power for state-directed, organized violence (or potential therein).[4] Complexity theorist Gharajedaghi notes that "the classical notion of causality—where cause is both necessary and sufficient for its effect" can only work as stated in a classical science framework, as when the natural sciences established themselves as the first to modernize away from Feudal Age thinking.[5] The Age of Enlightenment, empirical study of natural sciences, and subsequent Industrial Revolution would modernize the Western world—and with it the professionalization of military forces into entities that emulated a natural science panache departing from earlier war forms.

This Newtonian-styled understanding of reality extends far into human history, enhanced into a "modern scientific rationality" by the rise of natural sciences and rebirth of earlier Greek-Western philosophy and ideas in the European Renaissance. Jörgen Sandberg and Haridimos Tsoukas posit that underpinning this modern scientific rationalization of reality are three core assumptions of all classical sciences. First, human reality "is constituted by discrete entities with distinct properties." Second, "the subject-object relation is the most basic form of developing knowledge about the world." Third, "the logic of practice is constituted by the epistemological subject-object relation."[6] Reducing the world to isolated, bounded parts comes from the Greco-Roman period of philosophical inquiry before the rise of science, yet natural science would rationalize these concepts through analytical experimentation. As the first of the natural sciences (geology, physics, chemistry) quickly took form, the military—as an unscientific, largely Feudal Age enterprise—would attempt not only to return to earlier Greek-Roman warfare roots but to latch on to natural science concepts, terminology, models, and methods to establish the modern scientific rationalization of war.[7]

With the rise of classical (natural) science over the last three centuries, most communities and professions began to adopt its focus on analyzing a system's independent variables—and militaries followed suit. The whole is nothing but the sum of the parts within this mindset. To understand any system, one must apply a scientific method to isolate the parts, determine basic rules that govern them, and then reassemble the whole to gain increased stability, prediction, and control of the entire system that must respond to the constituent independent variables.[8] War philosophers of the ancient through Feudal European periods would rationalize some natural orders upon war.[9] However, the new models stemmed from scientific methodology that included testing and evaluating theories and creating and sustaining conceptual models to then render methodologies to equip warfighters with a different way to rationalize reality.

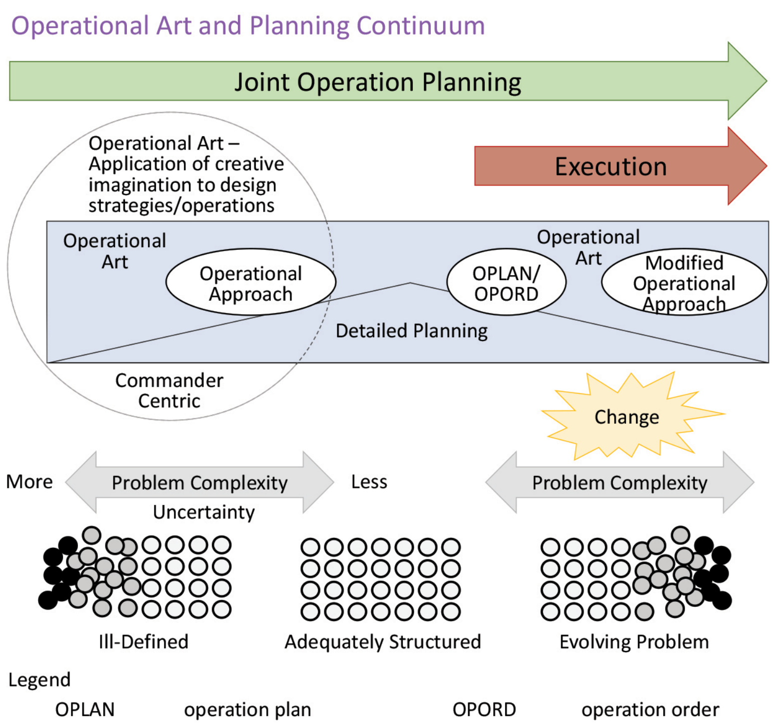



**Figure 1. Operational art and planning continuum.** (Joint Publication 5-0, *Joint Operation Planning*, August 11, 2011, fig. III-3, https://www.bits.de/).

Figure 1 depicts operational art and planning with the ill-defined qualities of a complex reality gradually becoming stabilized, ordered, or frozen in time and space just enough to allow for detailed planning and execution. Then, as complexity demands deviating from executing plans to assessing and adapting to the situation, the "evolving problem" shifts back to uncertainty and is "unfrozen." In critiquing this Newtonian-styled "scientific rationalized worldview," Sandberg and Tsoukas find three specific problems. First, it underestimates the meaningful totality practitioners are immersed in; second, it ignores the situational uniqueness characteristic of their tasks; and third, it abstracts away from time as experienced by practitioners.[10]

In nearly all military decision-making doctrine, the single-loop model (as it will be presented) is used to pursue analytical, not *systemic*, thinking. It also seeks to universalize and converge the institution regardless of situational context (universal laws and principles). Further, it turns time into a linear-causal, forward-backward, objective phenomenon operators can pause, rewind, fast-forward, or play at normal speed in simulations and planning activities and as interpreted by the organization when executing plans. This frame is institutionalized and mandatory for any operators in the organization lest they risk alienation or declaration of heresy.

According to Tsoukas, institutionalization "renders the social world patterned and routinized so that it is possible to 'freeze' patterns and routines, and formally represent them in an abbreviated explanatory-cum-predictive formula" (as depicted in fig. 1 and nearly all doctrine).[11] The mechanistic, sequential, and rather objective rationalization the figure illustrates helps define how and why modern militaries frame complex warfare through particularly rigid and shared constructs.[12] Modern military decision-making assumes that with sufficient information and time, the military operator should be capable of moving from an "ill-defined" reality to a more ordered one—even if just conceptually. Once operators have a more ordered concept through analytical rationalization, they need just construct the proper ends-ways-means instructional aids. These are sustained by the analytical reasoning, formulaic and objective models, and engineering terminology that permit military doctrinal publications to illustrate most warfare challenges with geometric, linear-causal symbols (such as depicted in fig. 1). Warfare becomes a blueprint the builder asks the engineer to map out so that construction crews in the field can create the warfare structure and accomplish its aims.

Tragically, the last three centuries of military modernization and professionalization have introduced dominant habits reflecting a natural science fetish within armed forces for describing reality in security affairs.[13] Strategic design has been influenced by the development of complexity theory, systems theory, and postmodern philosophy—along with contributions in sociology (social paradigm theory as one sub-discipline). Yet designing with these disciplines, theories, and concepts conflicts with the earlier and well-entrenched military frame that emulates a natural science ordering of reality. Therefore, the Newtonian-styled, ends-ways-means-centric, reverse-engineered methodology for formulating strategic designs and operational plans is still the only institutionally accepted way to act in warfare today through institutionalized military doctrine, training, and education. Yet this formula is becoming increasingly fragile and arguably unable to deal with developments in technologically advanced, highly interconnected, and socially developed societies in this information age. War is no longer as it was: military thinking framed within a single-loop or double-loop construct is insufficient for the emerging challenges of the tomorrow war.

**Notes**

(All notes appear in shortened form. For full details, see the appropriate entry in the bibliography.)

1. These statements are commonly found in contemporary policy documents, strategic papers, military vision statements, and military case studies such as those by RAND.

2. See Argyris and Schön, *Theory in Practice; Argyris*, "Double Loop Learning in Organizations"; Gharajedaghi, *Systems Thinking*; Gharajedaghi and Ackoff, "Mechanisms, Organisms, and Social Systems"; and Weick, *Sensemaking in Organizations*. These books dedicate entire chapters and significant portions to these concepts and are primary sources for them.

3. Paparone, *Sociology of Military Science*, 155–61; and Pirolli and Card, "Sensemaking Process and Leverage Points for Analyst Technology."

4. Gharajedaghi, *Systems Thinking*, 10; and Tsoukas, *Complex Knowledge*, 240–42.

5. Gharajedaghi, 91.

6. Sandberg and Tsoukas, "Grasping the Logic of Practice," 340.

7. The Middle Ages featured a shift in how militaries organized, fought, and understood war in a departure from earlier Greek and Roman ideals to those of a feudal model. New ritualization, symbols, theories, and value sets created a unique limited-war construct. Now, titled nobility would control a land-based economy system. They would rely on indentured soldiers/farmers and mercenaries to conquer land or pursue ideological objectives (that still involved land acquisition). This paradigm would change in tandem with the modernization of Europe through science and professionalization of the military.

8. Gharajedaghi, *Systems Thinking*, 13.

9. Ancient war philosophers such as Sun Tzu would address various constructs that impose a natural order to reality and war. This book focuses on the rise of modern military forces that developed from European origins and the scientific and professionalized endeavors associated with the Renaissance and subsequent Industrial Revolution.

10. Sandberg and Tsoukas, "Grasping the Logic of Practice," 341.

11. Tsoukas, *Complex Knowledge*, 73.

12. Joint Publication 5-0, *Joint Operation Planning*, 2011, fig. III-3.

13. Author's note: I wrote this book for defense, security, and governmental organizations. In cases where I refer to concepts and applications within a security context, they generally apply to military and defense organizations as a whole. The NATO Operations Planning Process (NATO-OPP) and joint planning process (JPP) discussed throughout the book apply specifically to militaries. Neither government agencies like the CIA and Department of State nor law enforcement plan and strategize as the Department of Defense does. Only the modern military adheres to a rigid, linear, and highly Newtonian process that includes, for example, centers of gravity, lines of effort, branches, and sequels, as this book will explain.

Chapter 2

# Single-Loop Thinking

## Nonreflective Military Cycles of ENDS and MEANS

Organizational theory, complexity theory, systems theory, management theory, and postmodern theory, among others, include constructs on how and why humans think about their thinking. Such reflection is not universal—not all people reflect on what they are doing or how and why they are doing something as they are in action. Nor do all exercise such reflection in the complex reality in which we live—moving beyond descriptive analysis (who, what, when, where, and to what extent) to synthesis (explanatory and comprehensive). A useful construct for delineating forms of reflective practice is termed "triple-loop learning." This construct represents a new, innovative methodology that the US military and larger defense community could consider for disrupting the legacy mode for military decision-making. It could also be used to introduce significant concepts—such as those in complexity theory, sociology, and organizational theory—that are currently absent or marginalized in the dominant, modern war paradigm. This model offers a single, double, and triple loop to explain how humans learn about their environments and think to devise actions.[1]

The "single loop" is defined as means-end thinking, where a future state of reality is envisioned and clarified to realize a desired "end" or goal. In their work on triple-loop learning, Robert Flood and Norma Romm state that "ends are set and then a search begins for the best means of meeting those ends."[2] The single future state becomes fixed or static so that a single "end" can be reverse engineered in a linear-causal manner using systematic logic. Systematic thinking is entirely linear. We assume that reality can be understood through isolating distinct value sets for the parts of a whole, leading to the total value of the whole.[3] A plus B should lead to C, and this formulaic mode of rationalization fixates on an instrumental, mechanistic, and repeatable conceptualization of how reality works. Single-loop thinking is nonreflective—one follows the instructions like using a coloring book where one draws within the lines. Someone might produce many different versions of a coloring book exercise, but they all will feature coloring within the lines established by the rules of the coloring book. Operators using such conceptualization focus on the process and performance by self-evaluation through measured adherence to (and validation of) the process.

In other words, nonreflective operators become stuck in WHAT-HOW by following an established sequence and are unwittingly and/or unwillingly committed to following the process at all costs. Single-loop operators cannot escape dependence on the single-loop process since they cannot question beyond the limits of following that process. This mechanistic mode reflects powerful influences of how the Age of Enlightenment transferred the laws of reality from ideological structures and beliefs to natural scientific laws and stability. In turn, single-loop thinking exercises a mechanistic, mindless system process with no purpose but as a tool.[4] Operators using single-loop processes are not mindless; however, within using the logical frame, they remain nonreflective and devoted to using the tool as designed. Returning to the coloring book example, an entire class of children will diligently produce a range of colored images that are more or less identical. While they might self-assess how effectively they could color within the directed lines, the students are unable or unwilling to challenge whether the lines should be followed at all, or if entirely different drawings might be produced instead. There is a systematic mode of decision-making that leads to a convergent, uniform, and a predictable outcome for performance analysis and evaluation.

Systematic logic seeks to break things down (reductionism) into inputs linked to outputs—or where A plus B leads to C—in a reliable, uniform, repeatable, and verifiable manner.[5] An institution curates systematic constructs formulaically so that future users can refer to an increasing stockpile of solutions paired with historical problems.[6] We become armed with solutions, searching along our paths in reality for possible matches to emerging problems in our way.[7] Robert Flood and Norma Romm indicate that "single loop learners are task oriented . . . exclusively to identifying the best means to meet their defined ends," adding that "single loop learners are isolationist in this way."[8] This elevation of a "goal-rational orientation" suggests a fixation on goals/ENDS where everything is reduced to a means-end calculation. Mark Rutgers, professor of social philosophy and dean of the faculty of humanities, Leiden University, criticizes this logic because it "disguises how and by whom the goals in question are to be established and which values underlie them."[9] Problems are linked to predetermined solutions in a linear-causal relationship of systematic reasoning in single-loop thinking. Donald Schön, a trailblazer in developing a reflective learning model ("in action" and "on [after] action"), observes, "It is not by technical problem solving that we convert problematic situations to well-formed problems; rather, it is through naming and framing that technical problem solving becomes possible."[10] Elizabeth Kinsella, in studying Schön's theories, elaborates that "practitioners set the problems that they go about solving, and such problem setting is a form of worldmaking that often falls outside the realm of the technical knowledge learned in professional schools." Further, she said, "Problem setting often begins when one's usual understanding of the world bumps up against a disorienting dilemma or problematic situation that falls outside of one's usual frames. . . . In this way the practitioner is viewed *as setting the problem within a world of his or her own making*" (emphasis added).[11]

In single-loop cycles, the military operator is conditioned to not necessarily identify a problem but to frame it within how their paradigm constructs and explains reality so that the frame itself is validated. Thus, the "problem-solution" ideation becomes the default setting for militaries attempting to think and act. When reality is not bending to our will, we deduce that there must be a solvable problem lurking, and we set out analytically to identify and isolate it for further treatment. Single-loop thinking prevents any operator inquiry into those values because it violates the closed, single-loop cycle. Figure 2 illustrates how modern militaries engage in "single-loop learning."[12]

At first glance, the military doctrinal diagram above may not appear to be a "single loop" of nonreflective thinking. Modern militaries generally follow the lead of American joint doctrine where,[13] as illustrated, the design of a military operation begins with the positioning of the organization with respect to its present state (NOW) and where it seeks to move toward (FUTURE DESIRED ENDS). The organization then formulaically begins identifying problems paired with solutions in systematic reasoning through ENDS-WAYS-MEANS logic. In military doctrine, the institution expects organizations to connect "resources and tactical actions to strategic ends." The commander "must be able to explain how proposed actions will result in desired effects, as well as the potential risks of such actions" before any actions even occur in what is a complex, dynamic system.[13] This norm illustrates what Henry Mintzberg, a top strategy and business management thinker, terms "machine bureaucracy." That is, few people at the top of the organization are allowed to think or establish decision-making rules. Subsequently, subordinates act according to institutionalized rules and implement plans in a formulaic manner directed by top leadership.[14] For instance, teachers in a grade school will get their students' coloring book drawings that may differ in color selection and skill in coloring within the lines, but they all will follow a mechanistic, repetitive mode controlled by the teacher and the preconfigured drawn lines. Coloring outside the lines is forbidden and also a rule not to be questioned or considered.

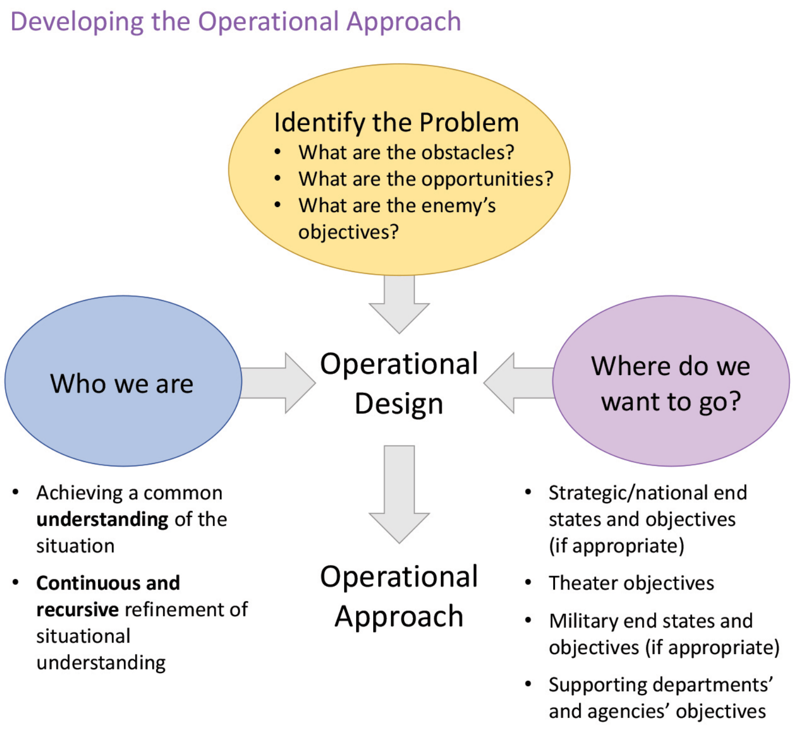



**Figure 2. Developing the operational approach.** (Reproduced from Joint Publication 5-0, *Joint Planning*, December 1, 2020, fig. III-3, 88, https://www.jcs.mil/.)

In figure 2, the question of "where are we?" is positioned in equal yet distinct tension with the competing inquiry of "where do we want to go?" These two constructs inform the operational design through identifying the problem that appears to inhibit the organization from moving unimpeded from NOW to FUTURE DESIRED ENDS. Ultimately, methods used to construct this military narrative rely on implicit institutional beliefs at an epistemological level about "how we know about thinking and acting in warfare." These concepts lurk behind images like the previous one but can be illuminated by considering the single-loop thinking of the modern military and rendering this graphic as depicted below (fig. 3).

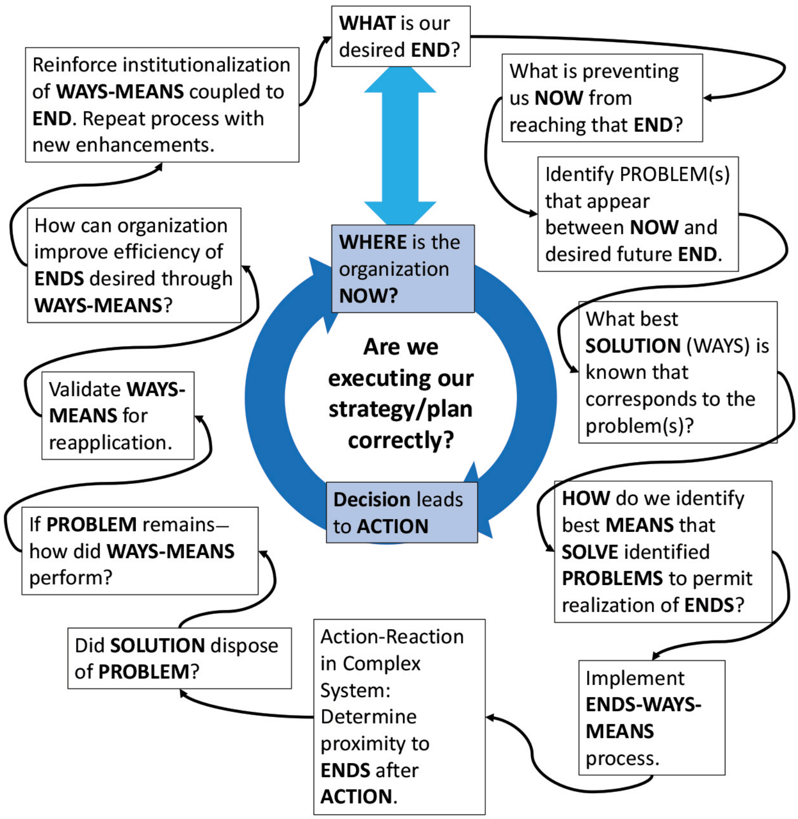



**Figure 3. Single-loop learning (nonreflective) in modern military institutions**

In the above figure, the blue loop is the single loop of nonreflective practice.[15] Operators stuck in this systematic logic will begin with "WHERE is the organization NOW" and then plot a deliberate, linear-causal journey that employs an ENDS-WAYS-MEANS process to formulaically engineer inputs to outputs. They will also attempt to analytically optimize predicted results (ENDS) through direction of institutionalized methods (WAYS) for warfare. These methods try to repeat historical and evaluated/validated processes the organization has collected and curated as best practices, which become further institutionalized with repeated success over time. Mintzberg rejects this rote application as planning and instead terms it "strategic programming," which he defines as "the articulation and elaboration of strategies, or visions, that already exist." He specifies that "planning has always been about *analysis*—about breaking down a goal or set of intentions into steps, formalizing those steps so that they can be implemented almost automatically, and articulating the anticipated consequences or results of each step" (emphasis in original).[16] Military units take the predetermined goal/ENDS of leadership and programmatically follow an established, uninterrupted path set in doctrine. Thus, they generate a plan validating whatever preexisting belief leadership had before the plan was produced. All coloring books will produce millions of similar, convergent drawing outcomes since the decision to make the lines has already been made beforehand.

This lockstep approach creates an organization dependent on policy guided by formulaic structures so that "planning removes the need for decision making."[17] The organization simply follows the set methodology and is insulated from criticism of its performance by attempting to fully adhere to the rationalized actions built into the formulas. Worse still, the institution will begin to symbolize some of these practices with the shared belief system so that predominant methods and activities become ritualized. That is, groups align their values (shared belief system) with artifacts (tangible things and experiences in reality) while elevating some artifacts to a symbolic status.[18] The Statue of Liberty, birthday parties, wedding rings, and wearing Halloween costumes to collect candy door to door are examples in American society of cultural values being symbolized or ritualized with behaviors.

There are other statues, parties, rings, and reasons to dress in costumes, but the symbolic emphasis imposed by our society renders select ones special and in ways above and beyond the nonsymbolic alternatives. In single-loop thinking, symbols and institutionalized patterns are accepted without question, with critical and creative thinking limited to how to reinforce and improve the established constructs—how might we better color within the lines? Thus, entrenched practices become further insulated from any critical reflection beyond the single-loop assessment of "are we executing our strategy/plan correctly?" This core inquiry becomes foundational to retaining a single-loop, nonreflective practice and is central to the preceding diagram.

By the nature of its form and function, the single-loop process creates a potential environment for institutionalized anti-intellectualism in that the purpose of organizational activities *cannot involve questions about the process itself*. Instead, operators unwittingly become locked into following the cycle in figure 3, using indoctrinated methods such as those in Joint Publication 5-0 (fig. 1). Operators are evaluated on their use of ritualized, systematic processes for accomplishing predetermined goals or assessing procedural compliance and efficiency so that they can increasingly follow and further validate that process. In this system, operators who do not perform according to the process fail, while the process itself is rarely critically evaluated due to the need for at least "second-loop thinking." This classical systematic approach comes from the assumption that "a planning project can be organized into distinct phases," according to design theorists Horst Rittel and Melvin Webber. However, they add that "for wicked problems [complex systems] . . . , this type of scheme does not work."[19] Using the terms "first generation" for essentially single- and double-loop thinking and "second generation" for triple-loop thinking,[20] they explain,

> One cannot understand the problem without knowing about its context; one cannot meaningfully search for information without the orientation of a solution concept; one cannot first understand, then solve. The systems-approach "of the first generation" is inadequate for dealing with wicked-problems. Approaches of the "second generation" should be based on a model of planning as an argumentative process in the course of which an image of the problem and of the solution emerges gradually among the participants, as a product of incessant judgment, subjected to critical argument.[21]

When repeated failures occur for military organizations trapped in single-loop, nonreflective thinking, there is introspection and a search for change. However, this inquiry often remains wedded to this same single-loop thinking due to dominant institutionalized beliefs on not just what warfare is and how to link thought to action, but *why* we know what our warfighting processes must be (and indirectly, what must remain outside our framing). This mindset again returns to the epistemological stances of the modern military, particularly with how we view the problem as a subset of our overarching ENDS-WAYS-MEANS form of systematic logic.

Complexity theorist Russell Ackoff indicated that humans attempt to navigate a complex reality by treating the surprises we encounter as we attempt to do things and manipulate reality toward our own goals by framing any interruptions of our "thought to action" continuum as a "problem." A problem only becomes something recognizable and significant if indeed we are prevented from experiencing the future reality flowing just as we anticipated before we formulated some purposeful activity. Greek organization and leadership theorist Haridimos Tsoukas complements Ackoff's ideas, stating that "surprise rests on our perspective and in our violated expectations, not in the system we describe in this way."[22] Schön expands on the concept of problem formulation from a sociological perspective:

> Problems are not given. They are constructed by human beings in their attempts to make sense of complex and troubling situations. Ways of describing problems move into and out of good currency (as the urban problem, for example, tended to be defined in the 1950s as "congestion"; in the 1960s as "poverty"; and in the 1970s as "fiscal insolvency"). New descriptions of problems tend not to spring from the solutions of the problem earlier set, but to evolve independently as new features of situations come into prominence. Indeed, societal problem solving has often created unintended consequences, which come to be perceived as problems in their own right. . . . This pattern of solutions creating unanticipated problems casts doubt upon the tenets of instrumentalism. Our efforts to correct errors have not converged upon solutions that are relatively free of error. On the contrary, the iterative cycles of problem setting and problem solving seem to diverge. The social situations confronting us have turned out to be far more complex than we had supposed, and it becomes increasingly doubtful . . . we can make accurate temporal predictions, design models which converge upon a true description of reality, and carry out experiments which yield unambiguous results.[23]

Essentially, the "problem" as someone or an organization may define it is not in reality the problem; it is what we humans individually or collectively conceptualize. Yet complexity theorists disrupt this factor by reframing surprise as entirely based on human perspective, where the violation of original expectations is inside people's minds and not actually part of the system being described![24] This view bodes poorly for the entire modern military decision-making process. It retains operators in single- and double-loop cycles that require them to preconfigure the "problem" paired with an analytically optimized, historically validated military "solution" so that the commander is comfortable with the implied risk for purposeful military action. Doing so leads to one of the most important points on ends-ways-means logical failings—we are forced into "problem-solution" frameworks that preclude considering the "problem" beyond that narrow band of military performance.

According to Ackoff, humans conceptualize problems in four primary modes: problem absolution, problem solution, problem resolution, and problem dissolution.[25] *Problem absolution* is particularly apparent in the problem-solution framework. It involves ignoring a problem with the expectation that it will fade away over time or otherwise not require any activity to address it. This nonaction is itself an action in any complex system. Paradoxically, many organizations use problem absolution wittingly or unwittingly in applying their decision-making methodologies (e.g., joint planning process) to particular identified security issues but not to others. Individuals in organizations seek to interpret and act within a complex reality using their organizational paradigms. However, in doing so, they may also unwittingly misidentify or fail to identify complex challenges. Further, they may use reductionist methods to focus on an isolated portion of a broader challenge, so they pair a specific "problem" with an institutionalized solution in the same single-loop process. Thus, they ignore or fail to identify the broader problem.

The other ways of approaching problems indicated by Ackhoff—problem solution, problem resolution, and problem dissolution—are described next.

**Notes**

1. Flood and Romm, "Contours of Diversity Management."
2. Flood and Romm, 157.
3. Gharajedaghi, *Systems Thinking*, 112.
4. Gharajedaghi, 11.
5. Tsoukas, *Complex Knowledge*, 20–21.
6. Tsoukas, 242; and Schön, "Generative Metaphor," 143.
7. Meiser, "Ends + Ways + Means = (Bad) Strategy," 81–85; and Mintzberg, Raisinghani, and Theoret, "Structure of 'Unstructured' Decision Processes," 134.
8. Flood and Romm, "Contours of Diversity Management," 158.
9. Rutgers, "Be Rational!," 25.

10. Schön, *Educating the Reflective Practitioner*, 5.
11. Kinsella, "Constructivist Underpinnings in Donald Schön's Theory," 9.
12. Joint Publication 5-0, *Joint Planning*, 88.
13. Joint Chiefs of Staff, "Developing Today's Joint Officers for Tomorrow's Ways of War," IV-4.
14. Mintzberg, "Design School," 185. See also Mintzberg's seminal books, including *The Rise and Fall of Strategic Planning: Reconceiving Roles for Planning, Plans, Planners* (Free Press, 1994).
15. Graphics in this book are original to the author unless otherwise cited. Referenced images and graphics are annotated as such.
16. Mintzberg, "Fall and Rise of Strategic Planning," 108.
17. Ryan et al., "Full Spectrum Fallacies," 244.
18. Hatch and Cunliffe, *Organization Theory*, 168–90.
19. Rittel and Webber, "Dilemmas in a General Theory of Planning," 162.
20. Rittel and Webber wrote their influential article in 1973 and were pioneers in developing a new movement in decision-making, organizational, and management theory that departs from the classical ends-ways-means approaches formalized in the early twentieth century. In the following decades, theorists would expand on their concepts and extend their arguments into "reflective practice," "sensemaking," and "triple-loop learning."
21. Rittel and Webber, "Dilemmas in a General Theory of Planning," 162.
22. Tsoukas, *Complex Knowledge*, 239.
23. Schön, "Generative Metaphor," 144.
24. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 989.
25. Ackoff, "On the Use of Models in Corporate Planning."

Chapter 3

# How Militaries Frame "Problems"

## Why Their Approach Contributes to Conceptual Failings

As a *modern* institution, militaries fixate toward a particular logic of framing "problems"—problem-solution—that Russell Ackoff explains is one way that humans conceptualize reality. Militaries seek to order reality (including war) so that everything can be formulaically interpreted into a problem-solution construct that enables an engineering mindset on how to eliminate a problem.

Military methodologies, doctrine, and training exclusively use this mode of problem framing. Problem-solution is "to select a course of action that is believed to yield the *best possible* outcome, one that *optimizes*" (emphasis in original).[1] Ackoff pairs this alternative with a "research approach" in that the problem-solution framework best matches a scientific methodology and suits the terminology, tools, and techniques of the modern military enterprise that seek to emulate natural science communities of practice. Ackoff differentiates problem-solution from problem resolution.

*Problem resolution* is "a course of action that yields an outcome that is *good enough*, one that *satisfices*" (emphasis in original).[2] Ackoff calls problem resolution the "clinical approach" because it relies on past experiences and a construct of experimental trial and error that builds into a long-term, cohesive knowledge base.[3] Strategists thus have a source for working resolutions when encountering seemingly similar problem sets. Militaries are bound to systematic logic and "problem solution" matched with identification of a related and historically consistent problem.[4] Donald Schön elaborates on this mindset with: "Practitioners solve well-formed instrumental problems by applying theory and technique derived from systematic, preferably scientific knowledge."[5] However, in practice most operators on the ground end up blending the clinical, mechanistic "solution" approach with intuition, tacit knowledge, and contextualization of unique circumstances so that "resolution" is often the realized technique rendered. As mentioned (chap. 1), militaries routinely employ problem *absolution* where Ackoff defines a lack of action or intentional denial of the problem as the decided approach. The convention becomes "ignore it and hope it resolves itself"—one with profound examples in commerce, politics, culture, and war.

Ackoff's fourth form for dealing with problems, *problem dissolution*, is absent from modern military decision-making methods. Ackoff states, "Dissolution involves *idealization* rather than satisficing or optimization [or ignoring], because its objective is to so change the system or its environment as to bring the system closer to an ultimately desirable state, one in which the problem cannot or does not arise" (emphasis in original).[6] Ackoff terms this concept the *design approach*.[7] Problem dissolution cannot be accomplished within single-loop thinking. Nor can operators consider beyond any process that locks them into nonreflectively performing the same sort of problematization repeatedly. Dissolution means that one designs a way to transform the system so that in the emergent, new system what was previously seen as a problem is dissolved and thus no longer a major concern. Nevertheless, the new system formation itself will generate problems. Ackoff explains the distinction between dissolution and linear solution of a problem. He indicates that "the designer makes use of the methods, techniques, and tools of both the clinician and the researcher, but he uses them synthetically rather than analytically. He tries to change the way the system as a whole functions within the larger system that contains it rather than the way its parts function within it." Further, "dissolutions are found in the containing whole; solutions are found in the contained parts."[8]

On single-loop thinking and knowledge curation as it exists in modern military decision-making, military organizations continue to be stuck in cycles of repeatedly doing the same "thought-to-action" continuum without the ability to reflectively practice variation outside that single loop. Or to paraphrase Ackoff, they default to "doing the wrong things right . . . [,] only mak[ing] us more right at being wrong."[9] Single-loop thinking prevents the operator from considering beyond "Are we executing our strategy/plan correctly?" (as depicted in fig. 4). Further, if the organization is confronted with repeated failures using this single-loop logic, it can only shift to yet another single-loop line of nonreflective inquiry. In this loop, the question "Are we doing the right things?" is raised to revert any critical thinking back to process refinement.[10] By moving the discussion from HOW to WHAT, the organization retains the same single-loop fixation on ENDS-WAYS-MEANS by creating new ends and means to consider. The question once again becomes "What else can we do so that the process is unquestioned yet we still can accomplish our desired goals?"

Analytical thinking has for centuries formed the foundation of classical science. The natural science disciplines were the first to deeply influence and inspire Feudal Age militaries seeking to modernize and develop. Yet this analytical reasoning uses a scientific method to assume the whole is "nothing but the sum of the parts, and thus understanding the structure is both necessary and sufficient to understanding the whole."[11] The process of *reductionism i*s not questioned in analytical inquiry, only the results of analysis and whether the operator performed analysis in compliance with how it ought to be executed.

In figure 4 (next page), the conceptualized form of self-referential inquiry occurs within an organization stuck in single-loop thinking due to this institutionalization. It essentially produces anti-intellectualism as a by-product of eliminating any reflective practice or introspection beyond process adherence. The first single loop is the same blue-coded loop as in figure 3 in the last chapter. The organization questions HOW it should think and act so that the ENDS-WAYS-MEANS epistemology for warfighting remains foundational to the decision-making process. If it creates repeated failures, the organization moves to the next single loop where a new question of "WHAT should the organization do if the process is failing?" is applied. HOW to follow the process shifts to WHAT else could be done within that process to accomplish goals. Mintzberg clarifies that "those with a calculating style fix on a destination and calculate what the group must do to get there. . . . The world is supposed to hold still while a plan is being developed and then stay on the predicted course while the plan is being implemented."[12] Thus, although an organization has defined new ends and means, it maintains the same original military decision-making processes (joint planning methodology). If failure still occurs, it will bring in yet a third self-referential loop. Each of these loops functions independently, with the organization executing single-loop learning as it cycles through any of the following nonreflective practices (fig. 4).

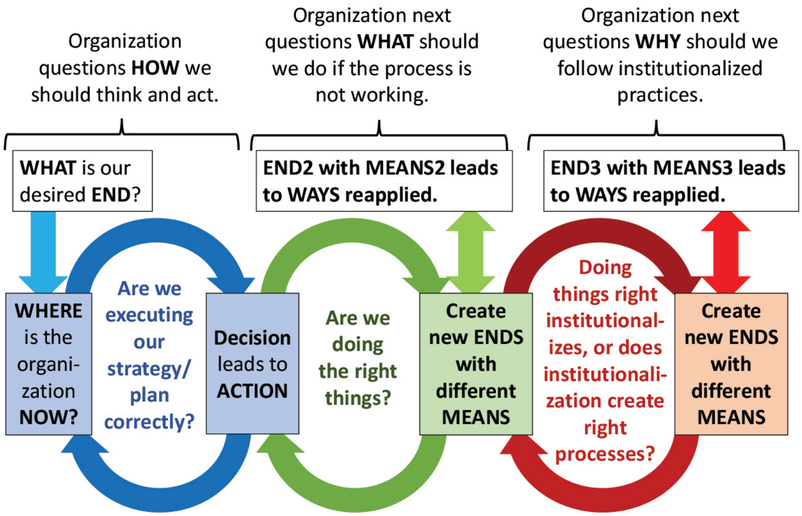



**Figure 4. Single-loop learning as self-referential to the framework**

Drawing from Flood and Romm's original illustration on three types of recursive single-loop practices, figure 4 depicts how a military organization encountering repeated process failures will shift from HOW to WHAT and finally to WHY.[13] Nevertheless, it will remain entirely stuck in single-loop, nonreflective practice. The organization questions WHY it should follow the institutionalized practices where, once more, new ENDS and MEANS are generated within the established limits of the process. This third layer of inquiry ponders, "Is doing things right what causes us to institutionalize best practices, or does our institutionalization itself generate processes we value as the right ones?" Readers should remember that in single-loop practice, the organization jumps from one loop to the next in a sequenced, linear-causal, and systematic mode that retains a nonreflective form of introspection. In each loop shown above, the organization is entirely self-referential. It questions the operators performing the process and how to reinforce the process through accepted variation. It also seeks confirmation of the broader belief system that the process can be improved. However, all developments from such introspection must reinforce the epistemological stances of the overarching war frame.

As the red loop in figure 4 illustrates, an organization might realize that while particular favored practices with historic precedent as "right to use as solutions" may no longer be relevant, the individual constructs themselves become another problem for the overarching process to address. The intentional shift of the US Army and US Marine Corps in 2006 to a new counterinsurgency manual (Field Manual [FM] 3-24/Marine Warfighting Publication [MCWP] 3-33.5) after significant setbacks in Iraq and Afghanistan is a powerful example of staying within a set construct.[14] Although the military institution changed the method for addressing an insurgency, it did not change the overarching process (i.e., how militaries approach all warfare through theory, models, methods, doctrine, and terminology informed by the belief system and values).

Counterinsurgency techniques and even the overarching strategy might be changed with a fresh doctrinal publication issued to all forces. Nonetheless, the deeper epistemological frameworks—conducting counterinsurgency according to entrenched core processes that underpin all other warfighter activities outside of counterinsurgency—remain unquestioned. New ENDS and MEANS might be generated, and even the decision-making doctrine itself (the process rules) might get revisions or alterations. But the overarching form and function of modern military decision-making retains a permanent epistemological fixation on ENDS-WAYS-MEANS for all security challenges. As political scientist Jeffrey Meiser explains, "Far too often, strategy is an exercise in means-based planning; it is inherently uncreative, noncritical, and limits new and adaptive thinking."[15] We simply cannot break out of single-loop conceptualization in war.

**Notes**

1. Ackoff, "On the Use of Models in Corporate Planning," 354.
2. Ackoff, 354.
3. Ackoff, 355.
4. Paparone, "How We Fight"; Zweibelson, "Awkward Tango"; Zweibelson, "One Piece at a Time"; and Zweibelson, "Rose-Tinted Lenses."
5. Schön, *Reflective Practitioner*, 3–4.
6. Ackoff, "On the Use of Models in Corporate Planning," 355.
7. Ackoff, 355.
8. Ackoff, 355.
9. Ackoff, *Redesigning the Future*, 8.
10. Flood and Romm, "Contours of Diversity Management," 158.
11. Gharajedaghi, *Systems Thinking*, 90.
12. Mintzberg, "Fall and Rise of Strategic Planning," 109–10.
13. Flood and Romm, "Contours of Diversity Management," 158.

14. Department of the Army and Department of the Navy, Headquarters United States Marine Corps, FM 3-24/MCWP 3-33.5, *Counterinsurgency*.
15. Meiser, “Ends + Ways + Means = (Bad) Strategy,” 81.

Chapter 4

# Escaping Single-Loop Thinking . . . to Get Stuck in Second Loop of Non-reflection?

Double-loop thinking, as defined by Robert Flood and Norma Romm in their research on critical systems thinking, presents a middle ground between organizations stuck in perpetual process reinforcement (single loop) and those capable of a slightly more useful yet limited form of critical examination. This approach to problem solving is termed "second-loop thinking" and is not to be confused with reflective practice, as it still falls within institutionalized norms and practices. Instead, Flood and Romm explain that "rather than looping between two centres of learning, consciousness gets stuck in the middle looking out. . . . There is double vision and blurriness."[1] Chris Argyris and Donald Schön originally introduced "double-loop thinking" in the late 1970s to demonstrate a more comprehensive, introspective form of learning, which would enable a range of sociological developments.[2] Later, this model would gain a third loop that, in turn, created limits for how single-, double-, and triple-loop cognition could be distinguished. This book introduces and expands on the latest "triple-loop" interpretation in forthcoming chapters.

An organization using second-loop thinking will rotate between inquiring "Are we doing things right?" and "Are we doing the right things?" It is only getting closer to Ackoff's warning that "doing the wrong things right just makes you better at being more wrong." This line of questioning still creates an element of anti-intellectualism in that institutional blindness retains a fixation on preserving epistemological frameworks for how the military must understand what war is and how warfare is exercised within that socially constructed paradigm.[3] Double-loop learning is rarer in organizations than single-loop learning because operators often are pressured to be cautious in critiquing the organization itself.[4] Often, organizational culture and norms prevent an organization from illuminating the information it most needs to investigate. Argyris saw this paradox: "If people could not discuss these issues, they still had to solve them, so they would have to make inferences about others' views. They could test inferences only indirectly and were unable to discuss how they tested an idea."[5] As depicted in the next figure, operators become stuck looping through a process adherence orientation to a more delicate introspection on whether the processes themselves are relevant, leading to a recycling of planned activities rendered through revised process (fig. 5).[6]

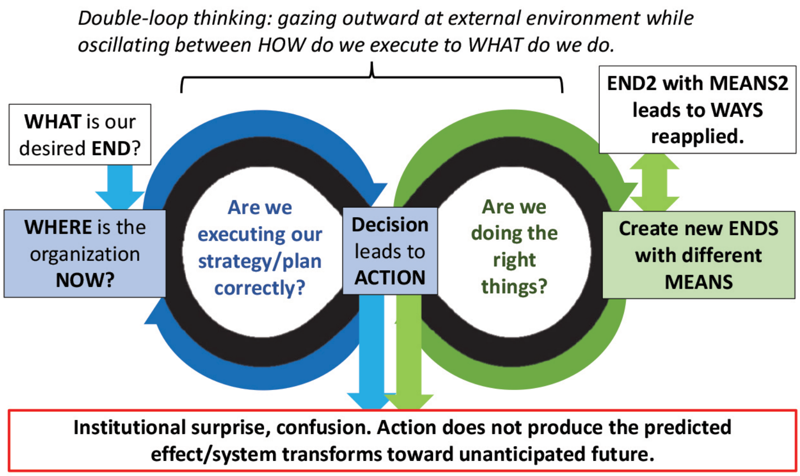



**Figure 5. Double-loop learning in military organizations**

In the above graphic, second-loop thinking oscillates between two of the aforementioned single-loop cycles where the organization looks outward at the external environment and inward at the products and effects of institutionalized processes.[7] Strategists and planners might examine military theories, models, and methodologies codified in published formal doctrine; policy positions; formal and informal activities to curate military knowledge; and areas involving the execution of institutionalized processes for training, education, or warfare activities. Christopher Paparone describes how militaries apply reflective practice to create, maintain, and enforce doctrine:

> US military doctrine as generic sensemaking continues to double down on the logic of systematicity, intent on removing equivocality, increasing robot-like predictive reliability, assuring compliance with hierarchical legal authority structures, and promising postbellum accountability. . . .
>
> . . . It seems no matter how the US military rearranges, relabels, and republishes its doctrine, the underlying logic of action remains culturally imbedded. Experiencing collapses of sensemaking in Vietnam, Afghanistan, and Iraq *seems not to result in wholesale changes to the logic of systematicity*; rather, there is

> again a doubling down on the insularity of treating military actions as complicated servomechanisms (emphasis added).[8]

Yet in either mode of reflection, the activity is single directional in that the organization focuses either externally or internally in a systematic (isolate things down, seek inputs and outputs) versus systemic manner. In the previous illustration, operators stuck in a double-loop learning cycle will follow the infinity loop. They will move from an external inquiry, such as assessing the performance of the process against competitors, to an internal inquiry, where the operators themselves are evaluated on process compliance. Dividing reality mechanistically into the "exterior environment" that permits an allegedly objective observer to conduct analysis forms the basis of modern military decision-making and doctrinal processes.[9] Such analysis helps codify double-loop thinking into binary shifts from internal to external mechanistically and systematically (input to output, formulaic).

Double-loop thinking expands on single-loop thinking in one significant way. Single-loop learning organizations are stuck in a process loop that depends entirely on the sustainment of the process itself (regardless of fear of institutional reprisals for speaking out) as well as the hidden institutional framing that reflects deeply held beliefs, values, and identity. In commercial enterprises, many will fail in changing environments because they simply cannot reimagine themselves as anything but what they have done in the past. Most major horse carriage companies went extinct with the rise of the automobile, and only a handful were able to make the transformation. With the rise of the information age and streaming social media platforms, many big-box stores went out of business. In a military example, most current combatant commands in the US Department of Defense (DOD) are geographically oriented on terrestrial features and established Westphalian boundaries. Today, military organizations and the Westphalian nation-states that wield a war frame established three centuries ago are often criticized as becoming obsolete or at least increasingly fragile.[10] Nevertheless, nearly all military strategic, operational, and organizational decisions still correspond to the traditional geographic combatant command form and function.

A single-loop organization cannot break out of adhering to the established process, where the pre-established ENDS are conceptualized with WAYS and MEANS so that the organization can focus refinement and process improvement on whether operators effectively move from A to B and achieve output C as planned. A double-loop organization moves past this simplistic cycle of single-frame process improvement to one that oscillates between internal and external considerations of that single frame in a moderate level of abstraction.[11]

Abstraction deals with how humans conceptualize ideas instead of focusing on tangibles or events in reality. It forms the basis of all innovation and invention and is what makes humanity a unique creature unlike all others. Without abstraction, humans would remain in their original animal state; before any tool is created as the first of its kind, it must be imagined in abstraction. According to complexity theorist Jamshid Gharajedaghi,

> Image building and abstraction are among the most significant characteristics of human beings, allowing them not only to form and interpret images of real things, but also to use these images to create images of things that may not exist. These images are then synthesized into a unified, meaningful mental model and eventually into a worldview. Man feels hunger, observes the fleeing prey, and realizes his inability to capture it. After discovering other related objective realities (wood, stones, etc.), he thinks about and eventually creates a subjective image of a tool, one yet to be, that would help him secure food. Transformation of this subjective image into an objective reality results in the bow and arrow, which in turn will be a reproducer of yet another image, and so on. This dialectic interaction between objective and subjective realities lies at the core of a process called design thinking, which is responsible for the dynamic development of human societies.[12]

In a double-loop framework, the organization can reformulate new ENDS and generate multiple WAYS and MEANS that ought to offer leadership a suite of options if the first efforts appear to fail. However, double-loop learning does not question beyond the institutionalized frame that defines the very selection of theories, methods, and models or the language and metaphoric devices underpinning standardized terminology. Variety is generated within a double-loop conceptualization of WHY, yet the organization does not move out of systematic logic toward a systemic perspective.

Single-loop and double-loop thinking share with other ideologies a universal and timeless framework that combines some "ultimate truth" (whether ideological, political, or scientific) with a predefined set of ends and means. This is where the concept of epistemology—how we know about our construction of knowledge—becomes critical (see chap. 7 for further detail). How one performs single-, double-, or triple-loop thinking is a modeling of the process of logical progression as an individual subscribes to a social paradigm. Ideologies are formed within a social paradigm, as Western societies tend to employ Judeo-Christian ideologies paired with the political philosophies of liberalism and scientific rationalism. Socialist societies operate differing ideologies (some interpretation of Marxism or Communism), and the social paradigm may reinterpret many overlapping constructs with a different epistemology. That is, one enterprise might use the same terminology as the other, but they both are referring to dissimilar dictionaries based on deep institutional values and belief systems that might be oppositional or incommensurate.

Underlying assumptions cannot be questioned directly, as all inquiry must relate back to supporting the underlying "ultimate truth" that is expressed entirely through the predetermined ends-means relationship.[13] When a military organization approaches some security challenge using single- or double-loop thinking, the preconfigured ends-means relationship exists prior to that organization encountering the specific security challenge. Upon observing and then orienting toward that problem set, it moves through its menu of decision options so that it can choose to act within an institutionally sanctioned process following the single- or double-loop mode of nonreflective practice. Whether uploading beliefs about natural "laws" of war or enforcing a popular conceptual model such as center of gravity or the OODA (observe, orient, decide, act) Loop to nest theories into methodological activities, the preconfigured relationships of ends-means and "ultimate, universal truth" are not themselves ever under critical review.[14] Haridimos Tsoukas elaborates that "justification is to a rule what a shadow is to an object. It follows, therefore, that, in the propositional mode of thinking, *why* practitioners should follow a particular rule cannot be conveyed; what a rule is for cannot be stated. A rule provides the method but not the purpose" (emphasis added).[15]

An example of how double-loop thinking fails an organization in complex security contexts can be found in what the United States Air Force did in Afghanistan. During the American-Afghanistan conflict from 2001 to 2021, the DOD decided early on that the Afghan Air Force would be trained and equipped with smaller cargo aircraft (C-27A planes) retrofitted and enhanced to mirror how the

US Air Force performs air movements and supply missions. In the first phase that ended in 2014 with catastrophic failure, all short runway takeoff C-27A planes were sold as scrap metal after being grounded for over two years.[16] This half-billion-dollar fiasco featured a single-loop cycle of US Air Force advisors in the North Atlantic Treaty Organization (NATO) Training Mission – Afghanistan (NTM-A) organization attempting to improve Afghan pilot and ground maintenance capabilities, while foreign contracted supporters ended up taking over most maintenance duties to achieve mission goals. Although maintenance was accomplished, the Afghan Air Force remained largely untrained and entirely dependent on foreign assistance.

The double-loop cycle that also existed in this same Afghan aviation endeavor was where the US Air Force sought to find ways to restart the training of pilots and ground maintainers so that they might become independent when the Obama administration in 2012 accelerated all transition of security missions and permanent Afghan security infrastructure over from coalition to Afghan Security Forces. In numerous strategic planning sessions within NTM-A,[17] US Air Force leadership in NTM-A stipulated to the design and planning teams that—under no circumstances—would a future Afghan Security Force restructuring proposal include any departure from the current Afghan Air Force implementation plan of the C-27A airframes through 2020, when those planes would reach the end of their service life. Anything else for the Afghan Security Forces might be modified, but for the Afghan Air Force, only the operators on either side of the "advisor-advised" relationship and certain processes within the overarching strategy could be targeted.

As the Afghan Air Force would collapse well before the expected 2020 life cycle termination of the original C-27A fleet, American and coalition advisors were trapped in a double-loop learning cycle where mission performance was entirely oriented on the original frame preservation. Western military aviation organizes within a highly centralized and technologically sophisticated form of tasking aviation effects with a decentralized support model. Essentially, ground forces will have some aviation available at all times, but they cannot specifically control or task direct support due to the entire organizational form/function of how Western air forces exercise their abilities.[18]

Many air forces through World War II and even into the 1950s employed an alternative model termed "penny packets" where ground forces directly controlled and employed aviation. This strategy paired well with lower technology, simpler airframes. Why didn't NTM-A consider implementing a penny packets construct with low-tech, simpler airframes for the Afghan forces in 2010 when things were going so poorly? Those questions would not be considered. The strategic guidance issued from the start prevented any such inquiry from migrating away from the original goal—to have the Afghan Air Force largely function as a mirror reflection of how the US Air Force advisors themselves functioned. This singular focus is where "triple-loop learning" was absent and likely a fundamental reason for understanding the sudden and complete collapse of the Afghan Security Forces in 2021.

**Notes**

1. Flood and Romm, "Contours of Diversity Management," 159.

2. Argyris and Schön, *Theory in Practice*; and Argyris, "Double Loop Learning in Organizations." Similar concepts include Schön's reflective practice and Weick's sensemaking, further discussed in this book.

3. "Paradigm" is applied here from a sociological sense, not the original "natural science" context that Thomas Kuhn first developed. Sociologists, complexity theorists, and organizational theorists often substitute "frame" with paradigm.

4. Argyris, "Double Loop Learning in Organizations."

5. Argyris.

6. This interpretation of a double loop differs from how Argyris and Schön originally presented it due to later development of a triple loop. By integrating triple-loop theory, social paradigms, Schön's reflective practice, and Weick's sensemaking, the original Argyris/Schön double-loop model is rendered less reflective in nuanced ways.

7. Argyris, "Double Loop Learning in Organizations."

8. Paparone, "How We Fight," 521–23; and Bousquet, *Scientific Way of Warfare*.

9. Tsoukas, *Complex Knowledge*, 220.

10. Lockhart and Miklaucic, "Leviathan Redux," 299; Gorka, "Adapting to Today's Battlefield"; and McFate, *New Rules of War*.

11. Abstraction is covered in greater detail in chapter 5.

12. Gharajedaghi, *Systems Thinking*, 60.

13. Gharajedaghi, 66.

14. The OODA Loop and "centers of gravity" are explored later in this book.

15. Tsoukas, *Complex Knowledge*, 244.

16. Defense Industry Daily Staff, "From Solution to Scrapheap."

17. The author was a lead planner and designer for many of these activities and had a firsthand account of how US Air Force leadership imposed rigid controls on what could and could not be considered. See Zweibelson, "Does Design Help or Hurt Military Planning," pts. 1 and 2; and Zweibelson, "Military Design in Practice."

18. Most Western technologically advanced air forces use a centralized form of airpower distribution, yet the alternative "penny packets" approach was used in World War II and by the French in the 1950s. See Zweibelson, "Penny Packets Revisited."

Chapter 5

# Triple-Loop Learning

## Moving Beyond the Pale of the Institutional Limits

In Flood and Romm's version of triple-loop learning, an organization recognizes the value of synthesizing multiple frameworks and plans accordingly. They characterize this synthetic thinking as iterative, nonlinear, and able to paradoxically consider interior and external perspectives using a diversity of models, methods, and theories that disrupt established institutional frames (what maintains single- and double-loop thinking). A military paradox emerges where single- and double-loop learning are appealing to organizations that want to be in control, while triple-loop learning acknowledges that in complex systems, control is usually an illusion. Alex Ryan et al. summarize this tension: "If events are random, we are *not i*n control, and if we are in control of events, they are not random" (emphasis in original).[1] Henry Mintzberg et al. differentiate strategizing in dynamic, ever-changing, and emergent systems as a process characterized by "novelty, complexity and open-endedness. . . . The organisation usually begins with little understanding of the decision situation it faces or the route to its solution."[2]

However, Flood and Romm's position is weakened by a lack of clarity on what constitutes a triple loop from a philosophical, theoretical, and multidisciplinary frame of reference. To enhance their argument, the theories of Donald Schön, Karl Weick, and other influential sociologists are merged here, along with complexity theorists who also engage on what a "reflective practitioner" is for the socially complex reality that humans generate atop the existing natural order of complexity. Schön uses "reflective practice" while Weick opts for "sensemaking," yet these concepts overlap and interplay extensively in triple-loop learning as presented here. Drawing from Ackoff and systems theory, Jamshid Gharajedaghi uses "holistic thinking" as one of several similar terms to articulate this reflective practice. He notes that "learning to learn is about the ability to learn, unlearn, and re-learn, both within and beyond conventional frameworks. . . . Unlearning is much more difficult than learning."[3] The institutional rigidity of single- and double-loop thinking intentionally generates these phenomena.

A primary oversight of single- and double-loop thinking is the emphasis on processing all activities through a lens of rational action. Once the norms found to be most compatible with rationalized action are identified—efficiency, consistency, uniformity, repetition, and coordination—the entire decision-making process (from strategic to tactical) is appraised entirely on how tightly these norms are followed. Aaron Wildavsky elaborates observes, "The assumption is that following these norms leads to better decisions. Defining planning as applied rationality focuses attention on adherence to universal norms rather than on the consequences of acting one way instead of another. Attention is directed to the internal qualities of the decisions and not to their external effects."[4]

In nonreflective thinking, strategists and planners are trapped into this rationalized action frame. Their often unwitting rationalization while moving in a single or double loop can cause the organization to fail without realizing why. Rationalized planning "is the attempt to control the consequences of our actions. . . . [It] is the ability to control the future by current acts." Yet a single-loop cycle of planning "becomes a self-protecting hypothesis; so long as planners try to plan, it cannot be falsified."[5] That is, when planning outcomes do not match the original intent, planners can offer that "the enemy has a vote" and that the planning process itself was a proper rationalization despite execution failures and surprises. The inability to break free from self-referential patterns will protect the rationalization of what constitutes a valid planning process and mitigate process errors by blaming either the operator and/or a complex external system. As long as planners plan by the preferred rationalized process, the institution preserves itself inside a nonreflective cycle of thought and action.

While this sort of rationalization may work in simple and some complicated systems, it becomes paradoxical in complex (and chaotic) systems where warfare occurs.[6] Single- and double-loop cycles steer operators toward assumptions that their institution has already worked out the rationale employed. Thus, by using the linear, mechanistic decision-making methodologies in military doctrine and adhering to the rules therein, the entire process subscribes to the rationalized action. Yet complexity violates this precept since "what is rational to the values of the actor may be different to the organisational values, which in turn may be different to the values highlighted by the subsequent analyst."[7] Triple-loop thinking demands reflective practice so that operators can think paradoxically. They can explore these tensions in how humans interpret reality in strikingly different ways yet are systemically acting within the same dynamic, complex, and emergent system that rejects much of the logical conclusions that single- and double-loop thinking can provide. Strategies in complex contexts may form gradually as the operators interact and sensemake, even unintentionally or in highly unexpected, emergent ways.[8] This dynamic runs contrary to single- and double-loop assumptions of control and prediction.

Triple-loop thinking is best paired with multi-minded systems from an organizational theory perspective. While single-loop thinking works with mechanistic, "mindless" systems lacking purpose or choice outside of following established rules and process, double-loop thinking seems to integrate with uni-minded systems that place "choice" and purpose at the system end where the brain or leadership node is. Parts within a uni-minded system are compelled to remain static and obey the larger system rules. Thus, double-loop thinking cannot itself escape the system pull of remaining within institutional boundaries conceptually. Yet multi-minded systems are socially dynamic, and all members can exercise their own purpose and choice independent of what the overarching system might be doing.

Multi-minded systems comprise members who voluntarily participate, and that system itself is nested in larger, purposeful systems that continue upward and outward in emergent, nonlinear, and complex ways.[9] Unlike assembling some machine with parts dependent on how the whole is constructed, socially dynamic organizations are constantly in flux at multiple levels. They require a completely different way of understanding multi-minded systems that mechanistic (single-loop) and biological (double-loop) frames simply cannot provide.[10] In complexity, ends and means become interchangeable concepts, with many "ends" becoming a new "mean" for further emergent ends that only now come into realization through how a complex, dynamic system exercises multi-minded patterns. At sufficiently higher levels of complexity, ends and means can converge and become the same, making reflective practice and systemic design the only real options for how humans might make sense of a reality incompatible with single- and double-loop rationalization.[11]

Schön and Martin Rein see reflective practice as the intertwining of thought and action but not in the linear-causal form that single- and double-loop operators use to frame reality. In those situations, "practitioners tend to assume that the factors essential to the goals they pursue lie at least partly within their control. With their taken-for-granted assumptions, they tend to ignore the factors that lie beyond their control and the shifts of context that may distort the hoped-for outcomes of deliberate action."[12] The belief that a system is stable and understandable enough to permit systematic logic with future goals reverse-engineered along linear-causal "lines of effort" reinforces this assumption.[13] Yet complexity regularly violates these aspirations of reductionist, mechanistic control. Humans are not objective creatures, nor does the social construction of human experiences permit some universal order and stability so that one context can transfer to another and yield similar, repeatable results. Instead, it is the social framings held by actors that need to be added to systemic appreciation.

Anna Danielsson—using the alternative spelling of "reflexivity"—frames the rise of reflective practice in military organizations:[14] "Reflexivity shifts the military attention to the knowing subject, to the social conditions and constitutions of knowledge, and to the *interactions* between the knowing subject, knowledge constructions, and other objects and subjects in the world" (emphasis in original).[15] In studying the emergence of reflective practice across military organizations, Danielsson observes that this multidisciplinary approach has entered into military education "often in close association with the broader discourse on military design . . . and not without resistance."[16] Whether triple-loop learning and overlapping concepts of reflective practice and sensemaking are indeed gaining headway into traditional military decision-making methodologies, doctrine, education, and training remains questionable. Numerous educators, theorists, and facilitators write about the difficulty and resistance in getting these ideas and perspectives past the institutional gatekeepers and defenders (witting and unwitting) of single- and double-loop thinking orthodoxies.[17] Reflective thinking is unavoidably disruptive. Thus, any conspicuous military resistance indicates that triple-loop learning as a novel process is creating the desired effects on an organization rooted in single- and double-loop practices.

Schön and Rein elaborate on reflective practice: "The frames held by the actors determine what they see as *being* in their interests and, therefore, what interests they perceive as conflicting. Their problem formulations and preferred solutions are grounded in different problem-setting stories rooted in different frames that may rest, in turn, on different generative metaphors" (emphasis in original).[18]

While single- and double-loop learners implicitly accept their assumptions without any critical inquiry into the larger system, reflective practitioners follow a third loop of learning where they accept that "there *are no objective observers.* There is no way of perceiving and making sense of social reality except through a frame, for the very task of making sense of complex, information-rich situations requires an operation of selectivity and organization, which is what 'framing' means" (emphasis in original).[19] Reflective practitioners move to higher levels of abstraction and inquiry to illuminate institutionalized processes and the ontological (what we know is real) as well as epistemological (how we know to construct knowledge about the real) choices that stimulate such structures in a frame. WHY folds back upon WHY, with recursive iterations of deeper introspection *beyond the limits of causal single- and double-loop thinking.* In distinguishing reflective practice from nonreflective practice (those trapped in single or double loops), Haridimos Tsoukas observes that "we become reflective practitioners when we both unreflectively carry out our research tasks to generate new knowledge about organizational phenomena of interest and engage in discussions about the validity of our knowledge claims" (emphasis in original).[20]

Reflective practice demands the acknowledgement that paradox and complexity are not just foundational to reality. They should be readily embraced instead of marginalized or avoided. Tsoukas states that "the human world cannot be mathematized because it is a world *defined* by beings with the capacity to reflect upon, and so contradict, any mathematical description made of them" (emphasis in original).[21] Militaries confuse the second order of complexity (that which humans socially construct) with the patterns and conditions of the first natural order of complexity. This misconception leads to a highly engineered, formulaic, and Newtonian-styled mode of systematically framing reality—one that becomes preferential to single-loop and double-loop cycles of theory and practice for an organization.[22]

Militaries tend to contradict Tsoukas and invest mental energy in planning and strategy-making by attempting to mathematize warfare entirely, including the human actors on both sides of a conflict. They try to understand war as a biological or physical fact of reality when it is instead a socially created one.[23] The Western world has incorporated complexity theory writ large, yet militaries appear devoted to their Newtonian-styled war frame that in turn cannibalizes complexity concepts. Consequently, their meaning is lost, and orthodox planning doctrine becomes littered with "faddish new fashions" devoid of content.[24]

In the illustration below (fig. 6), the triple loop exists only at the highest level of abstraction, beyond the self-imposed limits of any single paradigm (organizational frame). This level of inquiry and awareness does not look at theory from within the very ontological and epistemological choices that provide the theory itself a framework of logic. For example, a capitalist attempting to understand communism without departing from the theoretical framework of modern capitalism denies entry of Marx's theories of scientific socialism. Synthesizing the two theories so they are understood and represented requires a higher level of abstraction, which Tsoukas terms the *meta-theoretical level.*[25] At this meta-level, the operator questions beyond a single frame and becomes appreciative of multiple social paradigms. Instead of attempting to generate a single theory about a particular topic, an operator endeavors to "make the generation of theory itself an object of analysis."[26] Versus generating superior results through increased analysis and descriptive knowledge in an attempt to reduce complexity mechanistically into smaller isolated pieces, reflective practice thinks systemically. Thus, "actors become aware of the assumptions, the presuppositions, and the point of their actions only *after* they have obtained some distance from their actions, by looking back at them. Greater awareness comes about when we reflect on the way we reflect" (emphasis in original).[27]

For military organizations conducting a postmortem of the spectacular and unexpected Afghan military collapse in 2021, second- and triple-loop analysis would differ. Those engaging in a second-loop, nonreflective practice might seek to redefine existing methods for counterinsurgency operations. They may examine how to better accomplish foreign internal defense activities by introducing a new theory, new models, and different terminology to buttress the existing decision-making methodology. Conversely, triple-loop operators would deconstruct why modern militaries emphasize systematic logic for executing warfighter activities or project their own institutional values and organizational structure on all foreign entities, regardless of context.

Reflective practitioners might explore the dissimilar war paradigm of the adversary and why modern militaries dismiss such realities as irrelevant to universal war principles they employ to understand and define the enemy. They might evaluate why modern militaries converge decision-making through reverse-engineered, ends-ways-means-derived formulas that violate most tenets of complex systems. In the triple loop, operators are thinking about their own thinking and recursively using WHY-oriented inquires to explore well outside the institutionalized processes of linear-causal, systematic sequences nested to preconceived goals.

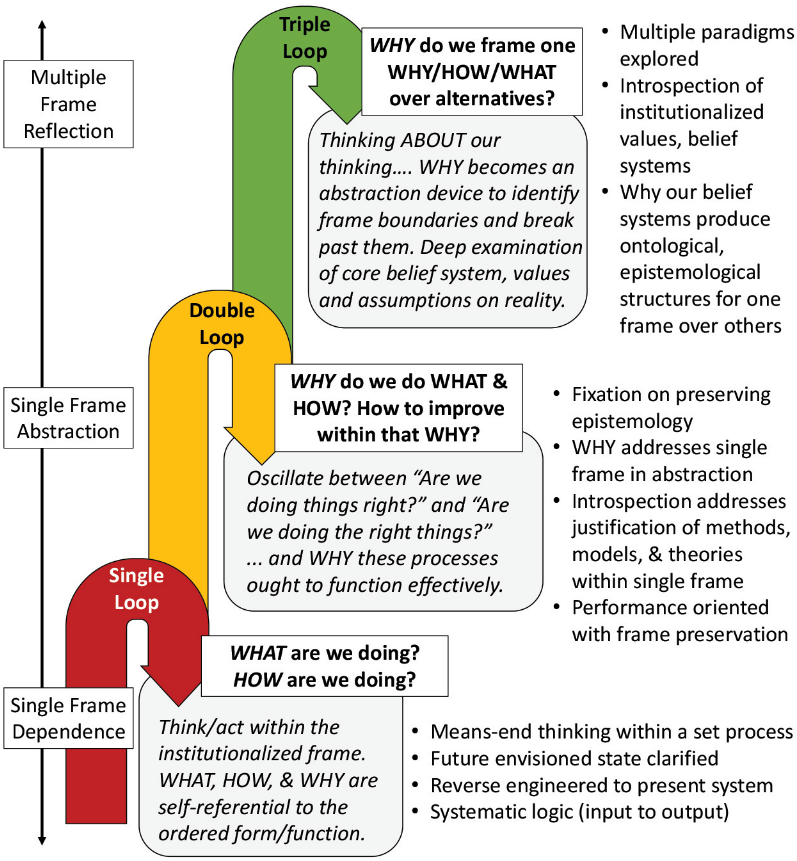



**Figure 6. Triple-loop learning and reflective practice**

Entering into triple-loop learning and reflective practice swings critical self-inquiry not just toward one's processes and institutional biases but toward abstraction on how and why humans socially construct a rich, dynamic tapestry of ideas, belief systems, values, and language upon a naturally complex world. A reflective practice requires operators to construct narratives iteratively as they attempt to appreciate what is ultimately an *interpretivist reality.*[28] This third loop of systemic inquiry features recursiveness in that as analysts engage with the system under study, they "must also confront . . . [their] own complexity." That is, "reflexivity is related to contextuality in the sense that inclusion of the narrator in the narrative involves another layer of context."[29] This generates recursiveness where reflective inquiry reveals layer after layer of systemically arranged and intertwined constructs. Recursiveness requires synthesis over analysis or a systemic framing that does not isolate, reduce, and render into parts to understand the whole. Russian dolls stack within one another as one metaphoric approach to this concept. In another example, a musician who writes a hit song is the original creative force in bringing abstraction into reality. However, individual listeners will interpret and assign meaning outside the artist's control and perhaps far beyond any original intent or design. Unexpected songs are sometimes the backdrop at weddings for the couple's first dance, not because the original artists wanted to write a touching love ballad but because of the rich, nonlinear, emergent recursiveness of a complex reality. Conversely, some of the most upbeat, toe-tapping tunes would be reintroduced in violent movie scenes that caused the audience to reassociate those songs with negative ideations.[30] To synthesize meaning, a triple-loop thinker cannot approach complexity in an analytical mindset. Increasingly abstract system pairings demonstrate influences and relationships that transform original frames and relationships into new, recursive constructs.[31]

In triple-loop thinking about complex systems, "meaning" outpaces "predetermined goals" for how organizations ought to approach decision-making.[32] This emphasis is devastating for single- and double-loop thinkers stuck in nonflexivity; it is incongruous with their insistence on goals/ENDS for any and all planning endeavors.

Tsoukas and Mary Jo Hatch note that "the recursiveness of context extends to the recursiveness of narrative thinking, so that thinker and thought become so intertwined as to render the possibility of disentanglement unimaginable, and ourselves more complex."[33] The preferred single- or double-loop approach of modern military decision-making methodologies, such as the joint planning process, is simply ill-equipped for complex systems. These approaches can do nothing other than mechanistically and systematically isolate, categorize, and apply universal formulas to a complexity that must reject such attempts outright. Schön's position on a reflective approach holds that "the problems of the real world practice require a process that engaged the practitioner's theoretical, procedural, and reflective knowledge."[34] In this triple loop, decision-makers must "move beyond a purely rational model of understanding to one that is transactional, open-ended, and inherently social" (fig. 6).[35]

## Notes

1. Ryan et al., "Full Spectrum Fallacies," 248.
2. Mintzberg, Raisinghani, and Theoret, "Structure of 'Unstructured' Decision Processes," 136.
3. Gharajedaghi, *Systems Thinking*, 103.
4. Wildavsky, "If Planning Is Everything, Maybe It Is Nothing," 130.
5. Wildavsky, 128–31.
6. Snowden and Boone, "Leader's Framework for Decision Making"; and Snowden, "Application of the Cynefin Framework."
7. Rutgers, "Be Rational!," 30.
8. Mintzberg, "Patterns in Strategy Formation," 935.
9. Gharajedaghi, *Systems Thinking*, 12.
10. Tsoukas, *Complex Knowledge*, 111.
11. Gharajedaghi, *Systems Thinking*, 107.
12. Schön and Rein, *Frame Reflection*, xiv.
13. Tsoukas, *Complex Knowledge*, 22–23.
14. Within sociology and complexity disciplines, researchers do not appear to agree on whether "reflective" or "reflexive" is the correct terminology and have various nuanced distinctions. This variation is irrelevant to this book's overarching purpose.
15. Danielsson, "Knowledge in and of Military Operations," 319.
16. Danielsson, 6.
17. Mitchell, "Stumbling into Design"; Beaulieu-Brossard and Dufort, "Rise of Reflective Military Practitioners"; Paparone, "Designing Meaning in the Reflective Practice of National Security"; Martin, "Tale of Two Design Efforts"; and Graicer, "Beware of the Power of the Dark Side."
18. Schön and Rein, *Frame Reflection*, 29.
19. Schön and Rein, 30.
20. Tsoukas, *Complex Knowledge*, 333.
21. Tsoukas, 224.
22. Meiser, "Ends + Ways + Means = (Bad) Strategy"; Monk, "Fallacy of Modern Military Planning"; and Paparone, *Prospects for Postinstitutional Military Design*.
23. Malešević, *Sociology of War and Violence*, 57.
24. Ryan et al., "Full Spectrum Fallacies and Hybrid Hallucinations," 239.
25. Tsoukas, *Complex Knowledge*, 322–23.
26. Tsoukas, 322.
27. Tsoukas, 326.
28. Interpretivism is one of four primary social paradigms that became prominent in social paradigm theory in the 1970s. Social paradigms are expanded upon later in this book. The interpretivist paradigm differs from the functionalist paradigm, which modern militaries rely on exclusively to extend natural science constructs into warfare explanations. See Burrell and Morgan, *Sociological Paradigms and Organisational Analysis*; Morgan, *Images as Organizations*; and Paparone, *Prospects for Postinstitutional Military Design*.

29. Tsoukas, *Complex Knowledge*, 249–50; and Tsoukas and Hatch, “Complex Thinking, Complex Practice.”

30. Director Quentin Tarantino notably creates such associations in his films, such as his violent and groundbreaking film *Pulp Fiction* that begins with Dick Dale’s “Misirlou,” originally a surfer song linked to the Californian beach lifestyle.

31. For instance, children might associate an old pickup truck with their father and feel warmth and happiness when it is parked in the driveway. If their father passes away, they might deepen such emotions toward the vehicle or perhaps wish to avoid ever thinking of it. Neither the truck manufacturer nor the parent who purchased the vehicle has control over or intended the association.

32. Rutgers, “Be Rational!,” 31.

33. Tsoukas and Hatch, “Complex Thinking, Complex Practice,” 1000–1003.

34. Schön, *Reflective Practitioner*.

35. Schön and Rein, *Frame Reflection*; and Lichtenstein, “Generative Knowledge and Self-Organized Learning,” 48.

Chapter 6

# The "So What" on How Single-Loop and Double-Loop Cycles Are Dangerous

Modern militaries rely on single- and double-loop thinking processes to maintain a fragile decision-making framework that is hierarchical and scales upward or downward with the same constructs intact. Plans for future action revolve around an institutional fetish for clear, objective, and stable goals/ends—despite the paradoxical admission that all war is wickedly complex and resistant to such efforts. One observation is that "the military mind exhibits an almost pathological desire to achieve certainty."[1] Meiser concludes that "the American way of strategy is the practice of means-based planning: avoid critical and creative thinking and instead focus on aligning resources with goals." Further, "problem[s] with our current understanding of strategy are exacerbated by the whole-of-government approach encouraging us to define national power as a discrete set of instruments that form a convenient acronym."[2] This mindset is an expression of single- and double-loop learning, where militaries become trapped in cycling through a process prohibiting any systematic appreciation beyond the institutionally imposed rationalization that process improvement is possible only through tighter adherence and compliance. Organizations are educated, trained, and evaluated in training centers to follow the process, refer to doctrine, and self-assess entirely on how well they achieved process compliance as a linear-causal assumption that proper process leads to goal accomplishment.

The ends-ways-means structure operates at a high strategic level and also scales down in subordinate fashion to the smallest tactical or technical activity if properly rationalized and sequenced within the bigger frame. Much as Russian nesting dolls fit within each other, militaries assume that the formulaic, universal, and repeatable qualities of isolated tactical events in warfare must correspond directly with broad, strategic, and operational processes so that planners at all levels can synchronize and accomplish desired goals. This approach reflects a Newtonian-styled perspective of warfare. It violates most core tenets of complexity theory and how humans collectively socially construct a second order of reality upon an already complex natural order. Taking the military decision-making methodology (whether the joint planning process, NATO's Operations Planning

Process, or a service variation) that is a tactical problem-solving analytical construct and applying it to operational and strategic challenges is problematic. However, it forms the raison d'*être* for the rise of the military design movement starting in the late 1990s.[3]

Arkalgud Ramaprasad and Ian Mitroff, in their paper "On Formulating Strategic Problems," observe that "a strategic problem does not have a unique, universal formulation—it cannot be projected upon larger systems from original sub-system analysis. Second, formulating a strategic problem in different ways can result in different solutions to the same problem. Third, an error in formulating a strategic problem can result in solving the wrong problem."[4] Lastly, nonreflective practitioners cannot break out of this loop, dooming the organization to cycling back through where one might be effectively "solving" certain problems at a tactical level. Consequently, success is localized exclusively to one potentially irrelevant part of a larger system where strategy is entirely decoupled from tactical activities. This disconnect is ultimately why strategists and planners in military organizations must gain reflective practice and assume a triple-loop learning approach.

Triple-loop learning incorporates reflective practice so that strategists and planners can break out of institutional barriers and single-frame limitations. Reflective practice involves what Karl Weick also terms "sensemaking" where there is "the process of social construction that occurs when discrepant cues interrupt individuals' ongoing activity, and involves the retrospective development of plausible meanings that rationalize what people are doing."[5] Triple-loop learning is already found in many of the military design methodologies, particularly those drawing from the theoretical work of Shimon Naveh, Ofra Graicer and the Israeli Defense Forces.[6] Reflective practice is also demonstrated in recent design case studies, including the US Army's 75th Ranger Regiment and other US services, the Canadian and Australian militaries, and NATO.[7]

Unlike in single- and double-loop thinking where operators are trapped in reinforcing and at times modifying a process to support the deeper assumptions and institutional beliefs justifying it, reflective practitioners take a triple loop outside these limits. In complex security contexts, the system is never stable or malleable to uniform or universal techniques. There is instead a process of dynamic reflexivity where the system is self-organizing and responding to the military force as it selects activities to perform. Consequently, predetermined goals are often abandoned or, more tragically, doubled down upon—often compounding the failure systemically. In the triple loop, "when an individual faces something unexpected, his or her sense of surprise and the resulting reflection-in-action elaborated by Schön can lead to a new way of framing or testing the situation."[8]

This reframing creates the first necessary step at a philosophical level for military introspection on why and how decisions are made internally. Such perspective is indeed thinking about our thinking, and reflective practice can only be realized through deliberate philosophical consideration. Students in contemporary military educational programs often lack the concepts to approach their entire warfighter frame at a philosophical level of inquiry first, illuminating a need in these programs. Approaching decision-making at a broader level helps clarify how and why decision-making methodologies function as they do and enables deeper reflection on theories and models underpinning those methods. The corresponding doctrine, terminology, and techniques can be disrupted out of the current single- and double-loop frameworks and toward a mode that places triple-loop learning as the new foundation.

Yet most military educational programs fixate on a single loop of process instruction and adherence in junior military development (learn the method). Arguably, in advanced education and training, intermediate career and senior leaders may only reach a double loop of critical reflection within institutionally sanctioned limits. One may question how the joint planning doctrine is applied to various security challenges—but not whether underlying models, theories, and core logic are appropriate. Mats Alvesson and Andre Spicer bluntly critique organizations that insist on nonreflective decision-making, terming it "functional stupidity." While it seems a harsh criticism, they summarize the core points of this first section and provide a useful point of transition to the next area of focus:

> Functional stupidity is organizationally-supported lack of reflexivity, substantive reasoning, and justification. It entails a refusal to use intellectual resources outside a narrow and "safe" terrain. It can provide a sense of certainty that allows organizations to function smoothly. This can save the organization and its members from the frictions provoked by doubt and reflection. Functional stupidity contributes to maintaining and strengthening organizational order. It can also motivate people,

help them cultivate their careers, and subordinate them to socially acceptable forms of management and leadership. Such positive outcomes can further reinforce functional stupidity. However, functional stupidity can also have negative consequences such as trapping individuals and organizations into problematic patterns of thinking, which engender the conditions for individual and organizational dissonance?

Continued rejection of approaching how militaries form and employ their warfighter frame is not just an anti-intellectual reaction toward philosophy (or more bluntly, functional stupidity of the organization). It is a doubling down on retaining single- and double-loop decision-making cycles for institutional self-interests that are bankrupting the military's ability to think innovatively, critically, and reflectively.[9] Without triple-loop thinking, how can the military transform the organization toward necessary reforms and prepare to fight tomorrow's war *differently than just recycling how they lost the last one*?

**Notes**

1. Ryan et al., "Full Spectrum Fallacies," 247.
2. Meiser, "Ends + Ways + Means = (Bad) Strategy," 90.
3. Sorrells et al., "Systemic Operational Design," 15.
4. Ramaprasad and Mitroff, "On Formulating Strategic Problems," 597.
5. Maitlis and Sonenshein, "Sensemaking in Crisis and Change," 551.
6. Naveh, "Australian SOD Expedition," 9; Graicer, *Two Steps Ahead*, 33; Graicer, "What Lessons Could the Israeli Doctrine Learn from the 2006 Lebanon War?"; Graicer, "Self Disruption," 21–37; Naveh, "Designing Campaigns and Operations to Disrupt Rival Systems," 4–7; and Hirsch, *Defensive Shield*, 318.
7. Stanczak, Talbott, and Zweibelson, "Designing at the Cutting Edge of Battle"; Beaulieu-Brossard and Dufort, "Rise of Reflective Military Practitioners"; Beaulieu-Brossard and Dufort, "Revolution in Military Epistemology," 1–20; Jackson, *Design Thinking in Commerce and War*; Zweibelson and Porkoláb, "Designing a NATO That Thinks Differently," 196–212; van der Veer, "Rise of Design"; Jackson, "What Is Design Thinking?"; Jackson, "Towards a Multi-paradigmatic Methodology for Military Planning"; Wrigley, Mosely, and Mosely, "Defining Military Design Thinking," 104–43; and Zweibelson, Whale, and Mitchell, "Rounding the Edges of the Maple Leaf," 11–12.
8. Lichtenstein, "Generative Knowledge and Self-Organized Learning," 49.
9. The author again clarifies that "stupidity" is not a pejorative attack on military individuals. Rather, the nonreflective practice of cycling through single- and double-loop thinking defines an organization as functionally stupid by Alvesson and Spicer's framework.

# PART 2

# Defining the Modern Military Decision-Making Frame of War

Chapter 7

# How Do Modern Militaries Frame Conflict?

Before addressing what constructs associated with the NATO Operations Planning Process (NATO-OPP) or joint planning process (JPP) might be tempered, modified, or completely removed, we must spend more time at the philosophical level where modern military institutions frame what war is and is not. Only then might we create a path to examine, deconstruct, and explore these military decision-making methodologies and offer alternatives. "Deconstruction" differs from "reductionism." Reductionism is associated with positivist efforts to categorize and analyze complex security contexts so that fundamental rules, principles, or laws might formulaically reassemble reality in a more orderly, predictable manner.[1] Gharajedaghi and Ackoff explain this mindset:

> Mechanistic models of the world conceptualize it as a machine that works with a regularity dictated by its internal structure and the causal laws of nature. . . .
>
> . . . [Thus,] the world can be *completely* understood and . . . such understanding can be obtained by *analysis* (emphasis in original). . . .
>
> Since understanding something mechanistically requires understanding its parts, the parts also have to be taken apart. This process stops only when indivisible parts, elements, are reached. These, when understood, are believed to make understanding everything else possible. This doctrine, called *reductionism*, is responsible for the prominence in science of such irreducibles as atoms, chemical elements, cells, basic needs, instincts, direct observations and phonemes.[2]

The military takes an epistemological (how do we know what we know) approach to modern warfare employing reductionism as outlined above.[3] Complex warfare challenges are reduced, categorized, isolated, frozen in time, and rendered in positivist fashion to utilize NATO-OPP/JPP methods and models. However, *deconstruction is not reductionism.* It is a postmodern endeavor to explore how the relationship between text (language, narrative, symbols, and metaphors) and meaning is complex, even unstable.[4] It is in perpetual transformation through a dynamic, perhaps turbulent interaction of things (the first order of complexity addressing physical reality) and ideas/meaning (a second order of complexity resting upon the first and manifested entirely in our own socialized collective).[5] Reductionism assumes a centralized, hierarchical structuring and order of reality where, at the surface, a situation may seem chaotic or dynamic.[6] However, once analytical optimization isolates and reduces that complexity to core, quantifiable elements, the universal rules or formulas governing this ordered reality become realized and rationalized.[7] Gharajedaghi and Ackoff state, "The relationship [between the parts that in aggregate form the whole] that is assumed to be sufficient to explain all actions and interactions of the parts is *cause-effect*" (emphasis in original).[8] For devoted military reductionists, one thing leads to another in causal action if their relationship is necessary and sufficient for the system to function as observed in reductive logic.

Deconstruction synthesizes versus analyzes and does not emphasize the parts to be isolated. Rather, it evaluates the relational quality of meaning in human conceptualization (in this case by reductionism and analytical optimization) using language and metaphoric devices therein to generate complex meaning and expression.[9] Analysis fosters description and can lead to deeper analysis, but analysis does not lead to explanation. Only synthesis provides explanation. Synthetic thinking moves outward to greater abstraction to discover how things and ideas are nested in yet larger systems in complex, nonlinear relationships. Analysis takes things apart to describe what things are and how they relate back into the reassembled whole. Synthesis approaches how and why something is part of yet other things beyond the apparent barrier between the defined concept and broader, less obvious relationships to realize why things form and function as so.[10] One is not better than the other; both are essential to military forces confronting complex security challenges. Neither are they interchangeable, nor might one be marginally applied (or misapplied) in some formulaic approach to all challenges with the expectation of a standardized output.

For an example of this difference, reductionism in doctrinal methods such as NATO-OPP and JPP posit centers of gravity for friendly and enemy forces positioned at various levels of war that can be identified, isolated, analyzed, and quantified into predictable/controllable linkages of linear causality. Targeting the enemy's operational COG critical vulnerability leads to collapse of the COG and accomplishing the desired end state along a line of effort. Deconstruction looks not at ways to accomplish COG analysis to achieve an end state but at how and why a military believes in its conceptual models. For instance, why does it include the concept of "levels of war" in a centralized, hierarchical arrangement or apply COGs using Newtonian physics modeling or a linear causality of a predetermined end state with reverse-engineered actions arranged on lines of sequential efforts?[11] Reductionism occurs exclusively within a given belief system and often can function with nonreflective practitioners perpetually looping through the same activities in attempts to improve the outcomes alone. Deconstruction orients to the belief system of the military on why it structures decision-making in such ways and how those institutional frames might work or fail within a complex, changing reality that cannot be entirely encompassed by any frame, theory, or model.

To deconstruct NATO-OPP and other modern decision-making methodological frameworks—such as the JPP, Military Decision Making Process (MDMP), and US Marine Corps Planning Process (MCPP)—we cannot simply swap one method for another or adhere to doctrinal constructs *without thinking deeply* about why our military even produces and promotes such doctrinal concepts. In the dynamic and perpetual relationship between groups of humans (whether organizations in formal, informal, or hybrid configurations) and a complex reality, we apply different methodologies toward thought and action so that we can gain some sort of response from reality. In a broad sense, any response a human might experience from any sensory or informational stimulus can be captured under the term "data."

A theory is referred to as a *dimension* rather than a discrete category one can treat like a container of expired milk to remove from the refrigerator. Karl Weick explains that a theory is a collection of verbal and symbolic assertions.[12] The theory identifies what variables are significant for what reasons the theory specifies, how and why they relate to one another, and under what conditions they might be related or unrelated in reality. Theories become "an inference from data that is offered as formula to explain the abstract and general principle that lies behind them as their cause, their method of operation, or their relation to other phenomena."[13] The exchange of purposeful action and data from that interaction in reality becomes a useful way to frame how various social paradigms provide perspectives for operators interacting with a complex reality.

A *paradigm* originally was coined to explain how one scientific theory and discipline rises and falls as an alternative or competing theory replaces the inferior scientific premise and renders it obsolete (e.g., Newtonian physics was replaced by the Special Theory of Relativity, though we still tend to use Newtonian physics to explain everyday things nonscientifically or metaphorically).[14] *Social paradigm theory* proposes that groups of humans have always developed and will continue to evolve a range of social paradigms that interpret reality differently.[15] Paradigms represent a belief system framework accepted by a community that guides the members in what they do.[16] One paradigm is not superior, but diversified groups using dissimilar social paradigms will have distinct interpretations and understandings of reality that may be comparatively antagonistic or paradoxical.[17] Further, those able to assume a meta-paradigmatic approach, where they consider a complex topic through a variety of models, will often gain advantages unrealized by those employing one social paradigm.[18] As will be explained, NATO-OPP and JPP operate exclusively through a single social paradigm at the expense of others and thus reject any opportunities a multi-paradigmatic-designed approach might provide. Social paradigms are discussed further in this section and elsewhere in the book.

Paradigm incommensurability occurs when those employing one paradigm are unable to conceptualize alternative belief systems and perspectives because the very language, metaphoric devices, and models do not function in their philosophical (ontological, epistemological) modes. The cargo cults of the South Pacific during World War II provide an example.[19] Small groups in Melanesia first encountered the outside world during a rapid industrialization by Allied military forces as they leaped from one remote island to another building runways and small supply bases. Many far-flung outposts received resupplies by airdrop, and the native islanders traded with soldiers to gain previously unimaginable goods and technology. The airdrops stopped when the military departed after the war. Cult leaders and spiritual priests promised a return of the air-dropped cargo if the tribe constructed bamboo imitations of the planes, towers, and airfield equipment.[20] The tribe's construction of a model of an American aircraft illustrates an attempt to replicate reality through simulation and ideological assimilation. Tribes also mimicked the military's day-to-day activities, uniforms, marching, and behaviors to restore the airdrops.

Paradigm incommensurability here is threefold. First, Westerners often marvel at and pity tribes that perform these rituals because they require a nonindustrialized perspective. Likewise, the cults did not have a Western industrialized perspective from which to view their rituals. Lastly, imagine a group of cargo cult members mimicking the refueling of a fighter plane using a bamboo proxy. If the group gained a real-world advantage in refueling a plane through practice and imagination, would it matter for the cult or departed military forces?

This nuance is important. If a group adapts a military methodology but does not share the same social paradigm as the original designers, it will likely use and interpret that method differently.[21] Humans use a combination of social values, culture, and symbols within what is often termed a *belief system*. Often, our belief systems help us generate not just the methodologies we want to apply to reality but a range of constructs that exist entirely in our minds (conceptual, intangible, and socially constructed). The language we generate and curate in our group, discipline, or field is underpinned by metaphoric devices that link to these values, symbols, and socially constructed belief systems.[22] The trailblazing philosopher Susanne Langer observed that "metaphor is the principle by which new words are born."[23] Social construction requires an appreciation of how paradigms function across communities of practice, whether isolated island tribes building airplanes out of bamboo or industrialized nation-states engaged in global war attempting to island-hop to defeat an adversary.

## Explaining Social Paradigms: How and Why We Conceptualize Warfighting

The concept of a paradigm originates with Thomas Kuhn, a physicist and philosopher of science who wrote the highly influential book *The Structure of Scientific Revolutions* that would insert the term "paradigm" into common usage. For Kuhn, a paradigm "stands for the entire constellation of beliefs, values, techniques and so on shared by the members of a given community."[24] In his original introduction of the concept, scientific communities would entertain one scientific paradigm at a time, with Kuhn explaining that all scientific progress follows a "paradigm shift" pattern. A scientific or prescientific concept (e.g., where Earth came from, how it is positioned in the universe) becomes normalized by scientific theory and study. That scientific modeling begins to drift as theorization and experimentation put the model into crisis, such as when the idea of a divinely created "flat Earth" was replaced by Earth as a round planet at the center of the universe that the stars and other planets orbited.

This geocentric model of the universe went into crisis as mathematical and astronomical theories failed to explain planetary and celestial motions accurately. The scientific model underwent a revolution where the heliocentric alternative model developed mathematically by Copernicus would overtake the earlier ideologically inspired geocentric model.[25] Kuhn posits that the scientific paradigm shift occurs when within a revolution, the replacement theory—such as a heliocentric universe—gains greater scientific acceptance and rigor through testing, debate, and an expansion of new research inspired by the replacement construct. After this paradigm shift, science becomes normalized once more, and the cycle again repeats. In the nineteenth century, the heliocentric universe model would again be challenged and replaced in a paradigm shift to a galactocentric model acknowledging the existence of other galaxies like our own. The theory that the Milky Way galaxy was central to the universe would undergo its own crisis and shift to theories such as the "big bang" and an acentric, expanding universe where the Milky Way is but one of billions of galaxies expanding outward.

Scientific paradigms work within natural science applications and also support the military philosophical belief that a character of war is ever changing, while a fixed "nature" of war remains constant and universal like a natural science law. Horse cavalry would eventually be replaced by mechanized armor cavalry, to be challenged and in some ways "replaced" by air cavalry, and so forth in a strictly Kuhnian scientific sense of military progress. Yet unlike natural sciences, the social sciences discipline proposes that human beings *generate and sustain multiple socially constructed paradigms.* Social paradigms are created and operate entirely within human minds. They are shaped and influenced collectively across large groups of people that wittingly or unwittingly share and sustain them. It is within social and not scientific paradigms that war exists. War is a human creation in that before humans there was no "war." If humans collectively agreed to ending all war (or more realistically, humans wiped out their entire species in a catastrophic final war), the universe would continue with natural laws—such as gravity and heat entropy. But "war" would vanish from existence without humans alive to continue the conceptualization.

Thus, war and all warfare activities lie firmly within social paradigms. The physical aspects of how war is exercised within reality are directed and informed by the social paradigms conceptualized by groups of Homo sapiens. However, the activities of war occur within physical planes of existence where bullets obey the laws of physics and human flesh bursts upon impact as biological and chemical realities impose certain unavoidable, quantifiable consequences. Scientific paradigms abound in warfare. But for humans to engage in the application of organized violence (war) upon one another, they must employ a social paradigm that articulates what war is (and what it is not), how one wages war (and does not), and why war has particular purposes (or why it does not).

Scientific and social paradigms can shift, although in distinct ways. Scientific development involves a complete replacement of the legacy or irrelevant paradigm with the new scientific one, while social paradigm shifting occurs in a wider range encompassing complex social, cultural, and informational reasons. Both involve change and the increasing systemic stress humans will experience as their selective frame for conceptualizing reality grows increasingly fragile or dysfunctional over time. For instance, a society may be increasingly unable to use mathematical formulas to explain astronomic and planetary movements, or a military may realize that its framework for understanding and applying organized violence to accomplish political desires no longer functions. Such stressors build until new theories and debate posit some paradigmatic alternative. Gharajedaghi provides a useful summary of paradigm shifting that applies to either construct:

> A shift of paradigm can happen purposefully by an active process of learning and unlearning. It is more common that it is a reaction to frustration produced by a march of events that nullify conventional wisdom. Faced with a series of contradictions that can no longer be ignored or denied and/or an increasing number of dilemmas for which prevailing mental models can no longer provide convincing explanations, most people accept that the prevailing paradigm has ceased to be valid and that it has exhausted its potential capacity.[26]

Social paradigms lack the scientific rigidity of natural science paradigms to include the singular sequence of one paradigm replacing an obsolete one. Instead, military communities will use social paradigms that feature characteristics beyond and outside of the natural sciences. Brigadier General Shimon Naveh (Israeli Defense Forces, retired), a military theorist at the Israeli National Defense College, clarifies the concept of a paradigm: It is "like a conceptual window into the real world; like a map that allows us to see the underlying terrain; like a menu that allows us to see into the back kitchen of a restaurant. . . . Paradigms are theories that aid us in reflecting critically on our profession."[27] Organizational theorists Majken Schultz and Mary Jo Hatch state that "paradigms are sets of ontological and epistemological assumptions. . . . Each paradigm engages a unique perspective from which concepts are defined and theories are developed. . . . Because each paradigm defines a different domain in which theories can be conceived, there is little or no possibility of effective communication between their adherents."[28]

*Ontology* is the study of existence: how humans conceive and perceive what we are, what the world consists of, and how reality is a continuum between purely objective and subjective extremes. Ontology is concerned with what is true or real and the nature of reality. When military philosopher Clausewitz posits that "war is nothing but a duel on a larger scale. . . . It is an act of force to compel our enemy to do our will," he is ontologically stating that war occurs just as a violent fight between two dueling opponents.[29] Ontologically, complex reality informs Clausewitz that war can be conceptualized and explained truthfully by mentally associating a deadly contest of wills between duelists with that of nation-states waging war. Ontology does not become any specific or tangible "thing" in reality; rather, ontology explains the order of things within reality and why the form and function of reality is as it is.

*Epistemology* is the study of knowledge and how humans create, maintain, and order knowledge through different methods. Unlike ontology that links reality to conceptualized models in a human mind, epistemology begins within the mind, and these mental events inform our perceptions that subsequently inform a separate reality. While ontology acts to help humans discover what "truths" might exist in reality, epistemology enables humans to create their understanding of what truth is and is not within the socially constructed framework they collectively maintain and curate. For example, people will weed their flower gardens so that certain plants are protected and nurtured while weeds and undesirable vegetation are eliminated. We "know" what flowers are "pretty" or "valuable" or "proper for home décor," and we also "know" about weeds and ugly things that must be removed. Yet insects and birds feed upon both without any such discrimination because they do not distinguish these constructs as humans have done epistemologically through culture and society. The epistemological constructs do not exist in reality and are entirely created within our minds, yet they deeply inform how we interact with reality.

Social paradigms are composed of three distinct concepts. Our paradigms use ontological, epistemological, and—subordinate to those two—methodological constructs to frame all human thought and action toward reality. Methodologies within a social paradigm are informed by ontological and epistemological assumptions and constructs. A methodology is created so that we know how to test our knowledge, curate it within a particular form and function, and disseminate it collectively across our network of human beings who share in our social paradigm application.[30] There are many types of methods; the military uses variations of decision-making processes that act as methodological frameworks for how to act to accomplish military goals.

These methodologies feature precise terminology used to articulate the "how" of performing the process, with those words underpinned by metaphoric devices reaching back to deeper ontological and epistemological assumptions that, in turn, are shaped by our culture, values, and shared belief system.[31] Social paradigms employ ontological and epistemological assumptions often informed by unique cultural social systems and result in distinct methodologies. Yet on the surface, these methods might be confusingly overlapped if the terminology used is misinterpreted from one social paradigm by the dominant one of an outside observer. Figure 7 (next page) depicts the interaction of the ontological, epistemological, and methodological aspects of a shared belief system.

The next figure shows one way (of many) to conceptualize a social paradigm. Ontology, epistemology, and methodology are depicted in a mutually supporting dynamic, with the "shared belief system" overarching the social paradigm, as these values, beliefs, and cultures directly influence how and why a group of people will form their ontological and epistemological assumptions. The green arrows illustrate how ontology and epistemology collectively shape the metaphoric devices that subsequently generate all language within that social paradigm. Hence, words do matter—but the same word often has an entirely dissimilar meaning when employed in one social paradigm versus another.

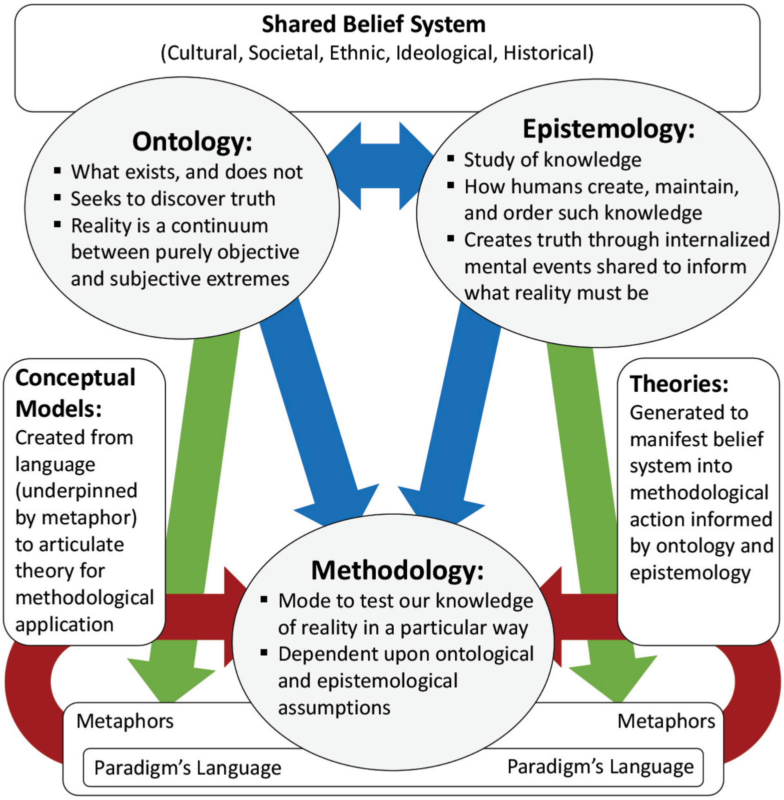



**Figure 7. Core elements of a social paradigm**

To draw from a model for organizing information that is incongruous with any military paradigm (e.g., JPP or PMESSI-PT, which considers political, military, economic, social, information, infrastructure, physical environment, and time factors), consider the story of the "Celestial Emporium of Benevolent Knowledge." Created by Jorge Luis Borges, it describes a fictitious taxonomy of animals that was later referenced by Michel Foucault in his book *The Order of Things*.[32] Borges tells the story of an ancient Chinese encyclopedia created by the emperor, with strict orders that the entire society must adhere to these categories for all animals. Categories included "those belonging to the Emperor, embalmed ones, suckling pigs, stray dogs, those included in this classification, those that tremble as if they were mad, those that from afar look like flies, those that have just broken the vase, those drawn with a very fine camelhair brush" and "mermaids, fabled ones and trained ones."[33] Readers might react with a value assessment that PMESSI-PT "makes sense" and is "scientifically sound" while the Chinese emporium model is utter nonsense. This expected response illustrates how one social paradigm will render those methodologies that operate under another paradigm irrelevant, incompatible, or incomprehensible.

The previous figure frames how a social paradigm is generally constructed to provide what might be viewed as a belief system "umbrella" underneath which the entire frame extends. The shared beliefs of a community allow it to construct theories, models, methods, and language that all interact purposefully. A group's belief system defines and influences its purposefulness, but this underlying factor is usually invisible to operators. Single- and double-loop thinking prevent reflection about why we do what we do, meaning that our social paradigms remain off limits to inquiry unless one enacts triple-loop thinking. While figure 7 focuses on the core elements of any social paradigm, this book expands that model and presents a new framework. It encompasses the essential related activities of how an organization conceptualizes theories, enacts mental models to support theoretical content, and develops methodologies to enable thought (theoretical) to result in purposeful action (methodology in application with reality). In figure 8, the shared belief system framework depicted in figure 7 is reduced to an umbrella for brevity. Readers should maintain a steady awareness of how ontology, epistemology, and methodology interact with values and beliefs and lead to the construction of theories, models, language, and purposeful action.

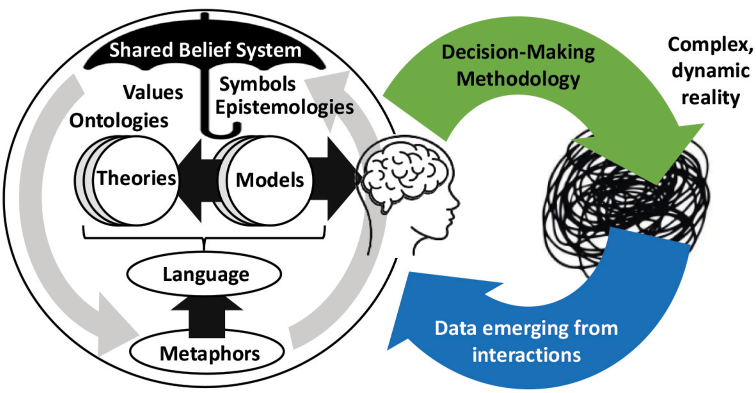



**Figure 8. Establishing an organizational frame (paradigm for warfare)**

Military decision-making methodologies spanning tactical to strategic, from large-scale, high-intensity combat operations to clandestine sensitive activities of special operations forces (SOF), in multi-force coalition arrangements or pure service configurations, draw from the same shared framework for thought and action in security contexts. They derive their institutionally approved terminologies (language), orchestration of methods, conceptual models, and core theories from what is comprehensively termed a socially constructed "frame" for warfare activities.[34] When considering the methodological underpinnings of NATO-OPP, JPP, or other similar variant, the US Department of Defense (and most associated nation-state equivalents) promotes, cultivates, and regulates this single institutional frame for organizing people, artifacts, ideas, and actions in complex security affairs.[35] This frame becomes the lens through which militaries see reality and filter out unauthorized, paradoxical, or alternative concepts that do not support this frame's rationalization of reality. Figure 8 illustrates this notion of a synthetic frame.

This model is again just one way to encourage readers to think beyond methodologies themselves (in this case, the form and function of NATO-OPP and JPP through doctrine, training, and education) to be able to deconstruct that method, critique it, and consider improvements. It also engenders selecting more radical alternatives that potentially get at overarching defense and security force missions, goals, and organizational purposes differently than the current legacy system frame provides. We need to consider what underlying military theories are being employed to justify the NATO-OPP/JPP methodology's logic and core assumptions on how the world ought to function in security affairs. Yet any model is only an abstraction of reality and, at best, an oversimplification that may or may not add value to how the operator relates the theoretical to the practical (methodology put to action).[36] How theories relate to models and together form the basis for methodologies is of paramount focus for readers seeking an explanation of why NATO and joint forces view reality as they do and how our military language, doctrine, and belief system generate this conceptual, socially constructed framework for decision-making in a modern form and function.

Theories dominant in the overarching modern military synthetic frame attempt to explain how war (security, defense, conflict, policy) occurs in a complex reality so that subsequent conceptual models can relate to the data observed as a method is applied to reality. Theories tend to remain in the background, quietly orchestrating the "why" of our frame activities while the "what" and "how" consume most of our attention. Theories are often positioned in near ideological solitude, unassailable by most because the immediate defensive posture for institutions is to cast blame on the operator or environment. "The enemy gets a vote" and "consider two sustains and two improvements" are common expressions of this institutionalized pattern in training centers and professional military education (PME) to shield theories and core belief systems from disruption.[37] While we might cycle through clear linkages of performance to established processes and doctrinal norms in our training centers, war games, and military classrooms, are we able to reflect on the broader shared framework of theories, models, methods, language, and beliefs? Or are methods (and corresponding models and theories) off limits for such critiques due to institutional emphasis on correlating effectiveness to an operator successfully following the steps of activity X in doctrine Y, as assessed by the military evaluator conforming to the institution?[38]

Given that this explanation is slightly oversimplified, a theory proves either true or false by a discipline or community considering and evaluating the theory. Defense forces as a community of practice assess solutions according to their cultural norms, although not necessarily in a strictly scientific or plural manner of open discourse.[39] Different theories on war operate abstractly above all military methods employing a range of conceptual models. These military models seek to generate similarity and familiarity (or not) about how these theories prove accurate or inaccurate as militaries think and act within a complex, dynamic security context.[40] Yet we rarely consider our preferred theories and models. Typically, in security training, education, and real-world practice, we prefer to evaluate methods and data exclusively for adjustment, reinforcement, or replacement. Units and individuals are measured against whether they successfully applied NATO-OPP/JPP to the task at hand or need to pursue improvement: whether the method itself needs repair or alteration is rarely of concern. If we are to examine why militaries cycle through such thoughts and coordinated actions in warfare without accomplishing desired effects (and redouble efforts over and over, using the same constructs), we need to shift from analysis to synthesis. Once again, description does not lead to explanation.

NATO-OPP and JPP methodologies follow the form of conceptual models that provide military leaders, planners, and analysts some arrangement of ideas on military activities/tasks across time and space so that the underpinning theories create similarity to or familiarity with what the military organization is receiving in data or experience upon executing the methods (e.g., NATO-OPP/JPP). The words we use and those we do not consider are equally important for deconstructing the methodology so that the metaphoric devices operating above the words themselves come into view. NATO-OPP/JPP metaphors—such as "center of gravity," "desired end state," "line of effort," "levels of war," "principles of war," "elements of operational art," "strengths and weaknesses," "shaping," "enabling," and many more—link shared DOD language to models and military theories. Military metaphors represent not just necessary cultural idioms or colloquialisms to boost shared understanding across a diverse military force. The metaphors employed in military language reveal the structural underpinnings of the modern military frame for warfare. All language is metaphoric; through consideration of military language found within NATO-OPP/JPP, we can examine the deeper relationships between theories, models, and methods.

These metaphors will link to those conceptual models and reinforce theories, thereby supporting our collective belief systems and rendering the NATO-OPP/JPP methodologies as they currently express in practice. Realizing that a model employs an ends-ways-means framework is informative because it confines decision-making to the institutional framework. In this paradigm, we may rationalize that a "design problem is linked with a potential creative solution" and use a scientific theoretical approach of developing informed hypotheses. However, when we test those hypotheses through rationalized analysis and seek patterns to explore potential fundamental rules or laws, we often operate within our social paradigm.[41] Using existing social paradigms highlights the content and obscures the process overarching how those ideas are conceptualized. Julian Janes, known for his research on consciousness, suggests that "we become rebels or patriots or martyrs on the basis of ideas."[42] Indeed, depending on what perspective an actor has, the same person might be any of those three things. Social paradigms themselves are rarely factored into introspection as they form the broadest framework of what we collectively know what is, and what is not.

In such introspection, we might recognize that in our efforts to reduce complex systems into smaller, more manageable chunks, the very language and metaphors we select will reinforce our choices.

Thus, our focus will be on the inputs and outputs of the process, not the framework designing our acceptance of such concepts.[43] Within this modern war frame, the NATO-OPP/JPP terminology remains exclusively physics-oriented, with a proliferation of Newtonian metaphors, classical mechanics epistemology, engineering language, and analytic constructs supporting objective expectations on reality.[44] Yet complexity theory, systems theory, and other competing theories for defense, security affairs, and warfare differ with the dominant synthetic frame for war. Thus, they are currently not available within the military's choice of methodology, language, or conceptual models for performing and synchronizing warfighter activities.[45]

Conceptual models are also difficult to separate from our overarching war paradigm, as they are imbedded into how militaries perform decision-making methodologies, such as NATO-OPP, JPP, and others discussed in this book. Jaynes provides the necessary linkage between models and theories, noting that "a theory is a relationship of the model to the things the model is supposed to represent."[46] For example, physicist Niels Bohr presented his Bohr's model in 1913 to explain atomic structure, where the nucleus is composed of protons (and neutrons) surrounded by orbiting electrons. The metaphoric device drew from astronomy and how planets orbit the sun, which Bohr used to articulate his new concept effectively to a population that already understood the astronomical model of inspiration. Bohr presented a new theory that all atoms in complex reality would be similar and explainable *by his model.* Decades later, physicists would discover new and exotic particles that disprove Bohr's theory—but the model itself remains. Jaynes explains that "a model is neither true nor false . . . [but] only the theory of its similarity to what it represents."[47] Theories can gain and lose accuracy over time, but the models themselves often can carry over into other activities or be employed with new theories to generate methods differing from earlier attempts.

Modern military strategists and analysts use many conceptual models within NATO-OPP/JPP. Some are the SWOT model (analysis of strengths, weaknesses, opportunities, and threats); levels of war; spectrum of warfare; CARVER matrix (criticality, accessibility, recuperability, vulnerability, effect, and recognizability, used for special operations and targeting methods nested to JPP); stakeholder analysis; and "iceberg models" (to determine underlying problems). Others are operational design models such as lines of effort and measures of performance and effectiveness linked to operations and campaigns.

Thus, NATO-OPP/JPP are methodologies used by militaries that employ doctrinally sanctioned models complete with a range of select military theories. These theories support institutional and individual belief systems, group values, and symbols. Militaries will, often without self-reflection, reinforce and incentivize the community of practice to adhere to institutionally sanctioned (indoctrinated) models. If the outcomes fall short, practitioners are encouraged to repeat the same process while self-evaluating whether they can follow it more stringently to produce desired outputs. One is not encouraged to seek alternative models outside of those endorsed by the regulated community of practice, nor should one experiment with a never-before-seen innovative act of creating a new model (fig. 9).

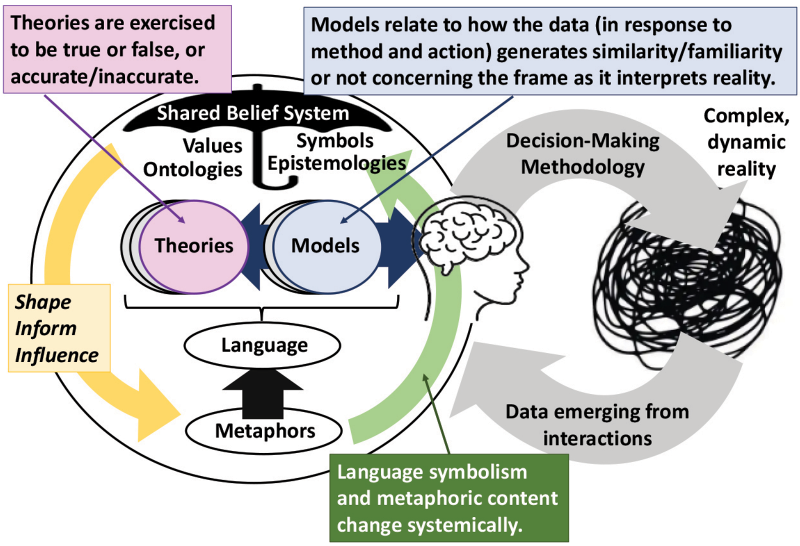



**Figure 9. Organizational frame (enhanced)**

The above figure highlights how a shared belief system is foundational to informing our language through metaphoric construction. All language is metaphoric, although much terminology is so entrenched in our frame that we are hardly aware of it. Our belief system shapes, informs, and influences our language construction. Therefore, when we encounter a dynamic, changing reality, we must perpetually invent terms for those new things and experiences that cannot be articulated with our legacy frame. Over time, we also edit and retire language that becomes irrelevant or insufficient. Organizational theory posits an endless, iterative, and dynamic cycle of how the assumptions we make as we engage with reality are shaped by our values (belief system), which in turn enable us to conceptualize and engage with artifacts in the real world (things, experiences, action). Some artifacts become symbolized, yet that process is also in flux as we continuously assess and reassess these relationships. Some symbols become problematic or are rejected, while new concepts and artifacts become symbolized. The green arrow in the graphic shows how language itself is part of this endless cycle that influences our belief system (assumptions, values) in an emergent, dynamic fashion.

This cycle is significant when we seek to frame the modern military paradigm and understand how everything from theories to models and the language we use is connected and interdependent in complex ways that reflect a process of *becoming* rather than a static being. Using the framework from figures 8 and 9, we will now attempt to comprehensively structure the modern military paradigm—acknowledging that this too is merely a model and that all models are approximations of reality through abstraction and simplification. Some models are better than others. Yet if readers examine contemporary military doctrine—whether NATO, joint, or service generated—there is no consideration of why militaries believe what they do, how they assemble these constructs into a coherent frame, or what that frame consists of (and therefore does not consist of).

Instead, militaries remain stuck in single- or double-loop practices where operators use codified processes like COG analysis or the OODA Loop, but they are unwittingly employing them without reflection on the processes themselves. We follow processes without realizing how they came to exist or are perpetuated. We do not question why the institution directs process compliance and inhibits critical reflection beyond the process presented in isolation. Militaries learn the steps of NATO-OPP or JPP and, separately, how to do COG analysis or how the OODA Loop functions. Nothing is nested systemically, merely positioned in sequence through systematic ordering. We are obligated to follow the rules of planning, such as "one must conduct COG analysis at this step before proceeding." We cannot consider planning without using COGs or substituting another model that diverges from the traditional approach to COGs. That is, all enemies, everywhere, in all wars—past and future—must be framed in a centralized, hierarchical construct akin to how Newton's celestial mechanics is understood in physics and engineering. The modern military paradigm requires us to use a COG; if that model were replaced, the theoretical justification would substitute another model that still would be familiar in a celestial mechanics–inspired way. In each sequence, activities are isolated by linear-causal processes as if the JPP were a factory assembly line. Moreover, modern staffs are isolated by how the Prussian-Napoleonic organization specializes and erects barriers so that particular staff specialists conduct various parts of the planning process. All participants excel at converging toward process completion and assessing through process adherence/efficiency, yet institutional barriers prevent them from viewing the frame systemically.

**Notes**

1. Bousquet, "Chaoplexic Warfare," 919. *Positivism* is a philosophical position (an epistemological framework on the nature of knowledge) that all rational logic can be scientifically demonstrated through analytical formulation. It advocates that everything in the world, given enough data and proper scientific inquiry, can ultimately be reduced to mathematical proofs, tested, and then applied in some way toward prediction.

2. Gharajedaghi and Ackoff, "Mechanisms, Organisms, and Social Systems," 290.

3. *Epistemology* is how we define the origin of knowledge within our discipline, field, or community of practice. It addresses how we know how knowledge functions and the limits of what we believe it to be. See Hazlett, McAdam, and Gallagher, "Theory Building in Knowledge Management," 32.

4. "Text" in this context acknowledges that language, narrative, symbols, and metaphors are all social constructions. This view breaks from earlier realist perspectives that text corresponds objectively with precisely what exists in reality.

5. Derrida, *Of Grammatology*; Tsoukas and Hatch, "Complex Thinking, Complex Practice"; Cilliers, "Complexity, Deconstruction and Relativism"; and Naveh, Schneider, and Challans, *Structure of Operational Revolution*.

6. "Situation" in this context represents how an observer conceptualizes reality and frames a portion of it into a bounded set of circumstances. This act of framing a situation itself reveals more about deeper theoretical and paradigmatic actions that this chapter will explain.

7. Boisot and McKelvey, "Integrating Modernist and Postmodernist Perspectives," 418–19.

8. Gharajedaghi and Ackoff, "Mechanisms, Organisms, and Social Systems," 290.

9. Hatch and Yanow, "Methodology by Metaphor"; Bousquet and Curtis, "Beyond Models and Metaphors"; White, *Content of the Form*; and Ricoeur, *Time and Narrative*.

10. Ackoff, "Towards a System of Systems Concepts"; Ackoff, *Redesigning the Future*; and Ackoff, "Why Few Organizations Adopt Systems Thinking."

11. Meiser, "Ends + Ways + Means"; and Zweibelson, "One Piece at a Time."

12. Weick, "Theory and Practice in the Real World," 455.

13. Weick, 455.

14. Kuhn, *Structure of Scientific Revolutions*.

15. Burrell and Morgan, *Sociological Paradigms* and *Organisational Analysis*; Schultz and Hatch, "Living with Multiple Paradigms"; and Ritzer, *Sociology*.

16. Hazlett, McAdam, and Gallagher, "Theory Building in Knowledge Management," 33.

17. The inability of operators of one social paradigm to comprehend that same reality through a different paradigm is termed "paradigm incommensurability." See Weaver and Gioia, "Paradigms Lost," 565–90.

18. Clarke-Hill, Li, and Davies, "Paradox of Co-Operation and Competition"; Gioia and Pitre, "Multiparadigm Perspectives on Theory Building"; Lewis and Grimes, "Metatriangulation"; and Lewis and Kelemen, "Multiparadigm Inquiry."

19. Worsley, "50 Years Ago."

20. Hall, "Cargo Cult Psychology."

21. Native Americans adapted horses into their culture, lifestyle, and war paradigm upon introduction by the Spanish conquistadors yet developed a different form of applying mounted warfare than European practices. The Chinese generated gunpowder centuries before feudal Europe but never used it for offensive weapons as the Europeans would later configure it toward. The "cargo cults" of Melanesian islanders during and after World War II offer yet another example of methodological variation through different social paradigms in operation.

22. Hatch and Cunliffe, *Organization Theory*.

23. Gerhart and Russell, *Metaphoric Process*, 102.

24. Kuhn, *Structure of Scientific Revolutions*, 175.

25. While earlier philosophical theories existed for centuries, such as those by Aristarchus of Samos, Philolaus, and Hicetas, it would not be until Copernicus's mathematical modeling that the concept would gain a scientific quality that later was validated by Galileo Galilei through telescopic observations.

26. Gharajedaghi, *Systems Thinking*, 8.

27. Naveh, Schneider, and Challans, *Structure of Operational Revolution*, 31.

28. Schultz and Hatch, "Living with Multiple Paradigms," 529–32.

29. Clausewitz, *On War*, 75.

30. Humans collectively construct and maintain social paradigms in myriad ways. Even the ways people space themselves and maneuver in crowded hallways without a word demonstrate shared behavior patterns and belief systems. Many behaviors change over time, such as whether one gender should open the door for another as a gesture of social manners or if such a gesture is no longer acceptable.

31. Schön, "Generative Metaphor," 137–43.

32. Foucault, *Order of Things*, xv–xvi.

33. Foucault, xv–xvi.

34. While tempting to state that this frame is a "paradigm," social paradigms do not adequately encompass all the interrelated philosophical, organizational, social, and cultural aspects of this synthetic frame as depicted.

35. In turn, the US Department of Defense inspires and influences most NATO, coalition, and Western industrialized, democratic societies to apply a similar war paradigm. See Paparone, "How We Fight"; Paparone, "Designing Meaning in the Reflective Practice of National Security"; and Zweibelson, "Professional Reading Lists."

36. Gharajedaghi, *Systems Thinking*, 118.

37. Zweibelson, "Enemy Gets a Vote."

38. Zweibelson, "Preferring Copies with No Originals?"

39. Paparone, "How We Fight."

40. These concepts combine a range of theorists drawing primarily from Jaynes, *Origin of Consciousness*, 52–54; Searle, *Construction of Social Reality*; Schultz and

Hatch, "Living with Multiple Paradigms"; Schön, *Displacement of Concepts*; and Weick, "Change Agents as Change Poets."

41. A "scientific ('scientific' is a matter of degree, not a description of a fixed category) explanation differs from a 'common sense' explanation in that it attempts to eliminate fortuitously connected events from its list of causal relations. The controlled experiment is directed toward this end." Rapoport, *Fights, Games, and Debates*, 33.

42. Jaynes, *Origin of Consciousness*, 8.

43. Kelly and Brennan, *Alien: How Operational Art Devoured Strategy*, 8–11; Tsoukas, "Missing Link"; and Paparone, "On Metaphors We Are Led By."

44. Paparone, "On Metaphors We Are Led By"; Paparone and Davis, "Exploring Outside the Tropics of Clausewitz"; and Hatch and Yanow, "Methodology by Metaphor."

45. Advocates of contemporary doctrine might argue that complexity theory and systems thinking were clearly incorporated into NATO-OPP and JPP in the last two decades. As this book will explain, the military prefers to assimilate certain terms and language from outside concepts but then removes the theoretical and modular constructs so that the borrowed language complies with the existing (and unaltered) legacy frame.

46. Jaynes, *Origin of Consciousness*, 53.

47. Jaynes, 53.

Chapter 8

# Constructing the Modern Military Paradigm

A systemic framing of how modern militaries make sense of complex reality is difficult due to several key factors. Many societies with different cultures compose the industrialized world, with NATO of particular interest. Culture becomes even more multifaceted across the military services, which feature profoundly distinct subcultures, and among military members who grew up in communities with varying ethnic, social, economic, and informational experiences. Language is vast, sophisticated, highly nuanced, and ever changing. Groups have paradoxical values, beliefs, assumptions, and conceptualizations about how the world is. Humans create and share intangible yet inescapable dynamics—such as power, beauty, and even knowledge itself—that defy any attempt to model entirely. However, some overarching patterns span the modern military institution, and it is these that form the basis for an approximation of what this modern military paradigm is. They also provide the institutional boundaries of what is not found within, which will illuminate what is beyond the pale for most modern military operators through existing education, training, and practice.

While nations contribute unique values and beliefs to their militaries, the militaries themselves are also shaped by the beliefs and values of the overarching Western, industrialized (modern) community of armed forces writ large. How outside cultures and norms influence a nation or its military is noted but not the focus of this inquiry. Instead, of paramount concern is the impact of institutionalized belief systems, values, and symbols of the broader military "community of practice" that employ overlapping decision-making methodologies. Some examples are the NATO Operations Planning Process (NATO-OPP), the joint planning process (JPP), or some derivatives therein. These include the US Marine Corps Planning Process (MCPP), US Air Force Joint Planning Process for Air (JPPA), and Military Decision Making Process (MDMP). Ultimately, any proposal to improve or modify NATO-OPP/JPP should include how a methodological variation relates to a synthesis of how modern armed forces make sense of reality to arrange ideas and activities toward complex security challenges.[1]

The modern expression of military decision-making as encoded in contemporary military doctrine espouses a natural science–inspired form of framing war; war itself becomes a "nature" where universal laws, principles, and maxims might be demonstrated in mathematical precision and certainty. While the term "character of war" is applied for processes and patterns of changing behaviors or routines, the metaphoric device implied is again mathematical and reductionist: seeking "characteristics of war" that are still obedient and described sufficiently within the permanent, unalterable "nature of war." Just as natural sciences (e.g., geology, physics, biology, and chemistry) offered the first real keys to unlocking the rules and principles of the objective aspects of reality, militaries sought to adapt such concepts toward unlocking objective certainty and control of war. While military, academic, and other contributions have shaped how and why modern armed forces organize thoughts and actions in war as they do today, some of the most influential of the last century come from Prussian military officer and academic Carl von Clausewitz. In describing the Napoleonic era theorist's foundational beliefs of war, Paret states that "political and social concepts could only dimly illuminate the actual mechanics of war. To understand these, Clausewitz developed a technique of inquiry that sought to *identify* and *separate* the numerous components of military organization, decision-making, and action, and to *reduce each* to its essential core before *fitting them together again* into larger and dynamic structures" (emphasis added).[2]

While devotees of Clausewitz will defend his concepts as beyond reproach, the assimilation and adaptation (and misinterpretations) of Clausewitzian ideas have in turn generated much of the modern framework for thought and activity in war. Clausewitz, who would not have considered himself a philosopher, applied a novel mix of German Romanticism and Enlightenment scientific approaches to move away from "mechanical watchmaker" war theorists, such as Antoine-Henri Jomini—another prominent military strategist. Jomini's ideas still attracted many advocates, and his original mechanistic "principles of war" remain foundational in NATO and joint forces doctrine and education.[3] Of the two, Clausewitz would only gain popularity in the twentieth century for modern warfare. Today, students in war colleges and field grade officer education continue to apply Clausewitzian concepts toward understanding what war is and how to best think and act to accomplish the goals of stakeholders directing military action.

Clausewitz's blending of the concepts of natural science (e.g., gravity, mass, speed, force) with those of modern Westphalian state politics and power would feature a romantic, even mythical perspective on military genius (the success of Napoleon as studied). Clausewitz's view was that "in its combination of scientific and material elements, which were given form and distinction by the creative imagination, war might be regarded . . . as a practical art, akin perhaps to architecture."[4] Clausewitz would challenge Jomini's mechanical, universal rules by still suggesting laws and principles of war, but they would be blurred through psychological, social, and physical entanglements he associated with "friction." Great military leaders would employ individual genius (heroic individuals conceiving of a future goal and acting decisively to link opportunity with consequence) to break any of the rules in battle, channeling the original ideas of ancient Greek natural philosophers.[5] For such heroic and decisive leadership on the battlefield, Western generals had to study military history deeply, as exemplified by Clausewitz, who applied historical analysis in determining the usefulness of a new theory in war. With the rise in technological sophistication in artillery, engineering, and machines of war, new generations of military officers had to take academic study far more seriously than the aristocratic men of sport and leisure they would replace. Jomini would resonate with mathematical precision for certain aspects of modern war, while Clausewitz's new philosophical framework on the parts that resisted Jominian battle formulas would inspire new thinking on state power, politics, national mobilization, and "total war" of the modern nation state.

Clausewitz's ideas would gain momentum in Prussia and parts of European military intelligentsia through the World Wars, later still inspiring major reforms in American and allied military doctrine after the Vietnam War. Today, modern NATO-OPP/JPP remains wedded to interpretations (and misinterpretations) of Clausewitzian war theory presented in a scientific approach for how statecraft informs organized violence in political extensions of national desires.[6] This belief system is enforced not through scientific evaluation, debate, or inquiry but through institutionalized doctrine, a centralized authority of compliance, and convergent warfare practices requiring systematic adherence. Paparone and others provocatively term this belief system "pseudoscience" in that modern militaries mimic the scientific methods of natural sciences. However, they fail to adhere to any real scientific processes for how militaries generate knowledge, experiment, curate knowledge (in doctrine), or make decisions in their organizations.[7]

This scientific approach to decision-making and, ultimately, making sense of the vast complexities of warfare through a *positivist* lens produces the modern military worldview.[8] That is, every rationally justifiable claim or assertion can be scientifically verified or is otherwise qualified through clear logical or mathematical proof; anything else is irrelevant, flawed, or meaningless. While this book explores the specifics of the methodological structures, terminology, and doctrinal models of NATO-OPP and the similar US JPP, these decision-making methodologies are structurally identical to nearly all Western, industrialized military methods, such as MDMP, MCPP, JPPA, and countless other representations. Myriad variations curated by specialized units and forces still draw from the same modern military framework of identical theories, conceptual models, language, and metaphoric devices concerning a convergent understanding of warfare.

The next illustration reflects one possible way to frame the modern military paradigm using the paradigmatic framework this book provides (fig. 10). There are many possible alternatives, and readers are encouraged to explore and propose these. However, there is nothing as presented here available in mainstream military professional education, training, doctrine, or practice as of this writing. Militaries teach and train using all of the elements depicted, but how they are presented—in isolation, systematically, and through nonreflective practice—enforces single- and double-loop thinking. We are not educated to think systemically, nor are we encouraged to design outside established processes and institutionally sanctioned ideas and organizational structures in power.

The modern military frame has evolved from numerous military theorists throughout history, whether well known or obscure, and over time the military phases in new theories at the expense of others. However, modern military decision-making rests upon a solid foundation of Jominian, Clausewitzian, and Machiavellian theories with many supporting or modifying elements grafted among them.[9] However, beyond these "warfare" theories, the military has adopted concepts from other specialized fields, such as management (e.g., Taylorism) and organizational theory, with well-established principles independent of war considerations. For example, psychology (versus sociology) principles are the basis for how modern militaries apply psychological and information operations and for many of the concepts in military intelligence and civil affairs enterprises.

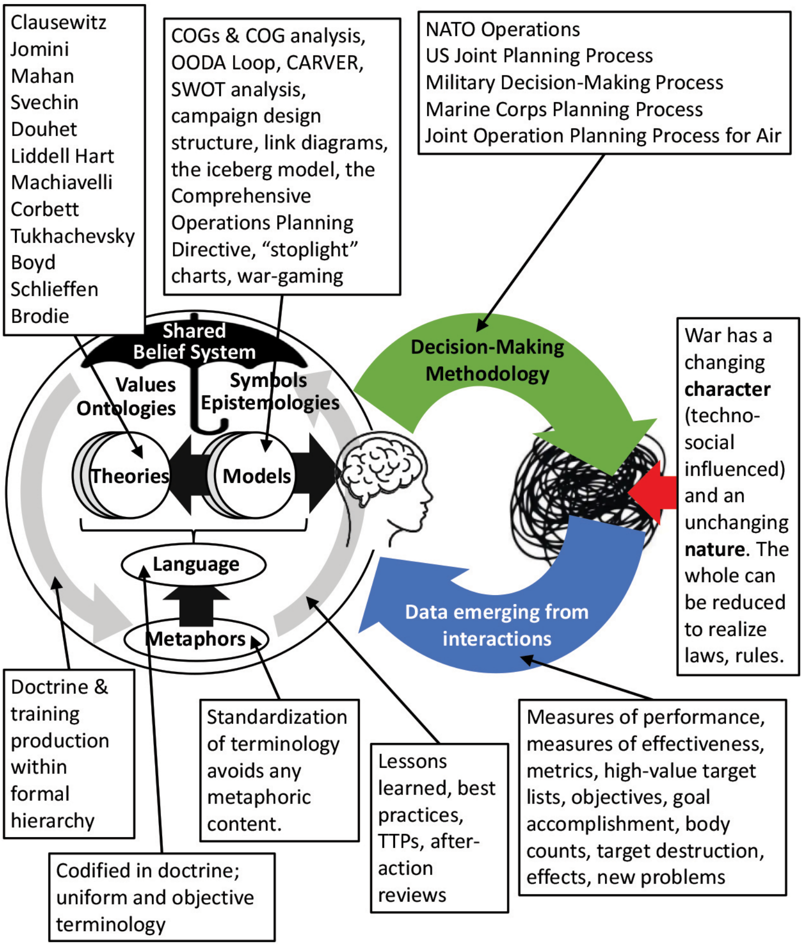



**Figure 10. One way to present the modern military paradigm**

Conceptual models can be created to help validate theoretical content so that a military can employ a methodology to link thought to action. For example, US Air Force theorist Col John Boyd created his OODA Loop, a model to assist operators in framing their decision-making process. This model was informed by general systems theory and complexity theory that Boyd incorporated into the ideas of military theorists such as Clausewitz and Jomini and for air warfare in particular, theorists such as Giulio Douhet and Brig Gen Billy Mitchell, US Army (posthumously promoted to major general). Those theories underpin Boyd's OODA model, which operational planners are expected to use to assist them in performing tactical through strategic methodologies such as JPP or JPPA. The OODA Loop is not a methodology or theory; a model can outlast the theories that helped establish it, or new theories might render a popular model extinct.

The military is often unwitting of how many models are constructed and employed within its military paradigm or of how most of them demonstrate deeper ontological and epistemological stances that infer an engineered, analytically optimizable approach to warfare. Most models mentioned in this chapter seek to categorize, reduce, isolate, and analyze those parts so that when reassembled, the "whole" of the warfare area of focus can be more effectively controlled and managed. These models share a similar ontology and epistemology because they emerge from the umbrella of a modern military shared belief system. This basis in turn shapes and influences the development of new language and metaphoric devices that enable operators to articulate and share concepts so that ideas are enacted into purposeful action in war. The modern military paradigm uses doctrine and training to produce new language and particular institutional narratives through the formal hierarchical form and function of the military. Doctrine goes through a factory-style assembly line, with approval from leadership. Once it is approved, the entire force is directed to comply and learn the new doctrine (including new terminology) and eliminate or retire outdated concepts.

Metaphoric devices abound in all language, including the military's, yet the institution deliberately and purposefully seeks to eliminate metaphor from formal military language. There is an effort to maintain objectivity, with parallels to mathematical formularization for how doctrinal terms and graphical symbols are employed to encompass all meaningful information in warfare. This cycle continues in how modern militaries assess and evaluate during and after warfare activities. With data emerging about how militaries function in complex security settings, militaries seek to interpret it in precise ways. They attempt scientific, engineering-styled assessments with "measures of performance" and the more abstract "measures of effectiveness" that indicate an "effects-based operations" sort of relationship. Whether interpreting the results of war activities through metrics (e.g., body counts, bombs dropped, new schools and wells built) or goal accomplishment (e.g., reaching objectives arranged along phases of a counterinsurgency campaign), militaries seek to render all emerging data scientifically.

The modern military paradigm frames complex reality and war itself in a natural science–inspired duality where the character of war changes through the swirling ebb and flow of culture, technology, society, and information over time, but the nature of war is absolutely fixed. Thus, like in natural science, once appropriate war theories are established and tested, any findings can reliably be turned into principles or laws so that at the micro-level in specific wars or the macro-level for any war at any time, certain things become static and controllable to the cunning operator. The decision-making methodology depicted in figure 10 (above) is how a modern military cohesively uses the entire war paradigm to link thought to action in war. Methodologies differ among services and nations and within military specializations (e.g., cyber, special operations, or domain-specific), and methodologies over time are modified, replaced, and recycled. It is this entire military war paradigm that is often hidden from view in totality. Thus, the promoted aspects of the frame are considered, and the institution can protect more vulnerable portions from critical examination.

With the working model of the modern military paradigm established, we move next to deconstructing the methodologies therein. To properly critique, diagnose, and suggest novel design for NATO-OPP or JPP, we must think systemically. That is, we must refer to this cohesive military frame of theories, models, methods, and language and how the shared belief system sustains the entire frame within the community of practice. Systematic reflection upon either decision-making methodology alone might produce some modifications or replacements, but it would still never challenge the larger institutionalized frame in operation. Without systemic reflection, one model might be replaced by yet another model that again adheres to the same theoretical, ontological, and epistemological frameworks and would likely become stylistic and superficial versus game changing or revolutionary.

If militaries are seeking innovation, creativity, and new flexibility in ever-increasing complex warfare conditions, they cannot achieve these goals through systematic, nonreflective practice (single- and double-loop thinking). They require systemic design exercised with reflective practice. In complex, socially constructed dilemmas (such as war), nonreflective practice will result in arriving at untenable solutions. That is, as Schön describes, “no available choice is a good one, because we are involved in a conflict of *ends* which are incommensurable. Ends are incommensurable because they are embedded in conflicting frames that lead us to construct incompatible meanings for the situation."[10] Reflective practice becomes the only vehicle for conceptualizing beyond the limits of a single war frame: efforts to force reality into a "problem-solution optimization" construct become just one of several competing perspectives of key stakeholders in conflict. Operators able to go beyond the pale of their institutional frame limits gain the advantage of systemic thinking over those adversaries unwilling to yield to anything outside their institutional limits.

**Notes**

1. Synthesis differs from analysis in that analytical logic breaks systems into smaller parts to seek meaning at the lower level. Then, the system can be reassembled, and lower-level understanding can lead to higher-level conclusions. Military planning uses reductionism to break down and categorize things analytically. Synthesis works paradoxically, where one starts at the system level and works outward, considering larger systems and the interplay between multitudes of ever-larger system relationships. For example, one might disassemble an automobile to the smallest parts, but there is nothing available that explains why drivers in the UK drive on the opposite side of the road. Only by moving beyond the car itself could one answer that particular question.

2. Paret, *Clausewitz and the State*, 8.

3. Many military theorists deserving of mention exceed the scope of this book. However, to establish the foundational thinkers that remain within NATO and joint forces decision-making, both theorists demonstrate significant and lasting impact.

4. Paret, *Clausewitz and the State*, 162.

5. Jullien, *Treatise on Efficacy*, 14.

6. Any critique of Clausewitz will create controversy. Readers disagreeing with this brief summary of Clausewitz's impact on the Western framework for modern warfare have many primary sources to consider as cited in this book. Philosophically, modern institutionalists seem to take on an ideological intolerance of any criticism or alternatives to what has perhaps been ritualized in modern war belief systems.

7. Paparone, "How We Fight"; Paparone, "Designing Meaning in the Reflective Practice of National Security; and Paparone and Squier, "Reframing Leadership at the Eisenhower School."

8. Paparone, *Sociology of Military Science*; and Paparone, "How We Fight."

9. Jullien, *Treatise on Efficacy*, 10–14, 20. Jullien explains the Western military paradigm for war as one consisting of ancient Greek natural philosophy revised and enhanced during Europe's Age of Enlightenment to incorporate Machiavelli's diplomatic and political theory along with Jomini's and Clausewitz's natural science influences. Chinese war theory would develop differently but is outside of the focus of this research.

10. Schön, "Generative Metaphor," 151.

Chapter 9

# Deconstructing the Modern Military Paradigm

NATO's Operations Planning Process and the joint planning process share a linear, sequential methodology where conceptualization is linked to orchestrated and managed security actions. These processes were designed to synchronize and produce scaled and resourced concepts of operations, campaign plans, operational orders, and all associated analytical and staff activities to support these activities. For purposes of this design deconstruction, we will not repeat describing the entire NATO-OPP/JPP methodologies and instead focus on the primary areas where modification, editing, or complete alteration might be warranted. Ample doctrinal publications exhaustingly detail NATO-OPP and JPP and how to adhere to them. Organizations even make pocket "smart books" and reference guides to show how to comply with the planning methods to better follow the linear-causal framework.[1] Nevertheless, some military professionals view not only the term "linear" as derogatory but also the underpinnings that justify some scientific soundness for these methods. Yet this term indeed frames the first critical step in deconstructing how NATO and joint forces approach warfare.

A methodology is considered linear when some clear proportionality is anticipated between identified causes and expected effects. Linear patterns are smooth and gradual; when mapped out, they show systematic relationships and enable plotting and predicting future behavior. When proportionality between cause and effect is lacking, the relationship is nonlinear and often experienced as counterintuitive or surprising.[2] When a linear methodology expected to describe a system (or explain reality) is contradicted, there are two options.[3] One might repeat the linear method and expect reality to produce the projected outcome in another effort, or one can determine that the methodology used is insufficient to appropriately describe that system. In the former, one is manifesting the definition of "insanity" by doing the same things repeatedly while expecting different results; in the latter, one employs reflective practice to break away from institutionally biased behaviors. Reflective practice is explained later but can be summarized as how "professionals gain knowledge of their (tacit) knowledge and of how this guides their actions. . . . [It] refers to the ability to reflect on one's action[s] as they are performed in concrete and specific situations, . . . [crucial to] . . . countering tendencies to rely on epistemologies that favour 'technical rationalism.' "[4] This is thinking about our thinking as we are in motion, unlike when we unreflectively act by following recipe-like sequences of behavior convergently and without questioning their relevance.

We often hesitate to realize the vastness of nonlinear patterns in complex security contexts because we do not feature the technical language of complexity theory in our decision-making methodologies.[5] Additionally, we approach such patterns expecting confirmation of our linear-causal belief system concerning how all modern warfare ought to function. When our preconceptions fail in action, we are surprised that linear expectations did not result in linear results. Nonlinear systems abound in complex reality where one does not see a smoothed or gradual path "but punctuations, or avalanches, . . . during which new forms appear."[6] The pattern shows no recognizable relationship from cause to effect, input to output, or beginning phenomenon to delivered "end result." We rarely get to our desired end states because they never existed except in our imaginations that we project upon a complex reality. Dynamic, complex systems never properly line up with such fantastically simplistic military expectations outside of immediate, localized, and tactical events. This concept links to ends-ways-means logic, explained later in the book. Linear-causal relationships of course exist in reality but only in simplistic contexts and rarely can be associated with broader complexity. This inclination to standardize military decision-making into linear-causal constructs extends from human enterprises in general and, according to Joseph Lampel and Henry Mintzberg, "is ultimately rooted in the wish to simplify the world and make our frameworks as general as possible."[7] We seek to tame the chaos of war just enough to permit our decision-making methodology to function.

The joint planning functions, process, and operational design methodology in figure 11 is from the 2020 joint planning doctrine published by the US Department of Defense. It is a powerful influence on how NATO partners, allies, and associated military forces curate their military decision-making methodologies.[8] While joint doctrine states that "the planning process is a recursive, assessment-informed process and not linear," this does not mean that the JPP is conducted in a nonlinear or emergent fashion as design occurs.[9] Instead, "not linear" suggests only that the systematic sequence of activities occurs as depicted in doctrine. Although the organization may gain new analysis or information and return to a prior step, each activity is isolated and positioned in the established order. Once the organization completes or revisits a step, it moves in the same established direction to the next uncompleted or uninitiated step. Thus, "linear/nonlinear" is framed in a classical Newtonian physics metaphoric device versus in complexity theory, where "nonlinear" means something entirely different.[10] If anything, contemporary military doctrine infers "out of order" instead of "not linear" in terms of operational flexibility in planning activities. In doing so, it again conforms the military institution to a Newtonian worldview of causes and effects and of inputs to outputs linking ways and means to preconceived ends.

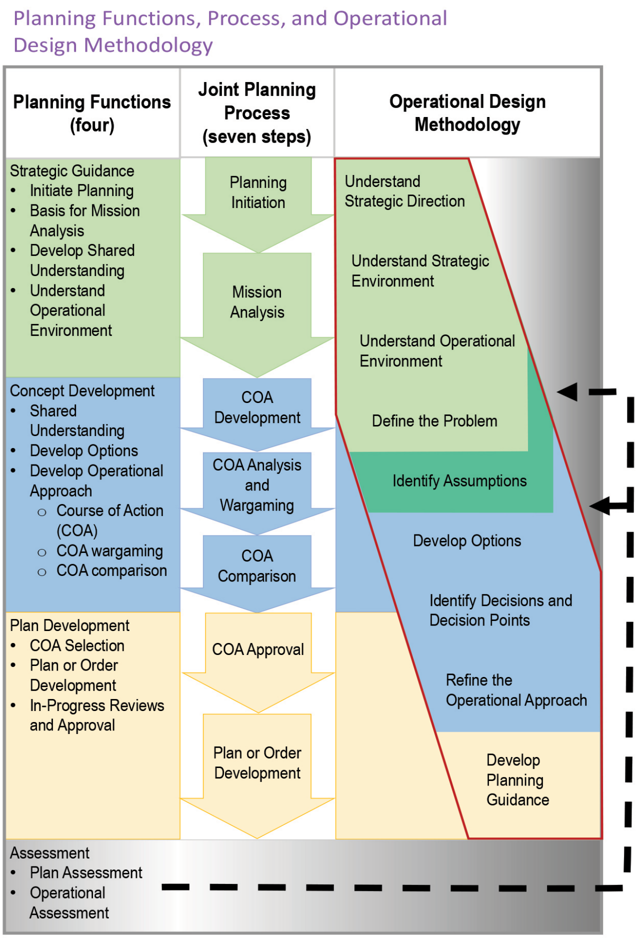



**Figure 11. Planning functions, process, and operational design methodology.** (Reproduced from Joint Publication 5-0, *Joint Planning*, December 1, 2020, fig. III-1, https://irp.fas.org/.)

The latest version of NATO planning doctrine published in 2021 even declares, "The process and templates presented in the COPD [*Comprehensive Operations Planning Directive*] v3.0 are a capture of best practice; they suit well a timely and systematic movement through the process from one phase to another."[11] JPP and NATO-OPP position the commander as central to leading and shaping the decision-making process, with staff analysis and expertise set within the centralized military hierarchical form of organizational expression. The institution again reinforces the traditional centralized hierarchy as the preferred organizational form. The commander sits atop a clear, structured entity that follows the linear-causal sequencing of activities just as one would follow a recipe exactly in order to produce a meal (fig. 11).[12] The greater the adherence to the recipe (NATO-OPP/JPP processes informing the commander), the stronger the expectation of a successful outcome.

JPP and NATO-OPP commence their decision-making processes with strategic guidance, reinforcing the centralized hierarchical organization and a top-down structure. All conceptual activities are nested within the Westphalian nation-state (and Clausewitzian explained) relationship of civilian-military dialogue that occurs simultaneously between senior civilian/governmental and military leaders at the national level for security affairs. The first planning function in the JPP is termed "strategic guidance" and groups the initial analysis of existing strategic guidance with any new or emergent strategic guidance. Senior military leadership (combatant commander) "crafts objectives that support national strategic objectives with the guidance and consent of . . . [the US secretary of defense]; if required, the . . . [chairman of the Joint Chiefs of Staff] offers advice."[13] Strategic overarching objectives are identified first, and in a reverse-engineering process that follows the sequence of synchronized, linear-causal activities in figure 11, the military organization develops a plan or order for execution and assessment.[14]

The NATO-OPP version is nearly identical to the JPP version. Aside from subtle differences in terminology that are largely methodological or based on necessary political or social requirements within the international NATO construct, these two decision-making methodologies are one and the same. Both commence with top-down hierarchical establishments of national or strategic military objectives and are curated through a clear chain of command of civilian/governmental and military leaders. In joint planning and the NATO variation, "the commander is the central figure in planning due to knowledge [and] experience . . . and because the commander's judgment and decisions are required to guide the staff through the process." For the NATO-OPP version, see figure 12. [15]

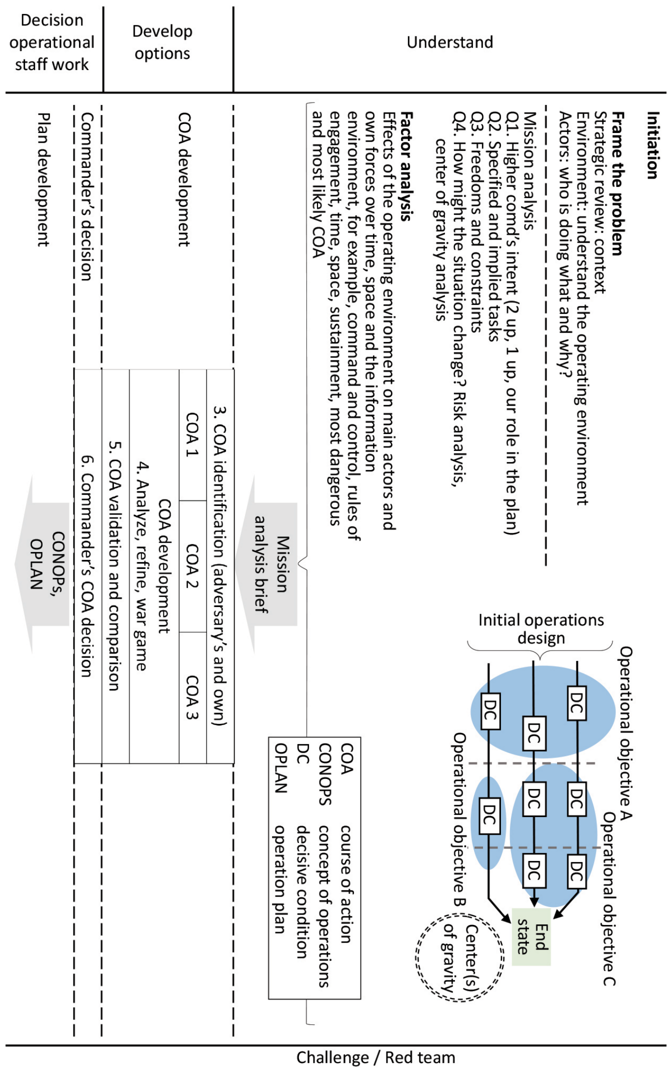



**Figure 12. Overview of the operations planning process.** (Reproduced from NATO Standard Allied Joint Publication-5 [AJP-5], *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2 [Brussels: NATO Standardization Office, 2019], Annex C, C-2, 165, https://assets.publishing.service.gov.uk/.)

In the modern military paradigm, commanders lead, and the staff supports.[16] The decision-making methodology itself adheres to a centralized hierarchical organizational form, yet this construct takes on significance in JPP and NATO-OPP when considering increasingly complex security contexts (fig. 12). Joint doctrine goes on to state, "Generally, the more complex a situation, the more critical the role of the commander early in planning by leveraging their knowledge, experience, judgment, intuition, responsibility, and authority to generate a clearer understanding of the conditions needed to focus effort and achieve success."[17] Joint planning doctrine correlates any *increase in complexity* with an increase in exclusive capability and capacity of only the *senior commander* in guiding the military organization through what complexity theory offers as situations previous knowledge and experience are unlikely sufficient to address.

Joint and NATO planning doctrine make egregious misstatements about complexity and systems theory and faultily incorporate them primarily because modern security decision-making is not established on those recent twentieth-century disciplines. Rather, these later theories would have select terms and concepts pulled out and assimilated (losing contextual relevance) into what is a Newtonian-based framework of far earlier theories, models, methods, and language for framing modern warfare. The centralization of the commander comes from Feudal Age and antiquities-based belief systems, values, and culture ritualized into modern management and decision-making for warfare. JPP and NATO-OPP employ models such as "principles of joint and multinational operations," "UK principles of war" equivalent to "NATO principles of operations," "principles of joint operations," and operations planning principles in the NATO COPD.[18] Also included are the original "principles of war" popularized by Jomini (attempting to explain the sudden rise of Napoleonic warfare) during the original modernization of "military science." This is where natural science development spawned military imitation, as many professions raced to reimagine themselves organizationally while attempting to assimilate increasingly sophisticated technology and industry. The military is not the only guilty party in missing the boat on complexity; complexity theory still has a limited impact on mainstream disciplines and communities of practice outside certain scientific groups.[19]

Modern military decision-making already carries a mechanistic payload of natural science metaphoric devices, terminology, definitions, and systematic logic.[20] These stem from natural science–inspired theories on war (e.g., Jomini, Clausewitz, Scharnhorst, Svechin, Liddell Hart, Moltke) and industrialized, centralized assembly-line (Taylorism school of management) organizational constructs validated during both World Wars.[21] Complexity, chaos, and systems theories would only come later, well after JPP and NATO-OPP structures became rigid and fixed. Joint doctrine acknowledges that "due to complexity and constant change, commanders . . . will never know everything about the given OE [operational environment] and will never be able to fully define its problems. As such, many of the problems in the OE may not have solutions."[22] It goes on to state that "the joint planning process . . . is a *problem-solving* technique designed for military planning" (emphasis added).[23] NATO at the strategic level seeks to "establish the boundaries of the strategic problem to be solved and the conditions that must be established to achieve an acceptable NATO end state."[24] Problems link to solutions so that militaries can reach a predetermined strategic goal or end state. This convention is conveyed at every scale and level of military activity and vertically nested from tactical, local missions to multinational coalitions implementing grand strategic enterprises.

Joint Publication 5-0 uses the term "problem" 166 times, with many instances directly stipulating (or inferring) a systematic "problem-solution relationship" for planners using JPP. "Systematic" indicates a direct, causal, and input-output correlated relationship that is quantifiable and suitable for analytic optimization (A plus B leads to C). Joint planning's operational design categorizes key inputs to key outputs, where "strategic guidance" leads to an analytically deduced *description* (not explanation), and network analysis leads to further description of opposing end states (fig. 13).[25] Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations* (2019), also shows a similar pattern with "problem-solving," "defining the problem," "analysis of the problem," and "understanding the problem" using the same mechanistic, Newtonian-styled constructs. An identified problem is paired with a solution, where the accomplishment of that solution becomes an objective or goal set in the future as a desired end state. Subsequent planning is a reverse-engineered formulaic sequence of linked activities led and centered around the senior leader with analytical staff supporting actions. Joint planning doctrine explicitly depicts these inputs linking systematically to expected outputs.

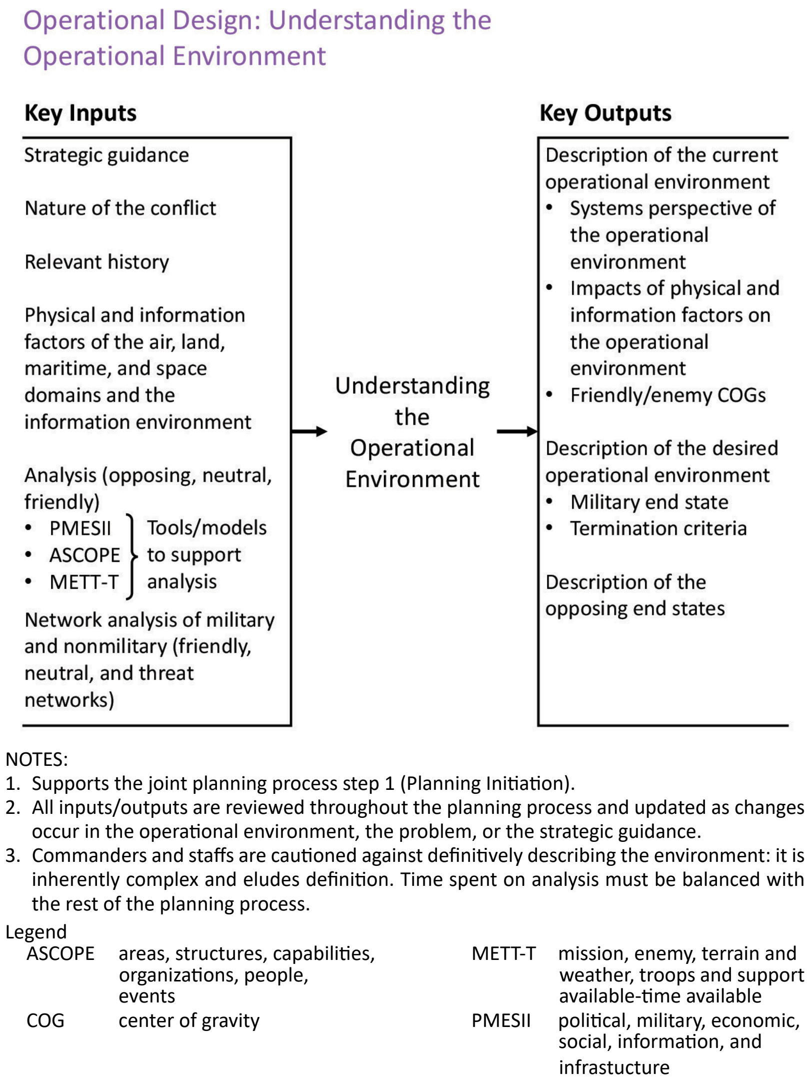



**Figure 13. Operational design: understanding the operational environment.** (Reproduced from Joint Publication 5-0, *Joint Planning*, December 1, 2020, fig. IV-1, https://irp.fas.org/.)

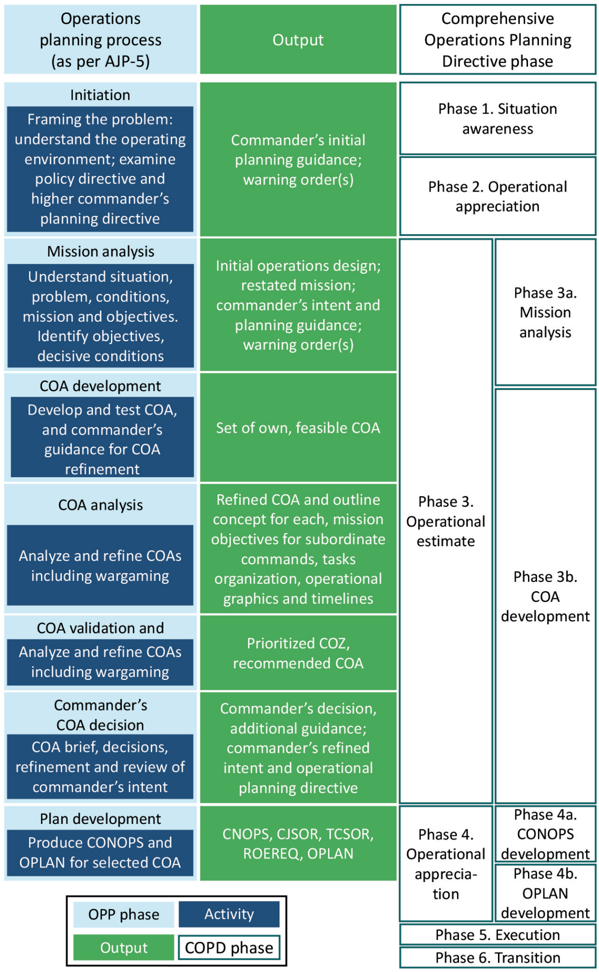
JPP and NATO-OPP arrange this linkage of operational planning to strategic objectives/goals through a centralized "operational environment understanding." The leader guides what joint doctrine terms an "orderly, analytical set of logical steps" so that the commander, staff, and subordinate and supporting headquarters and units "organize their planning activities, share a common understanding of the mission and commander's intent, and develop effective plans and orders."[26] This operational design (input) is supposed to lead to an output of "understanding" as the desired outcome of this analysis. This model demonstrates what is termed "systematic logic," which is valuable for analytical optimization and yields clear, repeatable results in simplistic and complicated systems.[27] However, systematic logic does not support activities in complex, dynamic systems where "wicked problems" readily resist such efforts.[28] Dynamic and complex systems feature a "messiness" or sophistication that prevents many solutions from working (as anticipated), often presenting a "wickedness" that denies previous solution frames from being reapplied to future ones. Often, the best optimized industrialized solutions are expected to meet all strategic and operational requirements in theory (or on paper) yet predictably fail in unforeseen ways when applied to the real world.

Convergent, systematic processes feature a preference toward an incremental gain in efficiencies so that clearly defined goals and objectives as originally crafted can be reached faster and with lower strain on resources and organizational interest. Systematic logic functions where inputs are linked to clear outputs and linear-causal relationships work mathematically, even mechanically, to sequence discrete and reducible activities across time and space to lead toward overarching objectives and goals.[29] Modern planning in this mindset seeks maximum efficiency at the expense of imposing closed system logic, where "time must be seen as merely metric, not productive of novelty."[30] Reality must be able to be frozen and isolated into slivers so that analytical optimization can work. In that reductionism, the methodology moves forward or backward on the timeline using enduring formulas and principles governing how things happen.[31] Closed systems are conceptualized where they do not interact with any elements that exist beyond the system itself. Anything not within the system is thus irrelevant to explaining that system's form and function. Isolating complex warfare through categorization, rule-setting, and analytical optimization closes that element off from the larger system.

Ideally, one can gain efficiency (decreasing risk, increasing control and prediction) by reducing complexity sufficiently so that formulas, rules, and established categorization stabilize a previously chaotic and confusing whole system. However, the act of becoming more efficient does not correlate directly to becoming *more effective* in complex systems. Effectiveness frequently requires innovation, imagination, and a willingness to break away from the very practices that an organization might be attempting to improve efficiency with.

In the first portion of NATO-OPP (see fig. 14) and JPP, the decision-making methodology seeks to pair the strategic, national, or higher headquarters command intent with evaluation activities. These include analyzing the operating environment, assessing the initiating directive (political or strategic), and making other determinations in the available planning time. Modern military decision-making features a series of staffing sections aligned with compartmentalized (Prussian-styled, specialized/categorized staff functions) actions to determine if the requirement meets existing suitability, capacity, capability, and authority criteria. NATO doctrine states, "The strategic and operational-level commander typically will provide initial planning guidance based upon [a] current understanding of the operating environment . . . and other intelligence products and staff estimates . . . [as well as] other factors relevant to the specific planning situation . . . [including] . . . doctrine, lessons identified and ongoing research and concept development."[32] Joint doctrine parallels that of NATO and determines several outputs generated in this initial assessment of strategic guidance for planning. In joint planning, outcomes are "assumptions, identification of available/acceptable resources, conclusions about the strategic and operational environment (nature of the problem), strategic and military objectives, and the supported commander's mission."[33]

There is a clear effort at an epistemological level (how an organization knows *how* knowledge exists, how methods function and are validated) to take a natural science–inspired, laboratory-styled approach to quantifiable, objective analysis of security challenges. The military approach of bounding an "operating environment" as something outside or beyond the organization (us, our beliefs, values, rituals, subjective and socially constructed frames) is akin to a scientific methodology. In both, the area of inquiry is detached from the analyst (and external variables) until one decides to act upon it in some deliberate (and quantifiable) manner.




Legend

| | | | |
|---|---|---|---|
| AJP | Allied joint publication | OPLAN | operation plan |
| CJSOR | combined joint statement of requirement | OPP | operations planning process |
| COA | course(s) of action | ROEREQ | rule-of-engagement reques |
| CONOPS | concept of operations | TCSOR | theatre capability statement of requirement |
| COPD | Comprehensive Operations Planning Directive | | |

**Figure 14. NATO Operations Planning Process.** Stages and outcomes of the operations planning process in relation to the *Comprehensive Operations Planning Directive*. (Reproduced from Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2, with UK National Elements [Change 1] [Brussels: NATO Standardization Office, May 2019], UK Annex C, Fig. C-2, 164, https://assets.publishing.service.gov.uk/.)

Intelligence focuses outward, using analytical tools that channel, categorize, isolate, objectify, filter, or sort available information in particular ways that suit military conceptual models within NATO-OPP and JPP processes. Institutionalized military doctrine and historical lessons are prioritized and granted greater validity than untested, unproven, or experimental knowledge and techniques. Doing so reinforces the military expectation that complex adaptive systems must become ordered, controlled, and static when military decision-making methodologies are applied to them. Things that worked before are therefore expected to work again in a similar and predictable manner, violating the core concepts of complexity, emergence, nonlinearity, and adaptation. We can never have complete knowledge of complex systems or remove ourselves from complexity to isolate or enforce some sort of assumed objectivity.[34]

Modern military decision methodologies have conveniently ignored and marginalized emergence because of their devotion to a Newtonian style and reductionism. Independent variables must exist within all systems so that the military can isolate them; analytically define, measure, and target them; and then link cause to effect and impact the entire system through manipulation of the defined parts. Militaries are hardly alone in this selective interpretation of complex reality. Gharajedaghi explains how most scientific disciplines followed suit through the middle of the twentieth century, when systems theory, complexity theory, and modern design thinking began to chip away at these epistemological stances:

> Handling independent variables is the essence of analytical thinking, which has remained intact in all three contexts: physical, biological, and social. To share in the glory of classical science, both biological and social sciences opted to use the analytical method with no deviation. This might help explain why a whole set of phenomena, known as type II (emergent) property, has been conveniently ignored. Properties like love, success, and happiness do not yield to analytical treatment. However, increasingly we are finding out that our independent variables are no longer independent and that the neat and simple construct that served us so beautifully in the past is no longer effective.[35]

The grip that analytical reasoning has on modern military decision-making cannot be understated. JPP and NATO-OPP position an "operational design phase" early in their decision-making methodology, focused largely in the "mission analysis" activities. "Operational design" is defined in joint doctrine as "the analytical framework that underpins planning . . . [and] supports commanders and planners in organizing and understanding the OE as a complex interactive system."[36] NATO-OPP emphasizes a deep understanding of "ends, ways, means and risks" as of "central importance for the operations design."[37] Ways and means are connected systematically to ends within this operational design. While many professions and scientific disciplines have moved away from this profound epistemological dependence on classical science and pure analytical reasoning, militaries today continue to extend the same original Newtonian-styled warfighting frameworks with only evolutionary or aesthetic changes to constructs two to three centuries old.

Modern militaries seek to link "primary objectives" to "desired effects" in systematic logical (input-output) relationships. First, a process of reverse engineering occurs by establishing a desired end state so that one can systematically build ways, means, and predetermined risk reduction from the future desired state back to the present. This linear-causal mode of logic is prominent in the conceptual phases of all modern, military planning (and strategy)[38] and all linear, detailed planning methodologies outside purely military contexts. Mainstream Western society—whether in commerce, government, academia, or general practice—generally seeks to reverse engineer activities in time and space to render uncertain, complex reality a more stable and regulated facsimile. Researchers Aki-Mauri Huhtinen et al. suggest that the "belief in ever-evolving progress and scientific development as the solution to all problems is characteristic of modern Western thinking."[39] The latest NATO strategic doctrine supports this assertion in the six-phase generic crisis response process (fig. 15).

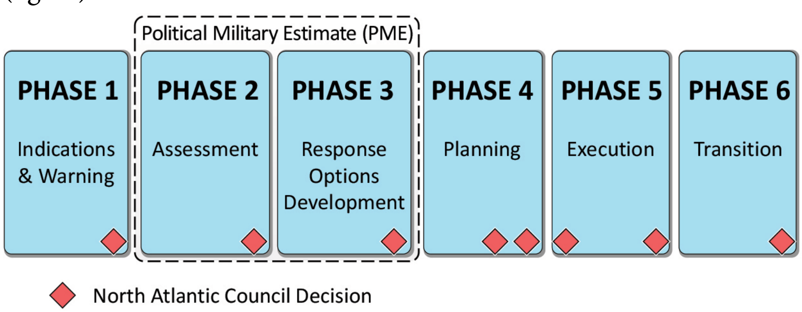



**Figure 15. NATO crisis response – six-phase generic process.** (Reproduced from Supreme Headquarters Allied Powers Europe [SHAPE], *Allied Command Operations Comprehensive Operations Planning Directive, COPD Version 3.0* [Belgium: SHAPE, 2021], fig. 1.1.)

Militaries and other centralized hierarchical organizations (industrial, political, academic) attempt to understand and act upon complex reality in a manner that defines Western, industrialized society.[40] NATO-OPP and JPP are founded upon this ends-ways-means logical arrangement, making the end state the military forces' primary focus. Anything preventing the organization (nested hierarchically in supporting the desired end state of higher organizations) from reaching its end state automatically becomes classified as a "problem" in need of a solution.[41] Thus, modern military decision-making becomes "linear and mechanistic by nature and grounded in industrial age warfare. The process is predicated upon the pursuit of specific terminal end states, from which planners work backwards to identify a linear sequence of enabling objectives."[42] This practice is appropriate in simplistic or closed systems where a single "best" solution is identifiable and often static and repeatable as well as potentially in complicated systems where "good enough" solutions abound; in more sophisticated settings, processes, analysis, and repetition through increased efficiency (and risk reduction) can lead to optimization, success, and the establishment of clear patterns. However, ends-ways-means logic rarely complements complex systems,[43] often the very ones that modern militaries must face.

In complex systems, self-predicting clear paths is impossible beyond immediate and often simplistic (closed loop) contexts because "an actor's future actions cannot be predicted by him/her since they depend on the outcomes of decisions as yet unmade by him/her."[44] Aspirational future end states in complex security contexts are, if anything, a representation of what the present organizational desires are in the legacy frame, detached from emergent developments that may change one's understanding of potentiality. The element of "time" is significant in reverse-engineered military planning because there is an implication that over time and the progressive accumulation of knowledge and experience, the organization will better understand, control, and predict a complex system. This assumption appears throughout all versions of modern military decision-making doctrine, including the 2013 interim version of the NATO comprehensive operations planning directive (fig. 16).

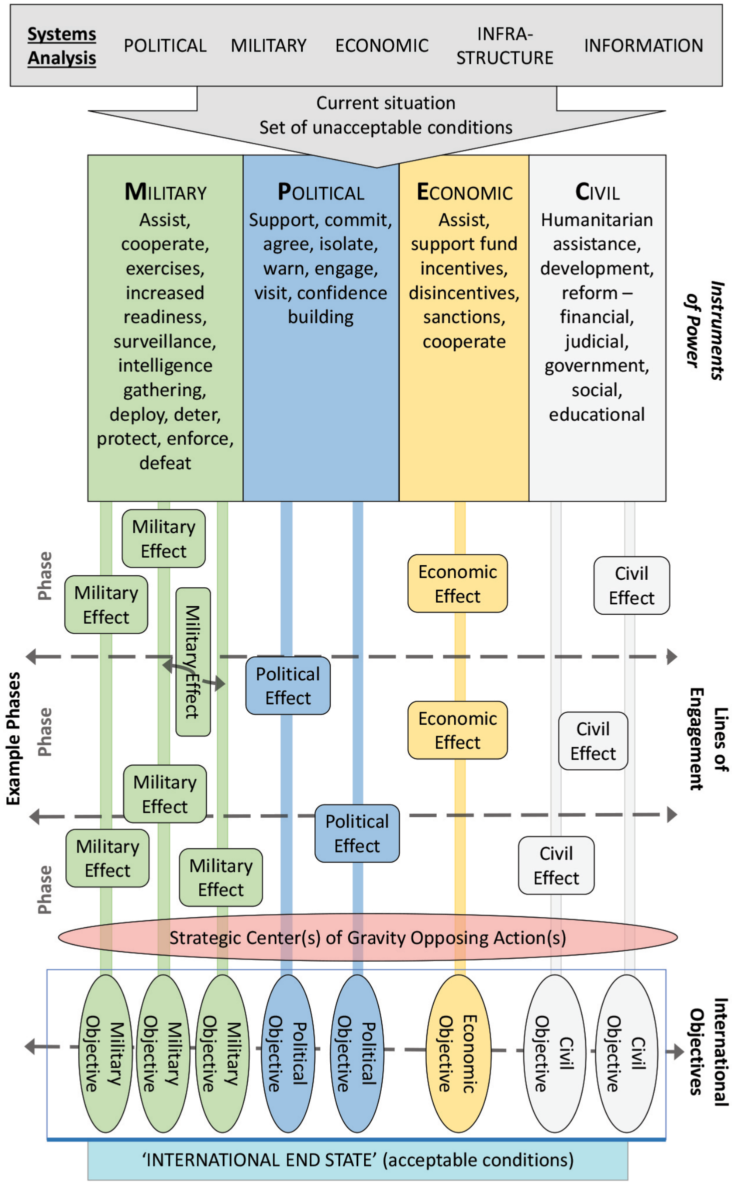



**Figure 16. Theoretical international design.** (Reproduced from Supreme Headquarters Allied Powers Europe [SHAPE], *Allied Command Operations Comprehensive Operations Planning Directive, COPD Interim V2.0* [Belgium: SHAPE, October 4, 2013], fig. 1.1, https://www.forsvarsmakten.se/.)

Joint planning doctrine expects warfare, despite its inherent complexity, to permit organizations to connect "resources and tactical actions to strategic ends." The commander "must be able to explain how proposed actions will result in desired effects, as well as the potential risks of such actions" before any actions even occur in what is a complex, dynamic system.[45] Despite JPP and NATO-OPP mentioning the volatility of complex systems, they immediately apply assumptions about cause and effect in what appear to draw from classical or natural science metaphors reapplied to warfare. NATO doctrine states that "modern crises are characterised by complex interdependencies[,] and conflicts are underpinned by a combination of historical, political, military, social, cultural and economic issues."[46] It directs planners and staffs to apply a categorizing, reductionist model of the political, military, economic, social, infrastructural, and informational (PMESII) construct, where the organization associates all observable and assumed valuable information into standardized domains.

Purely analytical, reductionist models are subsequently applied to stakeholders and to collected information to gain an understanding of how "to determine how these actors might be influenced in ways that achieve the Alliance's strategic objectives and end state, thereby contributing to the international community aims."[47] One isolates the data, files it into the preset categorization model, and collects the outputs to generate a stable formula for the security context under analysis. Mintzberg offers that in most modern organizations, there is interplay between a changing environment (context), the bureaucracy form that organizes actions to stabilize the changing environment, and leadership that mediates between the two. He clarifies that "strategy can then be viewed as the set of consistent behaviors by which the organization establishes for a time its place in its environment, and strategic change can be viewed as the organization's response to environmental change, constrained by the momentum of the bureaucracy and accelerated or dampened by the leadership."[48] NATO-OPP and JPP processes are the decision-making methodological expressions of this modern institutional belief about what strategy is, how it is made, and who executes such strategy in warfare applications. Staffs support the commander by using analytical tools to reverse engineer a formulaic mode of transforming the present state toward preset pathways that result in accomplishing national or strategic goals. In this process, they identify the problem, determine the solution, and manage careful execution of ways/means linked to clear ends.

Yet systems theorists decry this assumption implicit in all modern military doctrine for strategic and planning activities as not only false in any context but also simplistic for certain complicated systems. No collection of knowledge permits greater prediction of complex systems due to how they behave, with dynamic complex systems interacting and learning. Even if the organization gained more knowledge, that knowledge may be entirely irrelevant in the changed system.[49] This is not to suggest that NATO or joint forces remove the entire "operations design" portion featured in their mission analysis and initial planning phases. Rather, modern military forces may seek to enhance the initial design through the application of multiple futures—divergent thinking by staff on a wide range of nonlinear, emergent transformations that make historical and doctrinal conclusions irrelevant (or paradoxical). They might also foster a critical self-awareness (reflective practice) of how their own organizations may be employing multiple cognitive biases in conducting forecasts and planning of a complex future system.[50] Organizations cannot accurately assess the limits and failings of NATO-OPP or JPP without reflecting beyond or outside the rules, boundaries, and institutionalized limits of the chosen methodology and the associated language, metaphors, models, and theories that create the institutionalization itself.

In complex reality, linear causality is not readily indicated, end states will not work, and strategic goals will not be apparent except when within immediate reach.[51] Furthermore, an end state is considered an illusion in many regards due to the important aspect of "emergence" in complex systems. Design theorist Richard Buchanan points out this paradox of complexity and how new goals and emergent opportunities cannot be manufactured or reverse engineered in the present. He explains that "the problem for designers is to conceive and plan what does not yet exist, and this occurs in the context of the indeterminacy of *wicked problems,* before the final result is known" (emphasis in original).[52] Thus, organizations abandon original goals, novelty (unforeseen developments) occurs, and the subsequent goals that manifest could never have been anticipated.[53] NATO-OPP and JPP employ systematic logic to link a "problem" to a "proposed solution" within mission analysis and operational design. They also use this logic later in the methodologies in each subsequent step leading to operations order production or campaign plan finalization. This effort to reverse engineer military effects or objectives to predefined problem sets takes on a purely analytical approach to complex warfare, usually to the detriment of the organization seeking more than limited and highly tactical activities that adhere to this logic (fig. 17).[54]

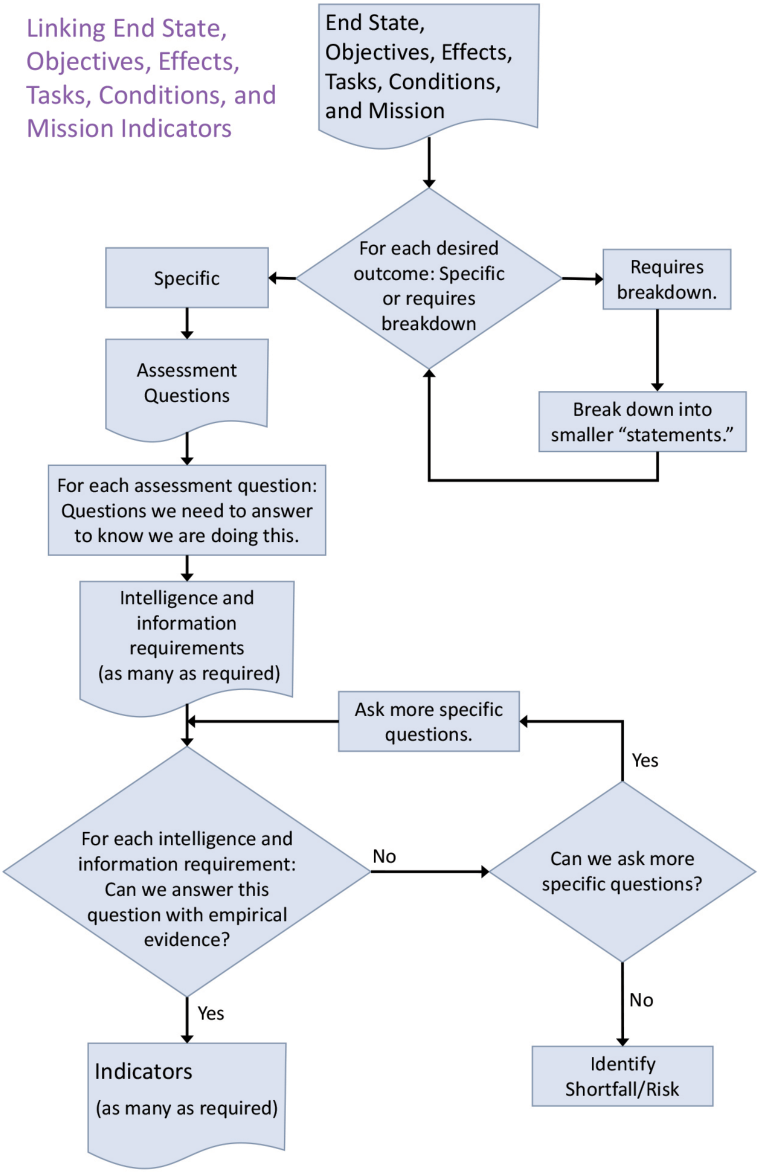



**Figure 17. Linking end state, objectives, effects, tasks, conditions, and mission to indicators.** (Reproduced from Joint Publication 5-0, *Joint Planning*, December 1, 2020, fig. K-12, https://irp.fas.org/.)

Pioneering design theorist Horst Rittel offers that the "problem definition" sequence is analytic in nature. Planners essentially reverse engineer their designed sequence for action by defining a problem and then specifying the necessary solution requirements that the successfully designed solution normatively should possess.[55] This approach is rationalization, where one is expected to apply logic (deductive and inductive) and analysis and attempt to prevent intuition or subjectivity from creating user bias or poor understanding. Again, NATO-OPP and JPP highlight a linkage of requirement analysis to overarching strategy (national, political, or higher directed) and the desired output of "understanding" in this phase of the methodology. Yet Rittel and others saw that despite the appearance of rational, systematic designing toward defining the right problem, people tended to become overwhelmed in highly complex situations or force preferred solutions in irrational ways—if only due to ignorance to their own biases forming within a complex social construction. The preceding diagram from the 2020 *Joint Planning* publication demonstrates the modern military zeal to systematically reduce complex security challenges to a linear-causal, formulaic sequence promoting oversimplified "if yes, go here . . . if no, go there" conceptualizations.

Rittel instead suggests that an organization confronting complex challenges should appreciate the properties of wicked problems; they cannot be solved in isolation. Breaking a complex system into manageable chunks or using reductionist models to then reverse engineer inputs to expected outputs (problem-solution) will rarely work in a complex system; if a solution does work, it will work only that one time. In real complexity, any solution is a one-shot effort that changes the system and produces nonreversible design consequences. These design challenges are unique, systemically (rather than systematically) linked to more extensive and abstract problems across an increasingly complex system where the designers are fully responsible for their own actions.[56] In these situations, design requires blending analytic, rationalistic thinking with intuition, artistry, and a designer's appreciation of complexity rejecting design applications featuring only one or the other in praxis.[57] NATO-OPP and JPP doctrine do not feature this approach and instead overemphasize analytical optimization through systematic processes of largely causal and reductionist activities.

Instead of reinforcing this traditional and exclusively analytic focus on "problem-solution" constructs, Rittel and Webber introduced the concept of "wicked problems" while drawing upon complexity theory to propose nonlinear, emergent, and dynamic designs.[58] As Buchanan explains, "the linear model of design thinking is based on *determinate* problems which have definite conditions. The [planner's] task is to identify those conditions precisely and then calculate a solution. In contrast, the *wicked-problems* approach suggests there is a fundamental *indeterminacy* in all but the most trivial design problems" (emphasis in original).[59] In clear, simple contexts in war, A plus B does lead to C in a reliable fashion. Technological, localized, and tactical activities can feature this sort of dynamic. However, organizations seeking to manage and orchestrate vast campaigns, operations, or activities in complex, dynamic security contexts will never find such predictable system expressions.

**Notes**

1. Schnaubelt, Larson, and Boyer, *Vulnerability Assessment Method*; Wade, *Joint Forces Operations & Doctrine SMARTbook*; and Joint Staff, J-7, Joint and Coalition Warfighting, *Planner's Handbook for Operational Design*.
2. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 989.
3. Kitchener, "Bertrand Russell's Naturalistic Epistemology," 140.
4. Danielsson, "Knowledge in and of Military Operations," 6.
5. This book will explain that while doctrine writers have inserted some terms from complexity theory, they are often stripped of their original meaning. Instead, the terms are assimilated into the Newtonian-style warfighter frame that supposes natural science rigidity and stability into all considerations for conflict and defense.
6. Morales-Matamoros, Tejeida-Padilla, and Badillo-Piña, "Fractal Behaviour of Complex Systems," 76.
7. Lampel and Mintzberg, "Customizing Customization," 29.
8. Joint Publication (JP) 5-0, *Joint Planning*, III–4.
9. JP 5-0, III-3.
10. Paparone, "On Metaphors We Are Led By"; and Bousquet, "Chaoplexic Warfare," 920.
11. Supreme Headquarters Allied Powers Europe (SHAPE), *COPD Version 3.0*, i.
12. JP 5-0, *Joint Planning*, 82.
13. JP 5-0, III-6.
14. SHAPE, *COPD Interim V2.0*, 1-5.
15. JP 5-0, *Joint Planning*, III-9.
16. SHAPE, *COPD Interim V2.0*, 1-4.
17. JP 5-0, *Joint Planning*, III-9.
18. JP 5-0, III-9; Allied Joint Publication-5 (AJP-5), *Allied Joint Doctrine for the Planning of Operations*, 2-3; and SHAPE, *COPD Interim V2.0*, 1-6.
19. Bousquet and Curtis, "Beyond Models and Metaphors," 55.
20. Bousquet, "Chaoplexic Warfare," 919–20.
21. Waring, "Taylorism and Beyond"; Waring, *Taylorism Transformed*; Paparone, *Sociology of Military Science*; Shy, "Jomini"; Paret, *Clausewitz and the State*; White, *Scharnhorst*; Svechin, *Strategy*; and Liddell Hart, *Strategy*.
22. JP 5-0, *Joint Planning*, III-10.

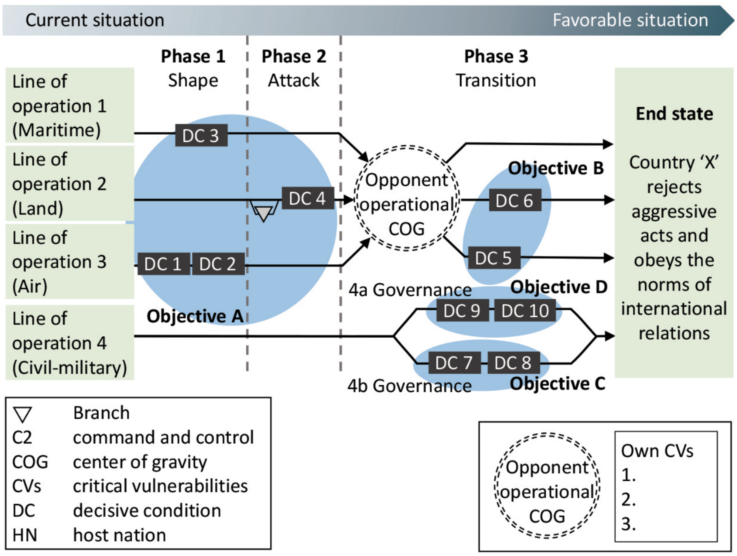
23. JP 5-0, I-20.
24. SHAPE, *COPD Interim V2.0*, 4-40.
25. Joint Chiefs of Staff, *Developing Today's Joint Officers*, 4.
26. JP 5-0, III-10.
27. Snowden and Boone, "Leader's Framework for Decision Making."
28. Buchanan, "Wicked Problems in Design Thinking"; Conklin, "Wicked Problems and Social Complexity"; and Tsoukas and Hatch, "Complex Thinking, Complex Practice."
29. Paparone, "How We Fight"; and Paparone, "Designing Meaning in the Reflective Practice of National Security."
30. Tsoukas, "What Is Organizational Foresight?," 263; and Bousquet, "Cyberneticizing the American War Machine," 83.
31. Krippendorff, "Principles of Design," 416; and Dent, "Complexity Science."
32. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, 4-5.
33. JP 5-0, *Joint Planning*, III-6.
34. Preiser, Cilliers, and Human, "Deconstruction and Complexity," 262–63.
35. Gharajedaghi, *Systems Thinking*, 13.
36. JP 5-0, *Joint Planning*, IV-1.
37. AJP-5, *Allied Joint Doctrine for the Planning of Operations,* 3-3.
38. Chia and Holt, *Strategy without Design*, 22–29.
39. Huhtinen et al., "Information Influence in Hybrid Environment," 7.
40. Tsoukas, *Complex Knowledge*, 276; Chia and Holt, *Strategy without Design*, 18–22; Martin, "A Tale of Two Design Efforts," 3; and Paparone, "How We Fight."
41. Meiser, "Ends + Ways + Means = (Bad) Strategy," 82–85.
42. Monk, "End State," 4.
43. Tsoukas and Hatch, "Complex Thinking, Complex Practice"; Bousquet and Curtis, "Beyond Models and Metaphors"; and Snowden and Boone, "Leader's Framework for Decision Making."
44. Tsoukas, "What Is Organizational Foresight?," 271. Tsoukas quotes Alasdair MacIntyre.
45. JP 5-0, *Joint Planning*, IV-4.
46. SHAPE, *COPD Version 3.0*, 1-13.
47. SHAPE, 1-14.
48. Mintzberg, "Patterns in Strategy Formation," 941.
49. Protzen and Harris, *Universe of Design*, 53–56.
50. "Reflective practice," explained in detail later in the book, is foundational to all security design praxis.
51. Stanley and Lehman, *Why Greatness Cannot Be Planned*; Conklin, "Wicked Problems and Social Complexity"; and Buchanan, "Wicked Problems in Design Thinking."
52. Buchanan, 18.
53. Stanley and Lehman, *Why Greatness Cannot Be Planned.*
54. Kitchener, "Bertrand Russell's Naturalistic Epistemology," 122.
55. Buchanan, "Wicked Problems in Design Thinking," 15.
56. Protzen and Harris, *Universe of Design*; and Rittel and Webber, "Dilemmas in a General Theory of Planning."
57. "Praxis" is the fusion of theory and practice in that as we develop theories, we are also practicing them. Thus, we refine those theories mid-practice, continuing the iterative cycle of creation, implementation, refinement, and consequence.
58. Rittel and Webber, "Dilemmas in a General Theory of Planning."
59. Buchanan, "Wicked Problems in Design Thinking," 15–16.

Chapter 10

# Newton's Gravitational Pull and Modern Warfare Ritualization

After the systematic linkage of desired future end states to strategic intent and recognizable "problems" paired with existing institutional solutions, NATO-OPP and JPP processes continue operational design by directing staff to identify and analyze centers of gravity. Joint planning defines a "center of gravity" as "the source of power or strength that enables a military force to achieve its objective and is what an opposing force can orient its actions against that will lead to enemy failure."[1] Joint planning indicates that a COG could be clear entities (e.g., a leader, force, capability, or function) or abstract concepts (e.g., national will, beliefs, or ideas). NATO-OPP restrains its COG definition to something that "is always an entity" and must therefore remain identifiable and actionable through quantitative, analytical, and objective constructs.[2] The COG model is employed in modern military decision-making methodologies, such as NATO-OPP and JPP, to apply military theory to complex warfare in reality. First conceptualized by Clausewitz, this concept would in the last two centuries of warfare gradually be entrenched in Prussian, Russian, and, later still, Anglo-Saxon military doctrine and practices.

COGs are foundational models in all versions of modern military decision-making, applied to linking desired end states and objectives to desired effects of military tasks. By targeting adversarial COGs and protecting friendly ones, a military force can systematically build elaborate input-output formulas of missions, tasks, and effects that should accomplish broader objectives. For such a powerful strategic tool for accomplishing wanted outcomes in complex security contexts, one might see COGs as a conceptual model also move out of security affairs and into industry, academia, and other non-warfare applications. Yet this is hardly the case. Few popular military models or theories are used in commercial or academic/scientific applications outside military and security organizations, with "center of gravity" itself being a Newtonian metaphor adapted from the theoretical work of Clausewitz and others.[3] There appears to be an institutional fixation by military forces alone in seeking COG modeling as the metaphoric device of choice in structuring decision-making in war that does not extend to the fields of medicine, law, social sciences, or finance.[4] Only in the military sphere does this concept occupy such a prominent position. In NATO doctrine, the COG becomes the ultimate warfighting device of convergence where virtually all other planning considerations are mapped to correlate in a linear-causal relationship over time and space (fig. 18).[5]




| End state<br>Country 'X' rejects aggressive acts and obeys the norms of international relations. | | | |
|---|---|---|---|
| **Objective A**<br>Defeat 'X' conventional forces | **Objective B**<br>Secure 'X' withdrawal | **Objective C**<br>Restore essential services | **Objective D**<br>Re-established HN ('Y') authority |
| DC 1 'X' C2 neutralized<br>DC 2 Air superiority gained<br>DC 3 Seas denied<br>DC 4 'X' land forces defeated | DC 5 Air control established<br>DC 6 'X' land forces repatriated | DC 7 Potable water provided<br>DC 8 Electric power restored | DC 9 'Y' Armed forces and police reasserted<br>DC 10 'Y' Governing authority reinstated |

**Figure 18. Option 1: lines of operation/bipolar centers of gravity.** (Reproduced from Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2, with UK National Elements [Change 1] [Brussels: NATO Standardization Office, May 2019], UK fig. E.2, https://assets.publishing.service.gov.uk/.)

In the modernization of military theory and doctrine, theorists sought to define warfare in a natural science context, where there is an orderly "nature of war" governed by laws, principles, or fundamental concepts that, once located in isolation/reduction, can be converted into universal formulaic expressions and applied to any conflict in time and space. Such laws of physics provide certainty, regularity, and a promise of risk reduction, increased efficiency, and some manner of prediction. Military theorists would share an epistemological choice to frame warfare in objectivity and natural science rendering to extend the laws of gravity to pull and shape humans engaging in organized violence. Newtonian physics, mathematics, and early natural science developments would influence the growth of military professionalization over the last four centuries; militaries would pluck metaphoric devices and models from the natural sciences to graft upon theories of war.

Today, modern military doctrine features models and metaphors taken from biology, geology, physics, psychology, sociology, complexity theory, systems theory, astronomy, and elsewhere. Often, they are stripped of their origins, detached from the theoretical constructs or otherwise recycled into what is a Newtonian-styled military frame for warfare understood objectively through physical domains and natural science modeling. Sociology professor James William Gibson clarifies this connection, citing Nixon-era secretary of state and national security advisor Henry Kissinger:

> Kissinger writes [in his book *American Foreign Policy*] that since 1945, American foreign policy has been based "on the assumption that *technology plus managerial skills* gave us the ability to reshape the international system and bring domestic transformations on 'emerging countries.'" The West, in Kissinger's view, had been committed to this hard epistemological work since Sir Isaac Newton first formulated his laws of physics. . . . The West is deeply committed to the notion that the real world is external to the observer, that knowledge consists of recording and classifying data—the more accurately the better. Cultures which have escaped the early impact of Newtonian thinking have retained the essentially pre-Newtonian view that the real world is almost entirely internal to the observer . . . [and] are therefore totally unlike the West and its leading country. Those who are totally unlike us and live in their own delusions are conceptualized as foreign Others. The foreign Other can be known only within the conceptual framework of technological development and production systems (emphasis in original).[6]

COGs are used today in modern military decision-making due to efforts to produce a more current, scientific-based methodology for understanding and acting in warfare on behalf of Westphalian derived nation-states. Western European society, coming out of the ideological conflicts that had plagued Europe through the seventeenth century, established the concept of "the *rational-legal nation-state as the center of gravity*" (emphasis in original).[7] Nation-states would henceforth wage war between states, using formal military instruments of power while seeking formal declarations of war and strategic closure through some ceasefire and metric of victory against a framed enemy force.[8] Clausewitz's definition of "center of gravity" was inspired indirectly by Aristotle through Newton; thus, these ideas have long been a part of Western society.[9]

Aristotle's notion of a hierarchical model of concepts divided into mutually exclusive categories would influence not just Clausewitz but most of Western society as it industrialized and modernized out of the Feudal Age. It was from the rise of natural sciences in the European Age of Enlightenment that war theorists like Clausewitz would draw models and metaphoric devices to describe a science of warfare that would be implemented by militaries, particularly in World War I, with such pronounced effectiveness that subsequent wars could no longer escape the pull. Militaries in the twentieth century raced to codify these ideas into set maxims, rules, laws of warfare, and doctrinally defined models that could produce sequential, systematic methodologies for executing warfare scientifically.

Formal military doctrine was established to pull what was previously a Feudal Age amateur, prescientific military into the modern era.[10] It seeks to accomplish the distribution and reinforcement of war knowledge to accomplish such goals as uniformity, reliability, repetition, and craft mastery. This professionalized military doctrine would be composed in the language of scientific methodology and assimilate classical mechanics concepts and metaphors into war-oriented methods. The military would draw from natural science theory to erect parallel military theories on warfare that echoed similar scientific models, methods, and shared language (with metaphoric devices intact). The birth of "military science" thus began in the Age of Enlightenment and was enhanced through the arrival of the Industrial Revolution.[11] What we use today for nearly every organized military action, including JPP and NATO-OPP, is a direct extension of these desires to professionalize and render scientific a process for the application of organized violence. Figure 19 is an example of how joint planning seeks a mathematical evaluation of courses of action to rank their performance in simulated exercises.

| | | Course of Action | | | | | |
|---|---|---|---|---|---|---|---|
| | COA 1 | | COA 2 | | COA 3 | | |
| Criteria | Weight | Rating | Product | Rating | Product | Rating | Product |
| Exploits maneuver | 2 | 3 | 6 | 2 | 4 | 1 | 2 |
| Attacks COGs | 3 | 2 | 6 | 3 | 9 | 1 | 3 |
| Integrates maneuver and interdiction | 2 | 2 | 4 | 3 | 6 | 1 | 2 |
| Exploits deception | 2 | 1 | 2 | 2 | 4 | 3 | 6 |
| Provides flexibility | 2 | 1 | 2 | 3 | 6 | 2 | 4 |
| CSS (best use of transportation) | 1 | 3 | 3 | 2 | 2 | 1 | 1 |
| Total | | 12 | | 15 | | 9 | |
| Weighted total | | | 23 | | 31 | | 18 |

NOTES: The higher the number, the better

- The joint force commander's intent explained that the most important criterion was "attacking the enemy's COGs." Therefore, assign a value of 3 for that criterion and lower numbers for other criteria that the staff devises **(this is the weighting criterion)**.
- For attacking the enemy COGs, COA 2 was rated the best (with a number of 3). Therefore, COA 2 = 9, COA 1 = 6, and COA 3 = 3.
- After the relative COA **rating** is multiplied by the **weight** given each criterion and the product columns are added, COA 2 (with a score of 31) is rated the most appropriate according to the criteria used to evaluate it.

Legend

COA course of action COG center of gravity CSS combat service support

**Figure 19. Numerical comparison example.** (Reproduced from Joint Publication 5-0, *Joint Planning*, December 1, 2020, fig. F-1, https://irp.fas.org/.)

Staffs use this process to imagine how their plans might succeed or fail in the real world before they act upon that complex system. An implied sense of objectivity ascribed to metrics and formulaic scoring, including adjusted weighting criteria, again implies a natural science feel or style to the activity. Yet most war-gaming of potential courses of action is entirely subjective, grounded in the values, belief systems, hunches, past experiences (with bias), and overall identity both of operators and their institutional identity. In Figure 19, the weight of scoring directly correlates to how much the individuals planning believe that one course of action accomplishes the attack of the enemy COG more than the others in their simulation. Ultimately, this exercise becomes more of a fantasy role-playing endeavor disguised as legitimate scientific study and experimentation. Paparone describes such a method as *pseudoscience* rather than an actual scientific endeavor.[12] Joint planners might share more with a festive group of Dungeon and Dragons role-players than with the engineers and physicists they emulate if we consider the scoring of alternate courses of action in figure 19 in detail.[13]

This preoccupation with turning warfare planning into science projects reflects a rationalization that large-scale military efforts might be designed and executed to a high return on investment before actual warfare intervention. Provided that sufficient mimicry of scientific rigor and testing is conducted prior to units moving into deliberate action, planners become rain dancers attempting to use models and techniques as depicted above to change the weather. Evaluation of highly complex, dynamic conditions in real warfare is reduced to a rationalization articulated through the objective appearance of numbers, yet there is little or no scientific activity behind the numbers. COGs are not just a contributing factor to this military rain dancing but play a primary role. The ways modern militaries conceptualize a COG become centers of gravity themselves by pulling all military rationalization toward how they are imagined. Paparone explains,

> Instead of accepting that events and situations in military operations convey their own, unique meanings, modern military science seeks to standardize meanings on events and situations so that it can devise organizational techniques for interventions. That is, modern military science is an attempt to functionally structuralize these complex interventions without making any critical reflection on whether this technically rationalistic epistemology is appropriate. Modern military science can be described as the illusive quest for making terms and concepts look like those of the physical sciences.[14]

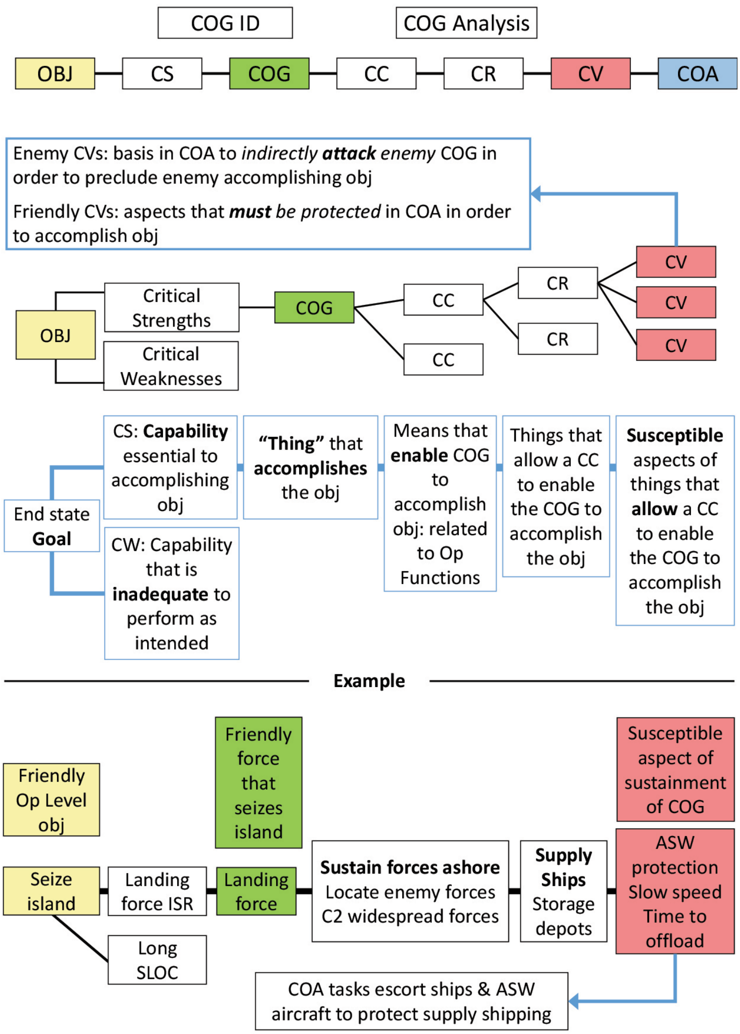
Yet COGs may also be a symptom (and quite popular component) of a tension between the complex reality where warfare occurs and the Newtonian-styled models, terminology, and methods that modern militaries expect to tame complex reality enough to stabilize under their desires and best-laid plans. In the past, particularly in highly industrial total war conflicts such as the World Wars or nationalized warfare in the Napoleonic Wars, the COG concept might appear more reasonable. At least, in specific war contexts where the scale, scope, and numerical superiority of one side over the other could potentially explain outcomes in a manner better rationalized than alternatives, the COG appeared useful. Yet in the last several decades, few conflicts present COG-favorable conditions for strategists and planners.

While previous conflicts seemed more compatible with COG-like descriptors, recent security challenges appear to reject such modeling. For militaries, COGs operate from a classical mechanics construct offering a reductionist way of treating complexity in war. In turn, they become the pseudoscientific efforts of modern militaries to create laboratory conditions for rationalizing how war is supposed to occur. Returning once more to Kissinger, militaries are "deeply committed to the notion that the real world is external to the observer, that knowledge consists of recording and classifying data—the more accurately the better."[15] An exclusive orientation toward the environment is outward facing, meaning the Department of Defense will tend to describe the system without self-reflection or contemplation of how it views reality, how it interacts with it, and what tensions might exist between its own belief systems and alternative ones.[16] All of war (or at least the relevant bits) can ultimately be decoded into mathematical equations, and even wickedly complex problems need only be solved using sophisticated design means through advanced technological and knowledge management efforts.

Modern militaries wish to be seen as a professional community of practice coupled with scientific processes and methods, a validated and highly developed knowledge of their craft, and a formal manner to select, develop, and promote members so that the profession reflects particular standards and behaviors. Militaries in general do not wish to be seen as anti-intellectual, as most modern professions capitalize on intellectual development and mastery of specialized knowledge and techniques as paramount to competing and improving. This ethos is especially true of any profession requiring a high sophistication of technology and deep mastery of tacit skills that cannot be mimicked or reproduced outside the formal mode of professional development. Thus, intellectual rigor is one cornerstone of most modern professions of which the military claims membership. At least, certain types of intellectual rigor are valued.

Intellectualism is a tricky topic, particularly because military forces are not scientific per se; they are at most pseudoscientific, as Paparone posits in the bulk of his research on the military profession.[17] That is, military organizations appreciate a "military science" in their education and doctrine, but this construct does not function or draw from any direct scientific discipline or field that extends the scientific qualities of the original source into military application.[18] Militaries created the first modern academies and published formal military doctrine in imitation of natural science movements spawned by the Age of Enlightenment, the development of capitalist economies (and the disruption of land-based monetary systems tied to autocratic, titled elites), and the rise of the Industrial Revolution.[19] These events fueled the rise of Westphalian nation-states, the explosion of scientific and technological progress (including in war), and the ability of societies to increasingly commit the entire national enterprise toward a "total war" effort. Militaries would depart from earlier feudal and ancient forms by assimilating many scientifically and academically inspired behaviors, but often in mimicry instead of legitimate transformation.

For example, modern military planning doctrine uses a center of gravity metaphoric device for a foundational part of how to arrange decisions and actions to operationalize strategic aims into tactical activities in time and space (fig. 20).[20] Yet there exists neither a single mathematical formula referring to gravitational constructs nor justification for the military's conceptualization of a military COG with any physics methodology used for validating an actual gravitational hypothesis. The military metaphoric device for this COG construct is devoid of a true gravitational theory; it became an orphan once ripped from the field and context of physics and subsequently clothed in military terminology to correspond to decidedly nonphysics beliefs on war. The assimilated metaphor retains the terminology but not the theory or spirit of the original. Militaries conceptualize war using a loose mimicry of natural science metaphors and models (physics, biology, chemistry, mathematics) but in a pseudoscientific mode outside the scientific rigor of any natural science community of practice. Consider how "speed" and "mass" have utterly disjointed meanings in the context of particles versus armies clashing for political aims of societies in disagreement.




Legend
ASW antisubmarine warfare CW critical weaknesses
CC critical capabilities ID identification
COA course of action ISR intelligence, surveillance, and
CR critical requirements reconnaissance
CS critical strengths obj objective
C2 command and control SLOC sea line of communication
CV critical vulnerabilities

**Figure 20. Center of gravity analysis.** (Reproduced from Steven D. Kornatz, "The Primacy of COG in Planning: Getting Back to the Basics," Joint Force Quarterly 82, 3rd Quarter [2016]: 95, figs. 1 and 2, https://ndupress.ndu.edu/. Used with permission of the author.)

The next figure exemplifies the elaborate and increasingly sophisticated mathematical formulas scientists use to accurately explain and predict gravitational behavior (fig. 21). Today's scientists apply these concepts to gravitational challenges in the physical world and can scientifically measure and validate results to quantitatively demonstrate a formula's accuracy. Future scientific innovation and experimentation may replace these concepts with a superior yet-imagined alternative, but natural science rigor exists in this context in an expression military forces seek to emulate. However, the prior center of gravity analysis figure, like the other military COG illustrations, has no mathematical formulas or content found in the gravitational formula for physics. The concepts are divorced, sharing only the same title phrase. Metaphorically, the military takes natural science concepts or models and strips them of their content, retaining the metaphoric device so that it can be assimilated into existing military canon and extend the legacy system with a particular nonscientific rationalization that centers of gravity in war can be likened to those in the natural world. Naveh et al. describe this military assimilation of Newtonian or natural science metaphors to transform the understanding of warfare out of a Feudal Age and into the Modern Age:

> The Renaissance at last provided the strategist with the intellectual planning tools with which to bridge the gap between worldly perception and mental conception. This new conception was nothing less than the "geometrization" of military space and time. *It meant that a common military "chessboard" would define the conduct of military operations*. . . . The physics of Sir Isaac Newton would set the strategic chessboard in motion. Newtonian physics was a direct consequence of the three-dimensional worldview wrought by the Renaissance. Newton's three laws of mechanics provided military strategy with which to plan campaigns. The metaphor was the idea of mechanical force. Once having grasped the nature of mechanical force, it became only a matter of time before the practical aspects of the idea would surface. Napoleon, an artilleryman, with a solid background in mathematics and physics, was one of the first classical strategists to recognize that to use force effectively you had to *concentrate* it (emphasis in original).[21]

**Gravitational Force Formula**

The gravitational force formula is also known as Newton's law of gravitation. Also, it defines the magnitude of the force between two objects. Furthermore, the gravitation force formula includes the gravitational constant whose value is $G = 6.67 \times 10^{-11} N{\cdot}m^2/kg^2$. Besides, the unit of gravitational force is Newtons (N).

$$\text{gravitational force} = \frac{(gravitational\ constant)(mass\ of\ object\ 1)(mass\ of\ object\ 2)}{(distance\ between\ objects)^2}$$

$$F_g = \frac{Gm_1m_2}{r^2}$$

**Derivation of the Gravitational Force Formula**

$F_g$ = refers to the gravitational force between two objects ($N = kg \cdot m / s^2$)
G = refers to the gravitational constant ($6.67{\times}10^{-11} N{\cdot}\, m^2/kg^2$)
$m_1$ = refers to the mass of the first object in kilograms
$m_2$ = refers to the mass of the second object in kilograms
r = refers to the distance between the object in meters

**Example 1:** Suppose two satellites that orbit the earth pass close to each other. Also, for a moment they are 100 m apart. Furthermore, the masses of the satellites are 300 kg and 20 kg. So, calculate the magnitude of the force of gravity between these satellites.

**Solution:** We can calculate the magnitude of the force between two satellites using the gravitational force formula:

$$F_g = \frac{Gm_1m_2}{r^2}$$

$$F_g = \frac{(6.67{\times}10^{-11} N{\cdot}\, m^2/kg^2)(300kg)(20kg)}{(100m)^2}$$

$$F_g = \frac{(6.67{\times}10^{-11} N{\cdot}\, m^2/kg^2)(6000kg^2)}{10000m^2}$$

$$F_g = \left(6.67 \times 10^{-11} N \cdot \frac{m^2}{kg^2}\right) \times \frac{6000kg^2}{10000m^2}$$

$$F_g = \left(6.67 \times 10^{-11} N \cdot \frac{m^2}{kg^2}\right) \times \left(0.6000 \cdot \frac{kg^2}{m^2}\right)$$

$$F_g = (6.67 \times 10^{-11} N) \times (0.600)$$

$$F_g \cong 4.00 \times 10^{-11} N$$

**Figure 21. Gravitational centers in physics**. (Reproduced from Toppr, "Gravitational Force Formula," accessed March 27, 2023, https://www.toppr.com/.)

Traditional advocates defending the modern military frame attempt to use this center of gravity metaphor to rationalize complex warfare as obedient to some natural scientific order.[22] Yet how militaries think about and apply the COG concept has nothing to do with gravitational formulas underpinning the physical theory. Instead, the military institution adapted the war theories of Clausewitz, Jomini, Scharnhorst, and others who studied the Napoleonic Wars. These theorists extended natural science metaphoric devices to military contexts, seeking to apply the stability, scientific rigor, and analytical susceptibility from the natural world to how humans wage war. Single-loop operators using military planning processes can cycle through COG development only by using a wiring diagram or other incarnation. Double-loop operators might question whether to use the COG models from one theorist or another and potentially advocate for doctrinal change, as the profession has experienced for decades.[23] With reflective practice, military designers can move to triple-loop learning and consider why COGs are intrinsic to the modern warfighting frame and if this precept is appropriate or increasingly fragile. At the triple-loop level, military planners would confuse physicists if they attempted to use COG analysis for any natural world gravitational challenge. Likewise, physicists would confound a military organization if they sought to correlate gravitational formulas with conducting a counterinsurgency or achieving victory if China attempts to reclaim Taiwan with military power. Reflective practice unlocks a perspective beyond the pale of institutional limits and doctrinal wire diagrams.

Julian Jaynes, author of *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, explains the reverberations of the natural sciences and other science fields on society still taking shape over the last few centuries. Like Paparone and Naveh et al., Jaynes also sees the influence of metaphoric devices, models, and terminology that would articulate the theories within those disciplines, in turn inspiring other groups and disciplines to consider their assimilation or adaptation. Modern military educational programs worldwide predominantly broadly categorize warfare contexts into the strategic, operational, or tactical levels, stacked in layers atop one another.[24] If we ask military professionals why this is, they are likely to respond with uncertainty or redirect to published military doctrine for further justification. Sadly, no reason is stated therein; war is to be understood in this "layer modeling" with particular metaphoric devices because the institution declares it. In discussing the problem of consciousness throughout history, Jaynes explains how the "layer model" first became popularized in an unexpected scientific origin:

> The first half of the nineteenth century was the age of the great geological discoveries in which the record of the past was written in layers of the earth's crust. And this led to the popularization of the idea of consciousness as being in layers which recorded the past of the individual, there being deeper and deeper layers until the record could no longer be read. . . . In the middle of the nineteenth century, chemistry succeeded geology as the fashionable science, and consciousness . . . was the compound structure that could be analyzed in the laboratory into precise elements of sensations and feelings. And as steam locomotives chugged their way into the pattern of everyday life toward the end of the nineteenth century, so they too worked their way into the consciousness of consciousness, the subconscious becoming a boiler of straining energy which demanded manifest outlets and when repressed pushed up and out into neurotic behavior. . . . There is not much we can do about such metaphors except to state that that is precisely what they are.[25]

Jaynes demonstrates how the natural sciences would—as independent disciplines seeking their own particular study of reality—generate models and metaphoric devices that would often escape their institutional confines to be reapplied to other fields. Surely, the military profession would do likewise during its three centuries of modernization where the Feudal Age framework for warfare had to be retrofitted and modified to incorporate scientifically sound and testable methods, particularly from the natural sciences that came first. For example, the levels of war model depicted in the 2017 joint publication *Joint Planning* shows a strong correlation to much earlier geological modeling for theories on the composition of Earth's layers (fig. 22). In single- and double-loop thinking, such coincidences or paradoxes will go unnoticed, as the procedural emphasis remains within the models and methods themselves. How one ought to function more effectively using levels of war takes prominence while a triple-loop examination of why we might be framing war in geological layers—and whether this is indeed the best way to consider complexity—is denied for being beyond the pale for the institution.

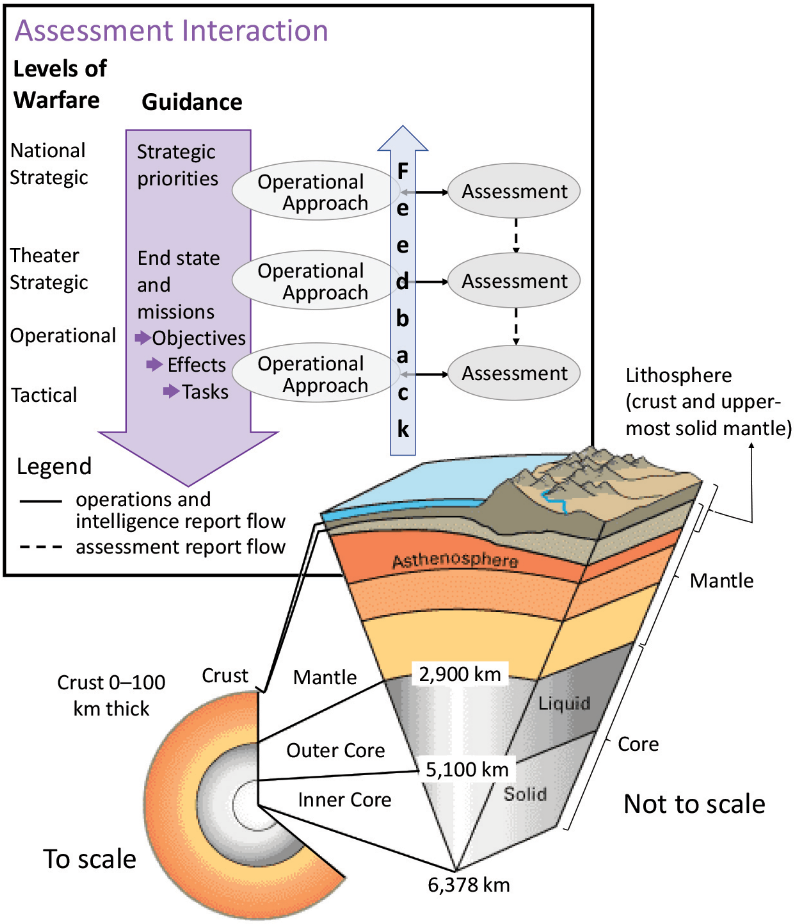



**Figure 22.** (Above) **Modeling of levels of war and** (below) **Earth's layers**. (Reproduced from Joint Planning Publication 3-0, Joint Operations, January 17, 2017, fig. II-2, https://irp.fas.org/; and United States Geological Survey, "Inside the Earth," accessed March 27, 2023, https://pubs.usgs.gov/.)

Might levels of war also originate from geological inspiration,[26] the spectrum of conflict draw from physics, and the principles of war from Jomini as a purveyor of the natural sciences for war theory stimulus? Across the fields of mathematics, physics, chemistry, geology, and biology, we find parallel adaptations and assimilations of metaphoric devices, terminology, and conceptual models (minus the original theory) from

Clausewitz, Scharnhorst, Mahan, Douhet, Svechin, Boyd, and many more who together shaped today's modern war paradigm. Virtually all modern military models, metaphoric devices, and even core elements of war theory appear to draw directly from and assimilate many components found first in the natural sciences. Yet should how humans now understand the electromagnetic spectrum also be how warfighters interpret the wide range of warfare and security activities (fig. 23)? Does making sense of war mean categorizing it like geologically inspired models of Earth?

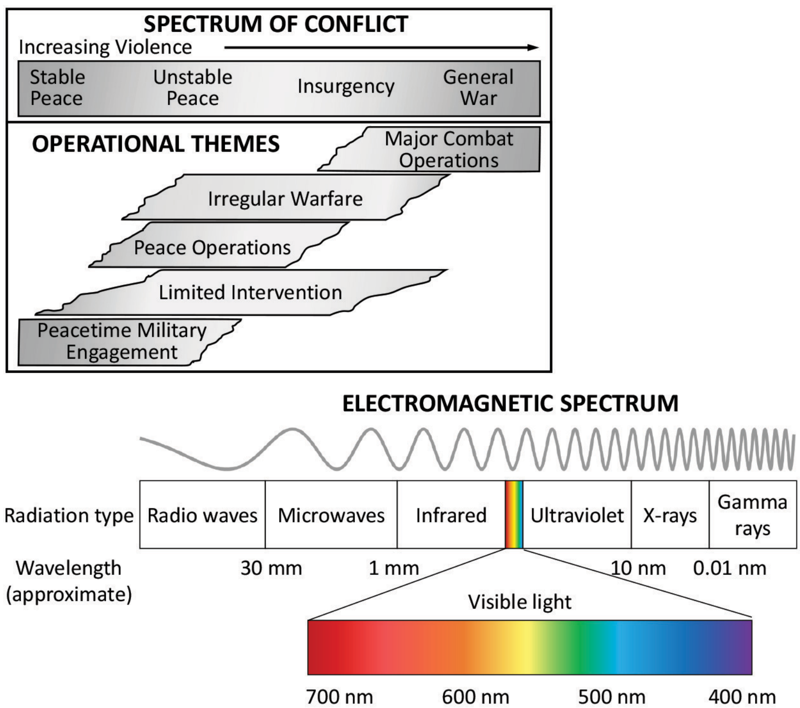



**Figure 23.** (Above) **Modeling of spectrum of conflict and** (below) **spectrum of conflict** (below) **spectrum of visible light.** (Reproduced from US Army Field Manual 3-0, *Operations*, February 2008, fig. 2-2, https://army.rotc.umich.edu/; and Khan Academy, "Light and Photosynthetic Pigments," image modified from "EM Spectrum Properties" by Inductiveload [CC BY-SA 3.0] and "EM Spectrum" by Philip Ronan [CC BY-SA 3.0], accessed March 27, 2023, https://www.khanacademy.org/.)

COG terms and constructs in modern military decision-making developed in a process similar to most metaphors. They are conceptual models constructed through select war theories relating to overarching philosophical beliefs the military (and politicians) embrace about reality where organized violence occurs. The mathematical, physics-oriented framework and rationalization that universal rules and principles such as COGs exist at various levels of war in all conflicts (universally, timelessly) demonstrate a modern military stance that one might "reduce war to a complex equation to be resolved by a technoscientific priesthood."[27] NATO's *Comprehensive Operations Planning Directive* (ver. 3) even defines "military doctrine" as "fundamental principles by which the military forces guide their actions in support of objectives."[28] Doctrine does not provide just the guidelines and generic framework to apply to a wide range of security challenges; it stands firmly upon universal, proven, and objectively measurable rules that govern all warfare in any context. Modern militaries need only collect, analyze, and decide faster than adversaries to apply the precise formulas that lead to battlefield success. Thus, single- and double-loop cycles of thinking become institutionalized into nonreflective practice. This formulaic approach would in turn create a way of understanding modern warfare that "was therefore frequently biased towards those elements which could be quantified."[29]

By reducing all wars to finite, measurable "principles" or sequenced rules, all conflicts can be reassembled into complexity.[30] Conflicts can theoretically be regulated and controlled like a complex engineering feat instead of a disruptive, irrational, and learning system of opposition and competition. NATO-OPP and JPP emphasize not just a problem-solution orientation within a single paradigm but an ends-ways-means logical construct for how all activities in war (those designed, planned, experienced) ought to behave or express.[31] COGs permit the continuation of this highly analytic mode of decision-making and planning, illustrating what is termed a "positivist epistemology" (breaking things into simpler parts and isolating core laws and rules to apply to reassembled wholes). Military thinking is dominated by this particular fixation of rendering all complex systems as closed, isolated, and mathematically controllable (predictable) with machinelike behavior.[32] Norbert Wiener inspired cybernetics theory (during World War II) as a new "science control and communications" that would rapidly gain popularity in the 1950s–70s, influencing nearly all military decision-making and organizational form in the Vietnam War and afterward.[33] The effects-nodes-action-resources model in the 2020 Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations*, demonstrates the formulaic, reductionist approach to complexity and warfare (fig. 24).[34]

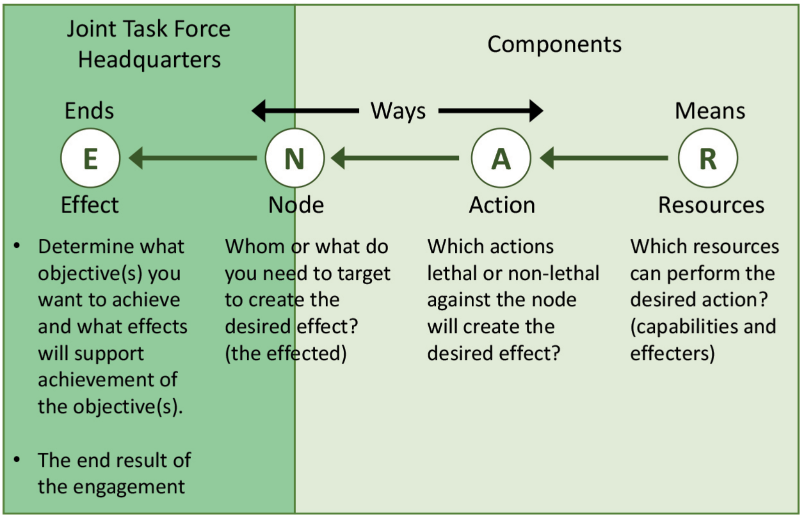



**Figure 24. Effects-nodes-action-resources model.** (Reproduced from Allied Joint Publication-5, Allied Joint Doctrine for the Planning of *Operations*, Edition A, Version 2, with UK National Elements [Change 1] [Brussels: NATO Standardization Office, May 2019], UK fig. 4.1, https://assets.publishing.service.gov.uk/.)

The power of isolation in natural science application appeals to military intellectuals who want warfare to express properties similar to physics, chemistry, geology, or mathematics. Haridimos Tsoukas suggests that "zoology, botany, and chemistry are the paradigmatic sciences for those subscribing to such an approach to social scientific knowledge; the ultimate taxonomy is the Holy Grail they are after."[35] Isolate, categorize, and connect things to other things in a hierarchy of knowledge. Indeed, many phenomena in warfare feature ample characteristics where isolation-oriented logic works perfectly. A physicist applies isolation to consider what is relevant based on knowing precise information about something at one point in time; one can then extrapolate that knowledge to all things everywhere, every time.[36] Once the characteristics of one oxygen molecule are measured and understood, they can reliably be applied to every oxygen molecule in the known universe.

This organizing logic works in natural science, but the military is unique as a profession in expecting natural science reasoning to extend to the socially complex world of human conflict and the application of organized violence for political, social, or ideological needs. Antoine Bousquet remarks, "It is also quite obvious that no social machine treats individuals as 'cogs and levers and rods' more completely than the military (an institution with which Wiener refused any association after the war)."[37] Yet complex adaptive systems do not have COGs except when we attempt to oversimplify our understanding of them by imposing such natural science constructs upon them. "A complex adaptive system," complexity scientist John Holland states, "has no single governing equation, or rule, that controls the system. Instead, it has many distributed, interacting parts, with little or nothing in the way of central control."[38] The Clausewitzian COG construct violates complexity theory in part because in the nineteenth century when the Prussian was framing his theories on war, he could draw only from natural science inspiration in Newtonian physics, chemistry, geology, mathematics, and other disciplines. That this natural science metaphoric device features so prominently and foundationally in JPP and NATO-OPP (and all other variations)—despite modern military doctrine also acknowledging complexity theory—should give the military institution pause. It should reflect on why this is and what benefits and limitations this metaphor provides for considering security force/context management in an increasingly complex, dynamic world where war is no longer "localized [clusters] of tactical action."[39]

The military expectation that increased control and prediction would make complex security contexts "solvable" for a wide range of military activities (from peacekeeping to nuclear war) depends on these sequential, logical orders to lead to predetermined effects. By focusing on solution–problem set relationships, joint and NATO staffs, intelligence analysts, and leaders appear to infer that most complex security challenges that matter might be "solved" through engineering and natural science terminology.[40] If everything worth understanding (or essential in achieving national goals) in war could be broken into mathematical equations, one need only crunch numbers better than the enemy to win any battle or war.

However, over the last two decades of conflict, NATO, joint, and allied military operations—conducted with the greatest technological and resource overmatch in human history—have largely been tactically exceptional and strategically frustrated. Whether one looks to Iraq, Afghanistan, the nonproliferation/containment of nuclear weapons, cyberspace, transregional terror, proxy surrogates, or adversarial near-peer rivals, there are many setbacks, failures, or uneasy stalemates. They indicate that positivist, reductionist, and purely analytical models, theories, and methods are insufficient (and possibly counterproductive) in today's complex security challenges.

**Notes**

1. JP 5-0, *Joint Planning*, IV-22.

2. Allied Joint Publication-5 (AJP-5), *Allied Joint Doctrine for the Planning of Operations*, 3-9.

3. Although today many commercial enterprises arguably employ military planning concepts, the origins of their usage frequently come from military professionals exiting defense organizations and bringing these precepts to business settings. These tools are considered "military grade" and valuable because a business might "wage war" against its competition to gain an advantage in commerce versus organized violence.

4. This is not to say that other professions do not recognize gravitational metaphors; rather, few professions outside the military emphasize COGs in how they understand reality. Militaries devote volumes debating what most professions ignore. See Paparone and Davis, "Exploring Outside the Tropics of Clausewitz"; Eikmeier, "Modernizing the Center of Gravity Concept"; and Vandersteen, "Center of Gravity."

5. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, 198.

6. Gibson, *Perfect War*, 15–16.

7. Sookermany, "On Developing (Post)Modern Soldiers," 10.

8. McFate, *New Rules of War*, 28–33.

9. Robinson and McGuire, "Rhizome and the Tree," 604; Paparone, "On Metaphors We Are Led By"; Paparone, "How We Fight"; and Zweibelson, "Gravity-Free Decision-Making."

10. The term "amateur" is used here in a precise way that is not intended to be pejorative. Earlier military models and belief systems charged elite, wealthy ruling classes to lead militaries and generate most war strategies, decision-making, and praxes. Military education, training, promotion, and status were irregular and without standards. Nobility assumed leadership positions by birthright, while armies often combined paid foreign mercenaries with conscripted farmers or serfs outside key agricultural periods in limited, ritualized conflicts. Doctrine and academies did not exist in any modern sense, while ideological and cultural values often directed warfare and conduct in such conflicts.

11. Boisot and McKelvey, "Integrating Modernist and Postmodernist Perspectives on Organizations," 418; and Jackson, *Roots of Military Doctrine.*

12. Paparone, *Sociology of Military Science*, 14–22.

13. JP 5-0, *Joint Planning*, 280.

14. Paparone, *Sociology of Military Science*, 20.

15. Gibson, *Perfect War*, 15–16.

16. Martin, "Tale of Two Design Efforts."

17. Paparone, *Sociology of Military Science*; Paparone, "Designing Meaning in the Reflective Practice of National Security"; Paparone, "How We Fight"; and Paparone and Squier, "Reframing Leadership at the Eisenhower School."

18. This clearly excludes military contexts where the scientific construct is independent of "military" considerations. A rifle demonstrates the same characteristics whether used for hunting or in a battle; militaries that conceptualize "mass and speed" toward an objective are entirely removed from the original physics application.

19. Jackson, *Roots of Military Doctrine*; and Malešević, *Sociology of War and Violence.*

20. Vandersteen, "Center of Gravity"; Paparone and Davis, "Exploring Outside the Tropics of Clausewitz"; and Zweibelson, "Gravity-Free Decision-Making."

21. Naveh, Schneider, and Challans, *Structure of Operational Revolution*, 35–36.

22. Kornatz, "Primacy of the COG in Planning," 91–96.

23. Vandersteen, "Center of Gravity"; Eikmeier, "Modernizing the Center of Gravity Concept"; Zweibelson, "Gravity-Free Decision-Making"; and Jackson, "Center of Gravity Analysis."

24. Some variations include a "grand strategic" policy for war policy above strategic or insert sublevels such as "theater strategic" above operational and "technical" below tactical levels. Significant to this conversation is the strict arrangement of these types of warfare in a layered, hierarchical relationship.

25. Jaynes, *Origin of Consciousness*, 2–3.

26. The modern theories used since the twentieth century include an operational level of war and an operational art construct developed in the interwar period by Russian war theorists. At issue here are the "levels of war" model and metaphoric devices, along with deeper ontological and epistemological choices maintained by modern military forces that likely took inspiration from the natural sciences and, still earlier, ancient Greek natural philosophy.

27. Bousquet, "Cyberneticizing the American War Machine," 88.

28. Supreme Headquarters Allied Powers Europe, *Allied Command Operations Comprehensive Operations Planning Directive, COPD Version 3.0*, K-3.

29. Bousquet, "Cyberneticizing the American War Machine," 94.

30. Essentially, you cannot reduce a complex system to simpler components; by definition, it is more than an assembly of the parts. So, for example, you could deconstruct the Mona Lisa into a pile of pigments, paper fibers, wood, canvas, and such, but people would not respond to it as they do when viewing the entire painting—the "Mona Lisa effect" would be lost.

31. Meiser, "Ends + Ways + Means = (Bad) Strategy," 81–85.

32. Paparone, *Sociology of Military Science*; Chia, "Teaching Paradigm Shifting," 410; and Gharajedaghi and Ackoff, "Mechanisms, Organisms, and Social Systems," 290–91.

33. Bousquet, "Cyberneticizing the American War Machine," 94; and Bousquet and Curtis, "Beyond Models and Metaphors."

34. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2, 129.

35. Tsoukas, "Refining Common Sense," 764.

36. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 991.

37. Bousquet, "Cyberneticizing the American War Machine," 82.

38. Holland, "Complex Adaptive Systems," 21.

39. Kelly and Brennan, "Leavenworth Heresy," 110.

40. Monk, "End State," 28; Chia and Holt, *Strategy without Design*, 21–29; and Meiser, "Ends + Ways + Means = (Bad) Strategy."

Chapter 11

# Ways with Means

## No End to Military Fixation on Capacities and Capabilities

NATO-OPP and JPP pursue an epistemological framework where all activities of warfare progress from political or national aspirations to tactical actions of organized violence arranged in time and space to accomplish objectives. The desired "ends" are related to ways and means so that commanders and their staffs "balance ends and means, determine ways and orchestrate and direct actions and capabilities. . . . Operations management then translates the operations design into action by integrating, coordinating, synchronizing, prioritizing and allocating capabilities across joint functions."[1] "Joint planning" itself is defined as "the deliberate process of determining how to implement strategic guidance: how (the *ways)* to use military capabilities (the *means*) in time and space to achieve objectives (the *ends*) within an acceptable level of risk" (emphasis in original).[2] The DOD's 2020 version of *Joint Planning* mentions "capability" more than 300 times and NATO doctrine 190 times in the 2019 Allied Joint Publication-5 for operational planning. The associated term "capacity" is far less referenced and often in relation to analysis of force projection, range, or movement of tangible warfighters/things. Thus, capability is nested within "military means" while capacity is associated with the "military tempo" of action.

NATO-OPP and JPP direct commanders and staffs to frame their understanding of the military problem(s) they see as barriers to reaching strategic goals, end states, or objectives by determining and assessing what key actors might do within a war or security context. The following operations design model moves from left to right, linking a "current situation" with a series of linear-causal actions to accomplish a future "end state" (fig. 25).[3] We attempt to size up the enemy during mission analysis to consider what military and security forces and other organized armed groups or rivals can potentially accomplish. This determination forms the entire rationale for NATO-OPP and JPP analytical optimization where SWOT, COG, stakeholder analysis, and other models attempt to assess strengths, weaknesses, abilities, vulnerabilities, and other pertinent factors. NATO-OPP even pairs the terms, stating that during the "evaluation of actors" step in problem framing, each actor's "capabilities and capacity to use force in time and space with relation to the current order of battle and disposition of the different actors [is required during the 'evaluation of actors' step within problem framing]."[4] This analysis is conducted for friendly forces (for each proposed course of action) as reduced to managed phases and conditions expected and for enemy forces. The two terms are significant because they relay metaphoric devices that express deeper theoretical and epistemological positions of the NATO and joint force framing of warfare. What do we really mean when we employ "capability" and "capacity" through the modern military decision-making approach to warfighting?

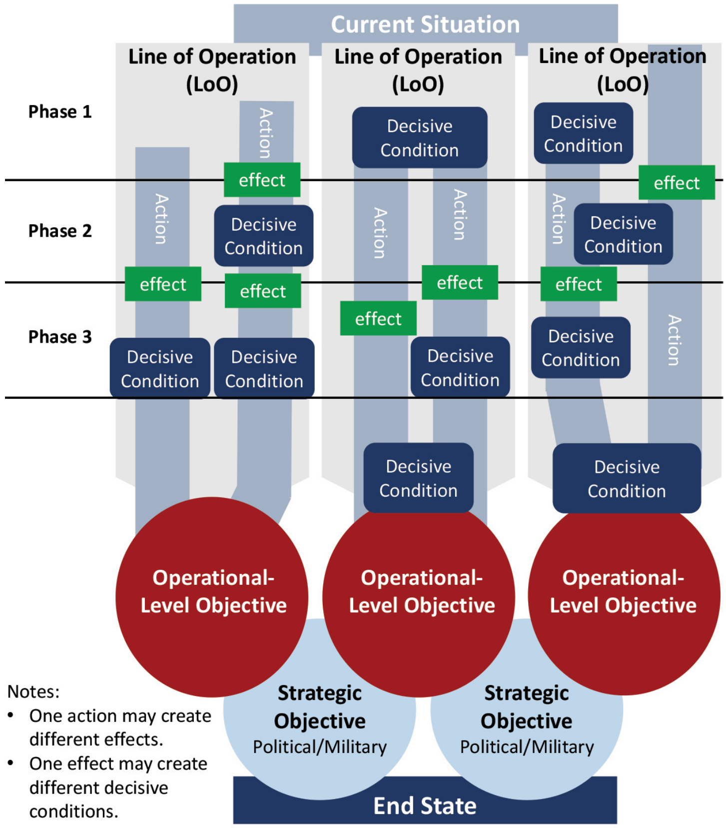



**Figure 25. Operations design.** (Reproduced from Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2, with UK National Elements [Change 1] [Brussels: NATO Standardization Office, May 2019], fig. 3.1, 3-13, https://assets.publishing.service.gov.uk/.)

The terms "capability" and "capacity" require greater examination, as they often are applied (and misapplied) as synonyms to military organizational form and function. While these terms have precise meanings in hard science contexts such as physics or chemistry, military organizations use them in an organizational/behavioral science context for complex warfare. "Capacity" refers to what a person, unit, or organization could accomplish within a standardized, controlled, and stable environment. A capacity is the ability that exists at present and in previously observed (known, stable, anticipated) settings. Often paired with "optimum or ideal setting," a unit's capacity to execute a task or deliver an effect is based on basic conditions existing so that the known ability and potential for success are correlated. Again, the concepts of capacity and capability nest within the Newtonian style of modern military decision-making, where systematic logic directs a formulaic mode of isolating, reducing, and sequencing tangible/objective things in vertical arrangements of hierarchical understanding and control. Everything of significance must be measurable, and only that which can be measured is of any significance.

A "capability" differs in that it is what the unit (or individual, organization) can do in its routine environment and potentially improve upon, while "performance" is what it actually accomplishes in that same environment. Units with high or exquisite capacities are expected to demonstrate superior aptitudes and performance compared to those with lower capacities. Capacity refers to general settings and resources, while capability relates to specific ones that also relate to an even higher level of ability that could occur under the right conditions or motivations; both influence performance. Generic capacity is important, but specific capability is more critical for an organization attempting to execute a challenging activity or mission in a different environment. That is, the environment is either unstable—unlike past environments where the organization could recognize performance measurements—or entirely novel. Thus, because of its lack of experience, the organization cannot accurately determine useful capacity expectations.

Capacity building also refers to a unit's (or individual's, organization's) ability to absorb and adapt to change in an unstable or evolving context quickly and effectively. Capacity is limited and assimilation variable. An assigned task or mission may have too high a demand rate for absorbing change that exceeds a NATO or joint force organization's capacity. This mismatch is akin to overflowing a funnel with gasoline when filling a lawn mower or expecting a child to pay attention for six hours of lectures about paintings and sculptures. Capability refers to the specific skills and abilities of a NATO or joint force unit required for a particular task or mission. Often, special operations forces or other highly sophisticated (or technologically advanced) systems or entities are considered within military planning through this regard. Thus, an organization might have the capacity to change fast enough for a challenging mission but still lack certain key capabilities that will result in mission failure. Inversely, it might have the key capabilities to accomplish a difficult, complex task but lack the capacity. A snowblower that can remove snow for a large driveway (capability) but lacks sufficient fuel to complete the job (capacity) is a simplistic example of this tension.

NATO-OPP and JPP staff planners attempt to quantify these notions of capacity and capability during mission analysis, which addresses all stakeholders (friendly and enemy). Later in the decision-making methodology, they assess two related concepts: "measures of performance" and "measures of effectiveness." Stakeholders are grouped into two categories. The first is formal military forces or a similar paramilitary or security entity that is an extension of a national instrument of state power. The second is an "other organized armed group" or such hostile, neutral, or other actor.[5] The analytic-oriented and centralized hierarchical structured construct illustrated here implies several possible assumptions within the modern military framing for all decision-making in warfare. It inspires strategists and planners to rationalize how they address capabilities and capacities of ideally similar opponents, particularly in the establishment and maintenance of state war plans, contingencies, and modern constructs such as great power competition among top Western adversaries.

Even opponents known to be nonstate actors are granted state-like capabilities and limits within the same uniform war frame where NATO or some alliance of nations might act against them.[6] Yet NATO and joint force decision-making methodologies grow increasingly inappropriate and insufficient for confronting nonhierarchical, networked, and divergent threats ever more familiar in twenty-first-century competition.[7] Few contemporary adversaries, whether Westphalian nation-state or nonstate actor, are willing to play by these war rules.[8] The game has changed regardless of how much technological, analytical, or political capital is invested to retain the older system for organized violence built on rather mechanistic, linear, and systematic logics of planning. The sequences of NATO-OPP and JPP's hierarchical, nation-state, and geographical (physical domain centric) construct moves from broad, strategic, or national-level initial assessments or focus areas to progressively narrower, limited, or analytically optimized priorities. The application of "capacity" and "capability" nested within these decision-making methodologies again perpetuates this reductionist, systematic framing of a complex security challenge—potentially creating a disadvantage for the militaries involved.

In this deconstruction of NATO-OPP and JPP, the entire methodologies were not presented in full. NATO and Joint Force Command offer extensive doctrine and supporting documents for such studies. Instead, select components illustrated in this work show how NATO-OPP and JPP attempt to function for modern military forces. They employ nearly identical theoretical underpinnings, conceptual models, methodological sequence, and doctrinally sanctioned language and shared metaphoric devices wedded to one specific way of thinking and acting in war. This framework demonstrates an orientation toward analytical optimization using a single war paradigm for visualizing and enacting strategic action through tactical and operational activities. There are several potential reasons for this, a primary one being that nearly all Department of Defense PME sanctions and encourages this war frame for analytic thinking. We have been taught one frame for understanding and acting in war: through institutionalized rituals, belief systems, and rigid training/education, we have little option to think outside of the lines.

Due to clear limitations in available educational alternatives (e.g., theories, sociological paradigms, models, and language), many military strategists, planners, and staff tend to interpret complex security contexts in the same ways. They use equivalent language, often unwittingly employing the same theories and methods iteratively while expecting different results. They apply what is ultimately a "technical rationalism" mode of making sense of reality in a military organization and project that worldview onto all adversaries (whether they differ or not is irrelevant). The result is that our organizations become increasingly unable and unwilling to critically examine how and why our own methods and logic may be insufficient, outdated, or potentially irrelevant to emerging contexts. We are directed to "shut up and color"; even worse, we are conditioned to attempt to color within the lines of our institutional pre-established beliefs *regardless of how dif-*

*ferent or unimagined the emerging security challenge is shaping up to become.* The term "technical rationalism" is explained in the next chapter so that ideas and methods beyond the modern military decision-making frame might be introduced to challenge the institutional standard.

**Notes**

1. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, 1–4.
2. JP 5-0, *Joint Planning*, xi.
3. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, 65.
4. AJP-5, 4-10.
5. AJP-5, 4-9–4-7; and JP 5-0, *Joint Planning*, i–6.
6. Malešević, "Organization of Military Violence," 466–68.
7. Miller et al., "Harnessing David and Goliath"; Monk, "Strategic Design for the Complex Realm"; Sageman, *Leaderless Jihad*; Rothstein, "Less Is More"; and Clarke-Hill, Li, and Davies, "Paradox of Co-operation and Competition."
8. McFate, *New Rules of War*.

Chapter 12

# The Limits of Technical Rationalism

## Modern Military Institutional Baggage

We have discussed the pitfalls of routinely following a process without regard to the process itself. It is the premise of this book that military forces using NATO-OPP/JPP methodologies would benefit from critically reflecting on and potentially changing how they arrange thoughts and actions in complex security contexts. To support this argument, we need to cover some academic terminology that frames how the modern military enterprise thinks, thinks about thinking, and links ideas to action in warfare and related activities. We also need to address the NATO-OPP and JPP overemphasis on analytical optimization and why this becomes a core theme epistemologically across most methodologies examined here. The term "technical rationalism" is used for how militaries attempt to force all warfare understanding and activities into a (pseudo) scientific framework where technological advances promise greater precision and control. Many have envisioned this future. For instance, in addressing Congress during the Vietnam War era, US Army general William Westmoreland shared the following:

> On the battlefield of future, enemy forces will be located, tracked, and targeted almost instantaneously through the use of data links, computer assisted intelligence evaluation, and automated fire control. With first round kill probabilities approaching certainty, and with surveillance devices that can continually track the enemy, the need for large forces to fix the opposition physically will be less important. . . .
>
> . . . I see battlefields or combat areas that are under 24-hour real or near-real time surveillance of all types.
>
> I see battlefields on which we can destroy anything we locate through instant communications and the almost instantaneous application of highly lethal firepower.
>
> I see a continuing need for highly mobile combat forces to assist in fixing and destroying the enemy. . . .

> . . . Our problem now is to further our knowledge—exploit our technology, and equally important—to incorporate all these devices into an integrated land combat system.[1]

This belief is that over time, as one gains greater depth of experience, more information, and precision with the established tools, there will be an incremental and progressive gain in military knowledge and an implied advantage in decision-making and action. With increasing mastery and validation in this framework, militaries expect that yesterday's ideas will work even better tomorrow.[2] These improved capabilities will enable them to outpace their adversaries or rivals attempting the same activities in war. Westmoreland conveys the feelings of many other proponents today (reflecting deeply held beliefs within our war paradigm) that technology and military development will ultimately provide a complete superiority on the battlefields of tomorrow. Such advancements will also compensate for all previous errors, strategic surprise, poor assumptions, and losses in the deliberate application of organized violence.[3] Modern militaries have increasingly become dependent upon, if not centralized around, technological abilities at the expense of other capabilities in this regard.[4] The technical rationalist mindset operates within the modern war paradigm beyond the theoretical, modular, and methodological levels to the level of a religious conviction and thus becomes epistemological concerning how Western industrialized democracies expect war to function in complexity.[5] In critiquing the American military's systemic failure in the Vietnam War, Gibson attributes much of it to this pseudoscientific rendering of war as a technological framing. This technological rationalism occurs where one can determine what knowledge is relevant to war, analyze and act faster than one's opponent, and filter out the rest. He states,

> A basic conceptualization of the relationships between knowledge and social stratification has been present throughout this analysis. War-managers are at the top of the stratification system. They think in instrumental categories taken from technology and production systems, and the business accounting rationales of debit and credit ledger.
>
> Those at the top of the stratification system had a virtual monopoly on socially accepted "scientific" knowledge. Conflict among different war-managers was quite common, yet those

> conflicts all occurred within the paradigm of Technowar and its technical knowledge about war. Never was the "otherness" of the foreign Other really questioned, nor was the social world of the Vietnamese peasantry examined, nor were the terrible contradictions and double-reality facing U.S. soldiers in the field ever confronted. Debates at the top were only debates and struggles concerning the direction of the Technowar, not a questioning of its basic assumptions.[6]

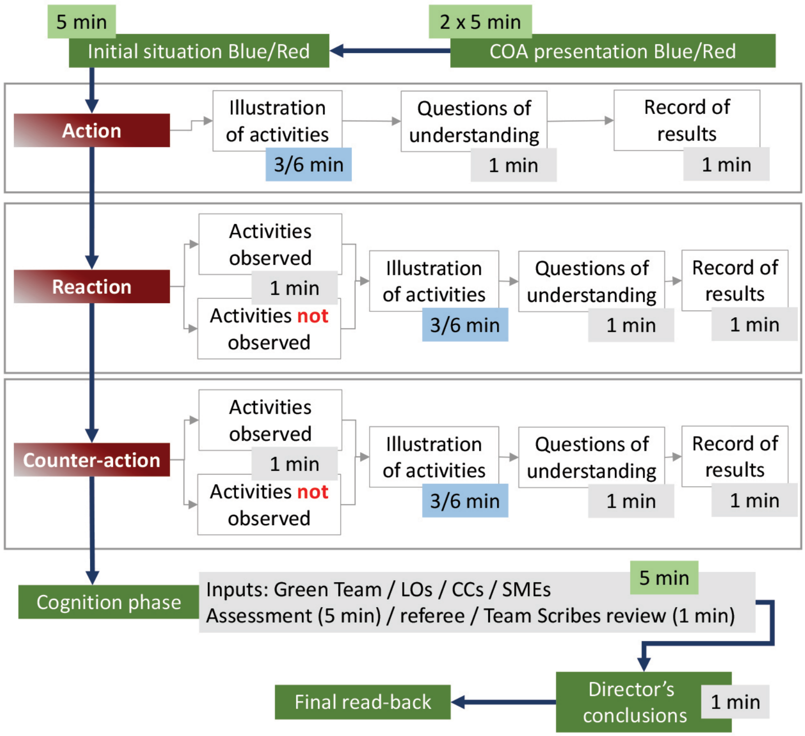
Academic terms are indeed critical to understanding beyond the methods strategists, planners, and analysts take for granted as sound and logical. These go-to methods include COG, SWOT, CARVER, stakeholder analysis, course of action (COA) analysis, levels of war, ends-ways-means, and war-game activities exercised via this reductionist, categorical approach. Even in areas where military theory and doctrine offer "military artistry" or "operational art," the language, metaphoric devices, models, and underlying theories are entirely scientific (or pseudoscientific as Paparone and others argue).[7] This schema creates a systemic tension of military planners and technocrats seeking to unlock technologically induced ways of managing and manipulating everything measurable in war so that ultimately they can predict and control what matters to accomplish overarching strategic goals and objectives. Yet complexity theorists, systems theorists, certain groups of sociologists, designers, postmodernists, and organizational theorists reject such efforts as futile and likely *counterproductive* to what security organizations really need to accomplish. Consensus and groupthink are discouraged in postmodern theory where diversity of ideas inspires creativity, and repetition of indoctrinated patterns anesthetizes it.[8] Even the production of NATO and joint doctrine can be deconstructed to demonstrate that how modern militaries mimic scientific communities, including their knowledge curation practices, is deeply flawed. Paparone indicates that

> the way the US military doctrinal manuals are developed and published indicates autocratic power at work, providing more of an illusion of scientific progress. . . . Publishing updated editions of the manuals gives the appearance of scientific-like progression, yet these texts neither require a citation system to buttress the efficacy of theoretical arguments nor are they subject to refereed reviews and other scholarly criticisms and mitigations afforded by other esoteric knowledge forms found, for ex-

> ample, in traditional professions, such as medicine and law. The publications become doctrine by virtue of a three- or four-star general or admiral signing them.
>
> Updates to doctrinal manuals can take 5–10 years or more, reflecting a rather shallow rehashing or reorganization of jargon, slogans, and buzzwords, while the underlying closed-world logic of systematicity remains further entrenched, contributing to the illusion of an engineering-like professional discipline of study.[9]

NATO and joint forces are institutionally compelled to follow formal doctrine on what military decision-making is and how to properly execute it. Yet even the mode of doctrinal production falls victim to an illusion of pseudoscience for framing warfare. NATO-OPP and JPP in turn become methodologies for decision-making that generate an institutionally desired illusion of complex reality for practitioners, as Ackoff warns in this book's opening quote regarding corporate planning. Commanders and staffs adhering to doctrine and iteratively following each step of these recipe-styled methodologies are more often than not engaging in nonreflective practice.[10] Ackoff indicates that most organizational planning is ineffectual because it is focused on applying a given process to complex systems not susceptible to simplistic reasoning and linear-causal, mechanistic logic.

Analytical reasoning that prioritizes quantitative, objective findings exclusively is insufficient for complex, dynamic systems. War is perhaps the most horrifically complex context that humans create in reality. We are capable of generating complex war through simplistic reasoning, but we cannot influence or manage said war (or even comprehend it well) through the same reasoning that likely led to war itself. Thus, modern military decision-making models, theories, and methodologies rest upon the assumption that they will work perfectly if preprogrammed with the right combination of military ingredients. The following cycle of war-gaming moves illustrates how NATO and joint war-gaming is rationalized in a sequential, turn-based "action-reaction-counteraction" process adjudicated in what becomes a sort of group "rain dance" ritual before the actual weather arrives (fig. 26).




Legend
CC commander
LO liaison officer
SME subject matter expert

**Figure 26. Illustration of a cycle within war-gaming moves.** (Reproduced from Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2, with UK National Elements [Change 1] [Brussels: NATO Standardization Office, May 2019], fig. 4.4.1, https://assets.publishing.service.gov.uk/.)

Militaries must be careful not to conflate knowledge with wisdom. The former comprises endless descriptions and mountains of analytical data, while the latter uses perspective and judgment to find solutions that cannot be described or cataloged. Swedish philosopher Nick Bostrom offers a useful distinction, stating that "we can think of wisdom as the ability to get the important things approximately right."[11] For John Boyd's model to function usefully, a military actor would somehow leap cognitively to this military wisdom faster than a cunning adversary; speed orients on finding the best solution in the piles of data before the enemy does. Yet when one considers complex adaptive systems (which most difficult military challenges are entirely within), this notion of wisdom does not occur before the situation unfolds. It emerges only with thought and action within that system as the adversary also engages and thinks.

Modern militaries tend to assume this troubling part of complexity away, expecting that technical rationalism and the gradual collection of convergent knowledge will allow locking in all possible solutions before the engagement begins. "Technical rationalism" is defined as a belief system where scientific progress and increased technological manipulation of reality will unlock previously unreachable paths for human development. Whatever the challenge or obstacle, if a scientific methodology is used to understand, test, and develop solutions for the matter at hand, eventually progress will unlock the way forward through new technological innovations and applications. This perspective dominates in modern militaries and is not without criticism. Alex Ryan, formerly a military educator at the US Army's School of Advanced Military Studies (renowned as the center for the American Army's intellectual development), suggests that "technical rationalism combines a naïve realist epistemology with instrumental reasoning . . . [but] the dominant institutional culture does not have the time or patience for philosophical distinctions." Further, "doctrine limits the professional language of the Army. . . . Naming is framing. It is difficult to escape the institutional paradigm when you can't change the language."[12]

Ryan adeptly captures the modern military paradox. On the one hand, the profession demands convergent thinking, uniformity, and repetition as established through deliberate and practical behavior. Yet, on the other hand, it seeks innovation, improvisation, and creative experimentation that cannot occur in that context. Buchanan frames this tension between the scientific community (and as applied here, the military profession) using analytic logic and designers using a wide range of concepts beyond systematic logic, analytic optimization, and technical rationalism. Thus, scientists (and military scientists) have a presupposed reductionist, positivist logic in framing reality that "solves" complex problems through engineering, mathematics, and natural science–enabled technology alone.[13]

Critics of technical rationalism argue that there must also be art, subjectivity, creativity, paradox, irrationality, intuitiveness, and novelty. Buchanan observes, "This creates one of the central problems of communication between scientists and designers, because the problems addressed by designers seldom fall solely within the boundaries of any one of these subject matters."[14] Modern military strategists, planners, and intelligence analysists tend to emulate scientific and pseudoscientific practices, language, and methodological applications to warfare. Military designers approach complex security challenges differently due to appreciating alternative frames and not adhering to institutionalized methodologies or doctrine unsuited for the emergent requirements that demand novel designs.

Militaries should consider revising NATO-OPP/JPP (and other variations) to acknowledge the legacy system influences and contemplate what alternative sensemaking methods, models, language, and theories might be incorporated that previously were unable to gain entry. "Sensemaking" differs from "making sense" in that it involves "the retrospective development of plausible meanings that rationalize what people are doing" as a process of social construction throughout any ongoing activity.[15] A redesign of modern military decision-making methodologies could entertain this sort of experimentation, provided the military first acknowledges and acts upon the modern synthetic frame that generates these methodologies. With his theories of design practice, Klaus Krippendorff supports the importance of designers able to view complex challenges from vastly different perspectives:

> The understanding that designers need to have is an understanding of users' or other stakeholders' understanding. This is an understanding of understanding, or second-order understanding for short. Second-order understanding assumes that others' understanding is potentially different from one's own. . . . First-order understanding is mono-logic. . . . Second-order understanding radically breaks with the widely shared illusion that scientists could take a God's-eye view of a world. . . . Second-order understanding also is dynamic in that it accounts for the possibility that artifacts change their users' meanings in use, that new artifacts always intervene in their user's understanding, and that we too change our understanding in the process of designing artifacts with and for others.[16]

This "second-order understanding" as articulated by Krippendorff is not conceivable throughout NATO-OPP and joint planning, where essentially analysts produce only first-order understanding (also termed first-loop reasoning), as explained earlier.[17] Closed system, single-loop thinking is done through reductionist, single-paradigm-constructed models like SWOT, CARVER, and COG analysis and epistemologically demonstrated through the formulaic language and linear sequences of modern military decision-making as expressed in doctrine.

This framework in turn illuminates the overarching *ontological stance* (what is and is not real) of what most industrialized modern military forces believe war is and cannot be. Modern warfare must be expressed through state-centric relationships that do permit some nonstate actors. However, it must still channel and render nonstate actors into state-similar or "state-adjacent" dynamics that are ordered and standardized into obeying an ontological "nature of war." This unchanging nature of war forms the ontology for which modern militaries can apply formulas, laws, principles, and rules and then subscribe to a technical rationalism of making sense of warfare as it occurs across time and space.[18] A characterization of warfare is enabled so that contextual changes might occur, just as evolutionary biology twists and turns as different species flourish or perish. Yet an overarching natural order of war imposes a Newtonian style of natural science–inspired organization and stability. This framework engenders an epistemological pathway so that the modern military profession can employ a technical rationalist outlook on any future security challenge occurring in any place conceivable.

Next, the traditional analytic optimization and reductionism modes of modern military strategy pair directly with tactical planning; the complicated war tasks at the lowest levels are expected to work just as effectively at the most abstract strategic levels of war.[19] Essentially, militaries believe that the wise leader, provided with sufficient technology and assets (capability, means to act), can deliberately act through force projection (speed, movement via capacity) to accomplish a military goal by "solving" any and all problems regardless of complexity. This expertise is assumed to unfold over time as leaders perpetually increase information, knowledge, and control. They then assess through a historical lens that reinforces the preconfigured doctrinal and institutionalized sequences their organization ought to follow based on past successes.[20] First-order understanding, Krippendorff offers, is "the kind of understanding that engineers need and the natural sciences have provided us, [and it] completely ignores the conceptualization that (other) humans bring to it. First-order understanding is mono-logic."[21]

This concept parallels single-loop thinking and often is how NATO defense forces, the US Department of Defense, and allied equivalents view modern warfare. It is also how national leadership, in turn, believes that the military instrument of power can be wielded in terms of foreign policy. One identifies a difference between current reality and a future desired reality, determines the "problem" existing between the two, pairs a solution to that problem, and then employs ends-ways-means systematic rationalization to militarily change reality as if twisting a screwdriver to sink a screw. Figure 27 portrays this reasoning, used in many contemporary doctrinal products, concept papers, and how-to military guides.[22]

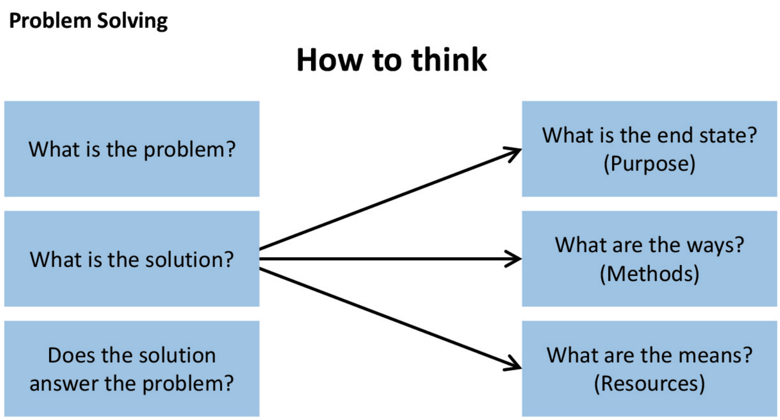



**Figure 27. Why modern militaries orient on linear, mechanistic thinking.** (Reproduced from Jack D. Kem, *Campaign Planning: Tools of the Trade*, 3rd ed. [Fort Leavenworth, KS: US Army Command and General Staff College, Department of Joint, Interagency, and Multinational Operations, US Army Combined Arms Center, 2009], 5.)

Note that the graphic is titled "Problem Solving: How to Think" and offers a linear, causal, and direct sequence of linking problems to solutions (inputs to outputs) in systematic fashion. The wobbly doorknob requires a screw to be tightened, and a screwdriver is brought in to fix it. The problem is identified, and immediately the analyst seeks the optimal solution that pairs with the problem identified. Internal validation is required with "Does the solution answer the problem?"—which is a self-referential action that opens the door to cognitive bias, institutionalisms, and lack of critical reflection on "why" we think. This mindset is oriented not on *why* (requiring ontology, epistemology, paradigm) but *how* (methodology, rules, sequences) through adhering to formal doctrine so that *what*-centric descriptive reasoning dominates. The ends-ways-means modeling on the right side of the graphic links linear, causal arrows to the conceptualized problem-solution, with each box being "what"-centric and entirely descriptive (thus reductionist, analytical, closed-system thinking).

Descriptive thinking only leads to further description; one cannot perform descriptive processes and reach explanation. If organizations following NATO and joint planning procedures use only convergent, analytical, and reductionist models—such as SWOT, CARVER, MSHARPP (mission, symbolism, history, accessibility, recognizability, population, and proximity), COG, and stakeholder analysis—they have narrowed the scope of potential actions. Further, if we only use such methods to attempt to explain and understand how a wide range of military activities occur (from peacekeeping and humanitarian missions to global nuclear war) and impact complex security contexts, we likely will be institutionally limited on challenging *whether these methods even accomplish what they intend or advocate*. Relying on them because they are entrenched in established military doctrine, planning methodologies, and the intelligence community of practice again reinforces this technical rationalist position on how all wars (and war actions) ought to function regardless of context. War (to include security activities in contexts below the threshold of armed conflict) can ultimately be decoded into mathematical equations, and even wickedly complex ones need only be solved using sophisticated design means via technical rationalism.

The 2020 Joint Planning publication depicts how modern militaries can holistically view the operational environment (fig. 28). Joint planning here attempts to describe the operational environment "in terms of its informational, physical, and human aspects" by using a geometric shape that combines physical domains, information, and those mediums information can occupy as well as the categorical structures for systematically describing human societies in military analytical processes.[23] Readers might also see the suggestion of a Rubik's Cube metaphor, where a military analyst need only find the right combination of manipulations to "solve" complex security challenges framed in this form. This cube graphic is further bounded by a thin, gray line indicating a formal boundary of reality or perhaps what is relevant to military examination and action. While this graphic is labeled "holistic," it instead depicts a reductionist, mechanistic, and systematic (not systemic) way of addressing reality. It reveals not an adaptation of complexity or systems theory in JPP but the dependency on Newtonian-styled natural science constructs alone.

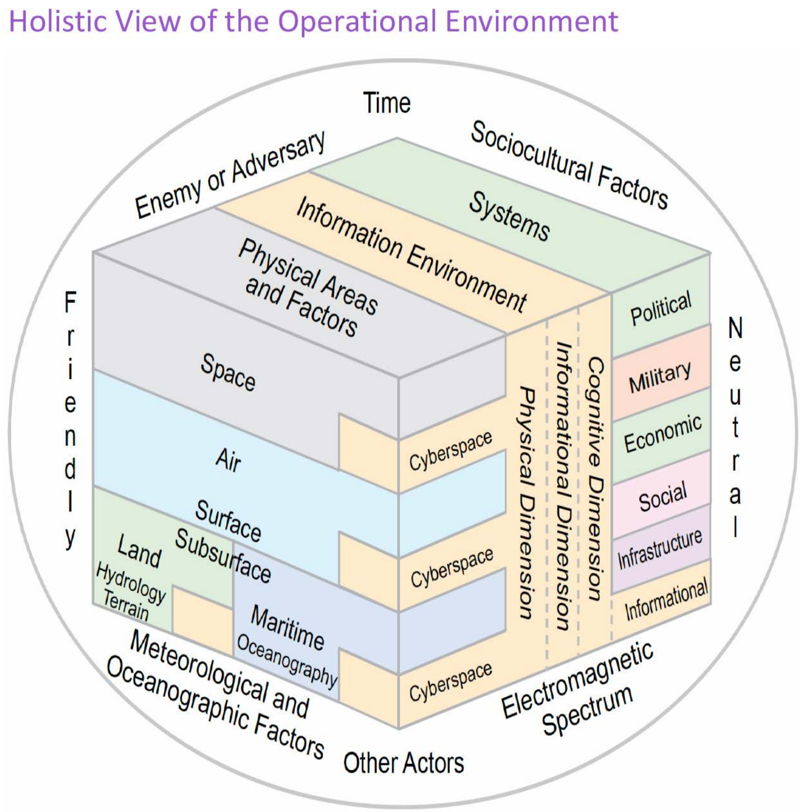



**Figure 28. Rendering warfare into geometric, interlocking shapes.** (Reproduced from Joint Publication 5-0, *Joint Planning*, December 1, 2020, https://irp.fas.org/.)

Complexity theory defines “holistic” and “systemic” quite differently than NATO and joint force doctrine do. Complex systems are open, meaning they are never bounded or static and cannot be broken into parts and reassembled. The whole is greater than the parts, and it is also in perpetual transformation where those parts and connections do not remain static. Systemic thinking differs from analytical thinking, which seeks to isolate and reduce larger systems into various parts. Systemic thinking requires an understanding of interdependency that exceeds the purpose of analytical inquiry.[24]

One cannot illustrate complex systems bounded by some cube of shared military terms and constructs like above. Complex systems do not operate at an equilibrium; thus, the idea of fixed levels, layers, or other nested frameworks proves oversimplistic and/or counterproductive in explaining complexity holistically. The modern military "levels of war" construct bears no relationship to complexity theory; "tactical" does not correlate to a more/less simple dynamic any more than "strategic" might. Each layer/level functions systematically, *not systemically*. Yet military forces appear tightly wedded to the hierarchical "strategic-operational-tactical" model despite these disconnects. Complexity does not work entirely within one particular organizational form or function. Complex systems feature many diverse components and relationships, with the output of components also being a function of their inputs. Many of these functions are nonlinear (input does not lead to direct, clear output) and cannot be stacked or isolated within some hierarchical or nested arrangement of scale.[25]

These interactions are also dynamic, meaning they change over time and again cannot be stacked or vertically layered in a hierarchical, nested manner of stability and order. Most significant to the glaring error of the "holistic cube" above, modern military forces fail to appreciate the aspect of emergence in complex systems that is essential to framing any holistic appreciation. Complexity theorist Paul Cilliers explains that "complex systems display behaviour that results from the *interaction* between components and not from characteristics inherent to the components themselves. This is sometimes called emergence" (emphasis in original).[26] The *Joint Planning* figure focuses on presenting a holistic view of complex reality entirely by arranging distinct components in an engineering and Newtonian physics framework where further analytical optimization should reveal some hidden order.

Thus, all warfare (every war in history and future wars) is reduced to finite, measurable "principles" or sequenced rules and reassembled into dynamic complexity.[27] Every conflict is regulated and controlled like a complex engineering feat—not the disruptive, irrational, and learning system of opposition and competition it is in reality. NATO and joint force decision-making methodologies emphasize not only a problem-solution orientation within a single paradigm but also an ends-ways-means logical construct for security activities in the broader context of foreign policy and war.[28] Thus, NATO and joint forces are prepositioned to reinforce existing (modern) military doctrine and language; the institution perpetually reinforces a single belief system on war at the expense of any alternative forms of thinking and acting. Ultimately, the words and underpinning metaphoric devices NATO and joint forces use create the very limits of how military decision-making succeeds or fails in complex reality.[29]

**Notes**

1. Westmoreland, "Gen. Westmoreland on the Army of the Future."

2. For examples of this pattern of thinking, see Chia and Holt, *Strategy without Design*, 25–29; Ackoff, *Redesigning the Future*, 30–32; and Tsoukas and Hatch, "Complex Thinking, Complex Practice," 992.

3. Parts of this chapter come from the author's publication *Understanding the Military Design Movement: War, Change and Innovation* (Routledge, 2023), https://www.routledge.com/.

4. Malešević, "Organization of Military Violence," 460.

5. Malešević, *Sociology of War and Violence*, 8–14; Naveh, Schneider, and Challans, *Structure of Operational Revolution*, 26; and Vagts, *History of Militarism*, 17–18.

6. Gibson, *Perfect War*, 462.

7. Paparone, *Sociology of Military Science*; Paparone, "How We Fight"; Sookermany, "On Developing (Post)Modern Soldiers"; Sookermany, "Military Education Reconsidered"; and Naveh, Schneider, and Challans, *Structure of Operational Revolution*.

8. Kilduff and Mehra, "Postmodernism and Organizational Research."

9. Paparone, "How We Fight," 521–22.

10. Weick, "Role of Imagination"; and Weick, *Sensemaking in Organizations*.

11. Bostrom, *Superintelligence*, 67.

12. Ryan, "Introducing Design to the U.S. Army."

13. Monk, "End State," 28; Chia and Holt, *Strategy without Design*, 21–29; and Meiser, "Ends + Ways + Means = (Bad) Strategy."

14. Buchanan, "Wicked Problems in Design Thinking," 14.

15. Maitlis and Sonenshein, "Sensemaking in Crisis and Change," 551.

16. Krippendorff, "Principles of Design," 416–17.

17. Flood and Romm, "Contours of Diversity Management."

18. Paparone, "Design and the Prospects of a Design Ethic," 7.

19. Hatch and Cunliffe, *Organization Theory*, 63; McFate, *New Rules of War*, 233–37; and Naveh, Schneider, and Challans, *Structure of Operational Revolution*.

20. Protzen and Harris, *Universe of Design*, 151–61.

21. Krippendorff, "Principles of Design," 417.

22. Kem, *Campaign Planning*, 5.

23. Joint Publication 5-0, *Joint Planning*, IV-8.

24. Gharajedaghi, *Systems Thinking*, 15–16.

25. Cilliers, "Complexity, Deconstruction and Relativism," 78–79.

26. Cilliers, 79.

27. Military doctrine illustrates this methodology in rich detail through historical vignettes or case studies. Any battle or military activity in recorded history must also obey universal laws, patterns, or formulas defined within modern military science and a "nature of war."

28. Meiser, "Ends + Ways + Means = (Bad) Strategy," 81–85.

29. Paparone, "On Metaphors We Are Led By"; and Paparone, "How We Fight."

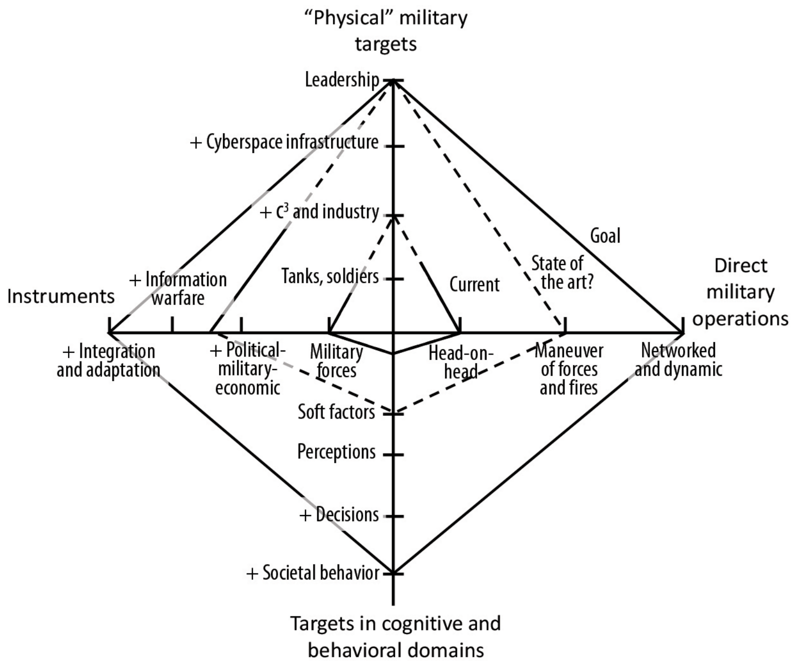
Chapter 13

# Ghosts in the Modern Planning Machine

## "Effects-Based Operations" after 2008

The Newtonian style of quantifying complex warfare into oversimplified physics and math equations has become entrenched in modern military decision-making despite attempts to purge some military forces of the mindset. Part of this phenomenon is the failure of social systems to learn due to deeply held epistemological stances on truth. Truth is commonly associated with simplicity and universal comprehensibility across the community, creating a perpetual demand for all future truths to pass a simplification test and a feedback loop rejecting anything not clearly understood as likely "false."[1] Complex systems reject simplification and reduction into isolated, causal parts, thus rarely providing examples that pass this truth test. Historically, the rise of scientific and technological development has demonstrated the opposite. It has shown the importance of organizations avoiding biases that steer comprehension back to linear-causal, mechanistic, and systematic deliverables readily accepted by the common operator in their existing span of knowledge, terminology, and shared models.

Rendering complex, dynamic systems into a formulaic modeling would spread across military forces and engrain within doctrine. As in the block-stacking game Jenga, the cunning opponent able to pull out the right piece might collapse the enemy's entire stack. Reductionist logic would go from context-specific applications in aerial bombing efforts where one could collapse a bounded system through kinetic strikes to becoming institutionalized by entire military services. Eventually, the US Joint Forces Command (USJFCOM) would influence American joint forces, NATO, and allies to reduce warfare to nested diagrams of strengths, vulnerabilities, and hierarchical relationships capable of being mapped and manipulated through advanced technology, speed, and knowledge curation. A RAND study conducted for the Office of the Secretary of Defense and the US Air Force depicts the concept of effects-based operations (EBO) (fig. 29).




Note: The axis of physical targets relates to both direct physical and systemic effects; dashed lines indicate where current capabilities are poor in capturing indirect effects.

Legend
C3 – command, control, and communications

**Figure 29. Effects-based operations model.** (Reproduced from Paul Davis, *Effects-Based Operations [EBO]: A Grand Challenge for the Analytical Community* [Santa Monica, CA: RAND Corporation, 2001], fig. 2.2, p. 9, https://www.rand.org/.)

While debated and eventually banished from doctrine in 2009, EBO's long shadow continues to influence contemporary military decision-making in NATO, joint forces, and military services alike. In the latest NATO strategic and operational planning doctrine, this linear-causal, systematic (input-output) logic of reverse engineering preconfigured ends with military effects through sequences of deliberate action remains dominant. The Supreme Headquarters Allied Powers Europe (SHAPE) version 3.0 operations planning directive indicates that "changing conditions from an unacceptable to an acceptable state will require the *creation of effects* that are necessary to achieve planned objectives and contribute to the achievement of the NATO end state" (emphasis added).[2] Effects-based military rationalization positions deliberate actions as a direct catalyst for controlling and predictively shifting the present "problematic situation" away from an undesired future to achieve a more palatable solution.

EBO is one of many examples where the military draws inspiration from nonmilitary professions and then assimilates the concept into warfighting. After World War II and particularly through the volatile 1970s and '80s, commercial enterprise experimented with how to reduce uncertainty and unpredictability by increasing control and efficiencies and operationalizing risk reduction in virtually every aspect of commercial enterprise. "Doing more and more with less and less" would lead to new practices such as "lean production," first established in Japan at Toyota. These management and decision-making methods would apply systems thinking through biological constructs or uni-minded systems and cybernetics approaches.[3] Militaries noted these developments; military theorists in the 1980s added related concepts (e.g., general systems theory) to introduce uni-minded systems frameworks for warfare versus commercial gains in efficiency.[4]

EBO reached mainstream military utilization coinciding with the Persian Gulf War, characterized as the first "high-tech," "smart bomb" war. It promised that the problems of the Vietnam-era strategic frustrations were now solved with advanced weapons and computers and sophisticated military force management. EBO positioned the desired military end state or strategic goal(s) as the centralized starting point for conceptualization of thought and action. Movement was to occur in what was misunderstood as "systemically" but rather would be orchestrated systematically. All areas were linked from strategic levels down to isolated tactical actions in quantitative, vertically nested formulations (e.g., security forces to politics, infrastructure, population, and resources). Just as the complexity maxim of "a butterfly flapping its wings in Peking [can cause] rain in Central Park" is often misinterpreted, EBO did the same with centralizing effects and causation to a centralized management of military action.[5] An example of these centralized "tree maps" is depicted in figure 30.[6]

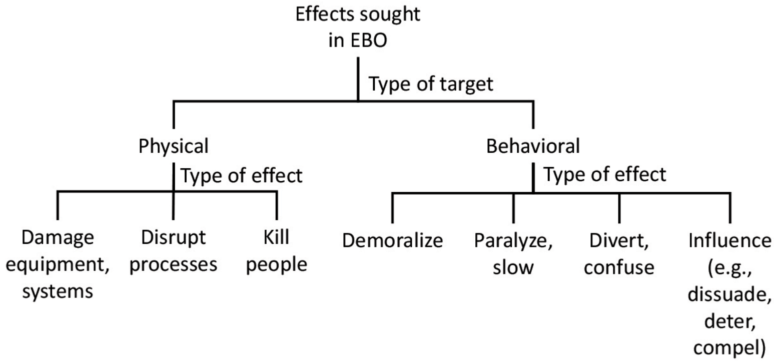



**Figure 30. Effects-based operations with a simple taxonomy of cause-effect.** (Reproduced from Paul Davis, *Effects-Based Operations [EBO]: A Grand Challenge for the Analytical Community* [Santa Monica, CA: RAND Corporation, 2001], fig. 2.3, p. 17, https://www.rand.org/.)

Later, readers will explore how concepts of emergence, nonlinearity, and system sensitivity to initial conditions influence decision-making and strategic goals in complex systems. Such systems are further convoluted "by the reflexivity of actors capable of absorbing and adjusting to the very knowledge produced about them."[7] Thus, we and our adversaries are cunning and able to think about our thinking as we are acting within a complex system. Consequently, no one willingly agrees to play to the enemy's plan or obliges to do the activities so easy to imagine that a staff can develop a detailed sequence in advance. Single future-oriented strategies not only fail here, but the expectation that envisioning a single desired future is sufficient for complex, dynamic systems suggests that military forces are uncomfortable with uncertainty. Generating a series of different futures versus a single desired one produces considerable issues with military synchronization, priorities, and management concerns and with appreciating risk, choice, and emergent opportunities previously unimagined.

Multiple futures generate greater potential for appreciating complexity than reverse engineering from a single, pre-established strategic end state. What EBO was intended to do in the 1990s for airpower in the Persian Gulf War would be misapplied across the joint forces and extended out of kinetic aerial strikes against hard targets (where CARVER assessment is well suited) into all warfare endeavors. Despite military efforts to mitigate uncertainty in war through analytic optimization, complex systems do not permit analytical efforts regardless of how technologically sophisticated, resourced, or descriptive. They cannot grant the precision to map the air displacement of a butterfly to global weather patterns any more than a single bridge strike in a critical enemy location might correlate with the eventual capitulation of that nation in defeat. If scientists could capture every butterfly and bird flap across a complex system, weather prediction would still negligibly increase due to how complexity expresses. Yet the entire epistemological outlook on warfare by EBO enthusiasts is that war could—through superior technology and science and faster military communication and decision-making—be made controllable, susceptible, and even predictable. Further, doing so would require minimal use of highly skilled, well-resourced forces. It imposes a uni-minded construct where instead of single-loop, mechanistically inspired logic systems that function in a Newtonian style, the double-loop exercise of EBO is that of biological inspiration. Gharajedaghi explains that

> the biological thinking or living systems paradigm, which led to the concept of the organization as a uni-minded system, emerged mainly in Germany and Britain, but then caught fire in the United States. The underlying assumptions and principles of the biological mode of organizations are also simple and elegant: an organization is considered a uni-minded living system, just like a human being, with a purpose of its own. This purpose, in view of the inherent vulnerability and unstable structure of open systems, is survival. . . .
>
> . . . Although uni-minded systems have a choice, their parts do not. They operate based on cybernetics principles as a homeostatic system (emphasis in original). . . .
>
> . . . The operation of a uni-minded system is totally under the control of a single brain, the executive function, which, by means of a communication network, receives information from a variety of sensing parts and issues directions that activate relevant parts of the system.[8]

When EBO is deconstructed in detail, the uni-minded structure becomes the dominant theme of how militaries intended for warfare to be realized in this different frame. Not to be taken literally (although more often than not, strategic and operational "centers of gravity" are significant enemy leaders and decision-makers to be targeted), the centralization of decision-making with a "brain" is how EBO views system strength and vulnerability. Effects that promise to "collapse the system" are paired with this uni-minded framework: if one cuts off the head of the snake, the body dies, whether targeting an aviation unit, enemy communication networks, or the strategic framework of an adversary's will to resist in a conflict.

Target and destroy a key node that reflects a brain function or essential pathway, such as the main artery supplying blood to the brain itself, and the entire system withers and falls apart. Effects are linked to system behavior framed with the uni-minded organizational form and function. Individual parts depend on the whole, and only the system itself (using the single "brain") has a choice; the parts depend on that system retaining its form so that the entire system functions. EBO positions "choice" at the unified system level; hierarchical structures are conceptualized to assign "cause," "effect," "relationship," and "dependency" in a predictable, stable framework. This idea would first capture military organizations (e.g., air forces, engineering) that could readily apply the uni-minded concept toward warfare systems that do exhibit uni-minded qualities, such as finding the right vulnerability to destroy a critical bridge or disabling an entire air defense network through a precise kinetic strike. Subsequently, the EBO craze would extend uni-minded frameworks and double-loop thinking to complex social systems not at all uni-minded.

The rise and fall of EBO occurred in the late 1980s through the 2000s, with the US Air Force advocating the targeting methodology as an overarching cure-all of analytical reasoning for nearly all aspects of warfare. EBO is structured under the same beliefs and models of CARVER and overlap in many mutually supportive ways. EBO, MSHARPP, SWOT, and CARVER view criticality as "single points of failure, degrees of importance to the system" in a uni-minded systems view (systematic logic) that maps cause and effect in a sequential, linear, and directly proportional rationale. CARVER uses a matrix prepared for each asset, and the assets are evaluated against a set criteria list. The criteria can be tailored "and the relative values manipulated, based on mission or operational needs (as long as consistency is maintained throughout the matrix)."[9] Note in the following EBO diagram that certain nodes are central to how the entire system is mapped, indicating a centralized authority or position of prominence (fig. 31).[10]

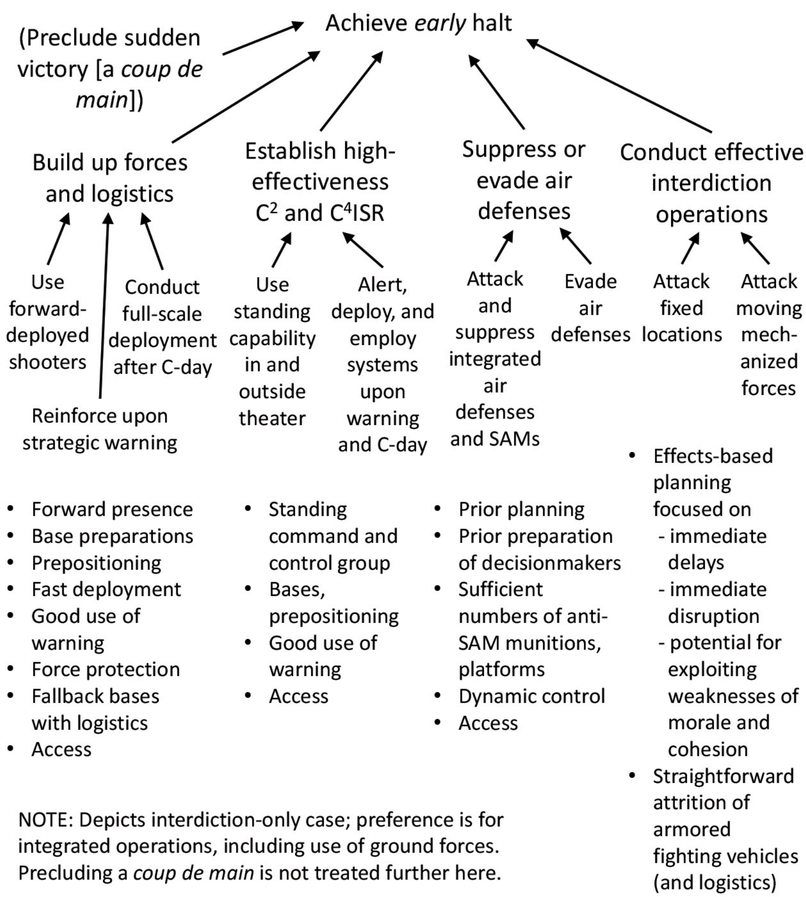



**Figure 31. EBO centralization of nodes in a uni-minded system construct.** Reproduced from Paul Davis, *Effects-Based Operations [EBO]: A Grand Challenge for the Analytical Community* [Santa Monica, CA: RAND Corporation, 2001], fig. 4.3, p. 36, https://www.rand.org/.)

These models and methods illustrate the modern military's fixation to shape military affairs into a closed system where one can perfectly model and control all relevant elements of violence. That is, "mathematical and logical models and simulations of warfare became fetishized for their promises of predictability and control. . . . Convinced with often near-religious fervor of the superiority of their method, . . . [defense intellectuals] were determined to apply scientific rationalism to the entire spectrum of war."[11] That the US Air

Force would be the loudest advocates of EBO and help introduce CARVER through aerial bombing again reinforces the misapplication of air and sea domain-specific activities to complex, dynamic systems more regularly encountered on the ground with populations. Uni-minded systems govern through a paternal, top-down hierarchical form and function, whether we consider how titans of commercial industry, such as IBM or Ford Motor Company, or many modern militaries continue to organize and make decisions.

Gen James Mattis, US Marine Corps, retired, commander of Joint Forces Command in 2009, would banish EBO as a method and lexicon from joint forces, attempting at that time to replace it with military design theory influenced by the Israeli Defense Forces. Mattis later stated, "While I agreed then (and now) with the U.S. Air Force's application of EBO in their targeting process, [JFCOM's] misapplication of USAF's targeting doctrine was the fatal flaw. Basically, JFCOM's misuse of the Air Forces tried to introduce an approach to warfighting at odds with war's fundamental nature."[12] CARVER as a cognitive tool is likely useful for clear, simplistic, and local effects of a weapon payload against a physical target. The USAF's pairing of CARVER and special forces with bombing and demolitions activities in the Vietnam War showcases the application of the right model and method in the proper context.

Yet just as EBO spread from USAF targeting for kinetic strikes on physical ground targets, CARVER escaped its original use and, since the 2000s, has been misapplied to sensitive activities well beyond the original scope and intent. Antoine Bousquet, drawing on the works of Paul N. Edwards and Chris Gray, posits that this misapplication happens because the "'vision of a closed world, a chaotic and dangerous space rendered orderly and controllable by the powers of rationality and technology,'" appealed to military institutions. There, "the training of troops is designed 'to reduce the conduct of war to a set of rules and a system of procedures—and thereby to make orderly and rational what is essentially chaotic and instinctive.' "[13] In a 2008 memorandum to USJFCOM, Mattis stated, "I am convinced that the various interpretations of EBO have caused confusion throughout the joint force and amongst our multinational partners that we must correct. It is my view that EBO has been misapplied and overextended to the point that it actually hinders rather than helps joint operations. . . . All operating environments are dynamic with an infinite number of variables; therefore, it is not scientifically possible to accurately predict the outcome of an action. To suggest otherwise runs contrary to historical experience and the nature of war."[14]

The US Air Force would be criticized of overselling EBO in the 1990s and 2000s (in the afterglow of the decisive Persian Gulf War results) with questionable science and a lack of academic rigor concerning military affairs. Lacking in demonstrated academic study, the USAF would instead promote military doctrine without underpinning theories, models, or sources and instead directed EBO practice on the centralized authority that formal military doctrine carried. While the Air Force embraced EBO concepts and, in turn, encumbered USJFCOM with them by the early 2000s, the US Army and Marine Corps would be skeptical that the concepts could extend beyond simple kinetic actions in select domains. Reflecting on this period, retired US Marine Corps lieutenant general Paul Van Riper recalls, "U.S. Army brigadier general David Fastabend, the deputy director for futures, wanted to avoid the negative reactions the Joint Forces Command had provoked with its unsupported assertions about the efficiency of EBO" when exploring alternative design theory experimentation in the 2000s for the Army and Marines. Advocates of CARVER, MSHARPP, and other targeting models become guilty of the same unsupported assertions and overpromising of EBO, which should be concerning for NATO and joint forces. They should reflect on how and why contemporary decision-making methodologies are so reliant on models that tilt toward the same epistemological fixations.

Today, many stakeholders in that period of Department of Defense transformation from the 1990s through the initial post–September 11th "war on terror" aftermath remember how EBO surged in popularity only to eventually collapse. Col Kevin Benson, US Army, retired, former commandant of the US Army School of Advanced Military Studies, recalls EBO opposition: "Mattis and [then Army lieutenant general William] Wallace were both bitterly opposed to effects-based operations. I had conversations with both of them. . . . They were looking for something that had some theory, some substance, because both of those men viewed EBO as linear . . . [essentially] bomb until we get what we want."[15] Meanwhile, in his article on the methodology, CARVER advocate Leo Labaj offers, "In my business, there was no problem that could not be solved with a large amount of high explosives. This thinking is also prevalent with al-Qaeda and other modern terrorist organizations."[16]

Methodologically, CARVER (along with MSHARPP) and EBO appear closely related in theoretical underpinnings, conceptual models, metaphoric devices, language, and method. These overlaps indeed existed before formal adaptation of EBO into various service doctrines and decision-making methodologies, and after elimination of the term in 2008, those overlaps remain rigidly in place.[17] A consideration for NATO and joint planners is that many concepts become entrenched in methodologies through indoctrination, training, and even institutional ritualization due to the allure of particular beliefs complementing an overarching worldview on warfighting.

Whether considering CARVER, SWOT, COG analysis, ghosts of EBO's former indoctrinated glory, or the most recently published NATO or joint planning doctrines and their myriad analytical models and constructs, NATO and joint forces have several areas of deep concern. Current decision-making methodologies are saddled with too many concepts and ideas generated elsewhere that have been collected and assimilated into the institutionalized social collectivity that manifests in NATO-OPP, JPP, and service-specific variations therein. Contemporary military decision-making is a clear victim of this issue in that strategists and operational planners likely are unwittingly (and in some ways, unwillingly) forced into socially conditioned responses to "a pre-established ordering of things" imposed by the modern (Western, industrialized) military enterprise.[18] Often, these problems are difficult to spot because they exist beyond a methodology's specific terms, steps, models, or techniques. Decision-making fallacies in modern warfare extend epistemologically from the theoretical to explicit practices within the entire socialized frame for making sense of warfare.

British philosopher and mathematician Alfred North Whitehead created the phrase "fallacy of misplaced concreteness" to "describe the tendency to see physical objects and things as the natural units of analysis rather than, more properly, the *relationships* between them" (emphasis in original).[19] Contemporary NATO-OPP and JPP have become a collective catch-all for too many ideas and concepts originally conceived within "a different thought style . . . [and were] easily assimilated into the dominant discourse in such a way as to neutralize claims which do not fit into the dominant order of things."[20] CARVER, particularly, is a prime example; analysts promoting the utility and scientific soundness of the targeting method believe it can render qualitative data mathematically into quantitative, objective outputs for clear, analytical reasoning. Thus, CARVER magically converts complex, dynamic social networks into neat bundles of linear-causal equations appropriate for a military planner or intelligence analysist to plan direct activities against. Kinetic strikes on hardened objects extend into complex social networks where the same formulaic reasoning turns terrorist networks into bridges, or airfields and infrastructure into social and cultural entities ready to be isolated and physically manipulated.

CARVER is one of several fallible or "weak science" models in modern military decision-making. It demonstrates an institutional barrier for NATO and joint forces toward reflective practice and critical self-reflection and away from outdated, irrelevant warfare practices.[21] In CARVER (and SWOT, COG analysis, MSHARPP, etc.), this analytical optimization and belief that complex social systems can be rendered into similar objectively stable models, such as hardened site bombing activities or demolitions effects, illustrates the following:

> A process of selective appropriation frequently occurs whereby concepts and ideas generated within a different set of ontological commitments and intellectual priorities are systematically appropriated and intellectually subdued to fit the underlying organizational logic of the dominant thought style. In this way, an intellectual "drift" occurs in which fresh and original ideas proposed within a different problematic are forcibly grafted and pressed into service within a context which neither framed nor generated them. This tendency to selectively abstract ideas, concretize them as essential aspects of reality and then to take them as appropriate units of analysis, whilst ignoring and forgetting this process of decontextualization, leads to what has been previously termed the Fallacy of Misplaced Concreteness.[22]

Thus, modern military decision-making presents problematic issues for NATO and the DOD. They include the underlying logic of the decision-making methodology, the origin of various models in NATO-OPP and JPP, and the deeper theoretical and philosophical (ontological, epistemological) structures in Western military warfighting constructs. Another issue is the fallacies shared by a generation of military analysts on how models such as CARVER function (or fail to function). EBO reasoning is rationalized so that models like CARVER, SWOT, and COGs make sense to strategists and planners employing the same warfighter frame.

The assumptions and biases for using CARVER in any application outside of kinetic strikes on physical objects (whether bombs or demolitions) show what Robert Chia and others describe as how individuals are members of a thought collective with a particular thought style. Without individuals or even the entire social collective realizing this influence, it often "exerts a compulsive force upon their thinking. When a particular conception permeates throughout the thought collective and influences everyday life and idiom, any contradiction, therefore, appears unthinkable and unimaginable."[23] Accordingly, the deconstruction and decontextualization provided through cognitive models in NATO-OPP and JPP—such as CARVER, SWOT, and COG—may seem improbable to those under this compulsive influencing mindset rewarded by the institution.

**Notes**

1. Gharajedaghi, *Systems Thinking*, 62.
2. Supreme Headquarters Allied Powers Europe, *Allied Command Operations Comprehensive Operations Planning Directive, COPD Version 3.0*, 1-2.
3. Gharajedaghi, *Systems Thinking*, 22.
4. Bertalanffy, "General System Theory"; Boyd, "Destruction and Creation"; and Osinga, *Science, Strategy and War.*
5. Deaton, "Butterfly Effect Is Not What You Think."
6. Davis, *Effects-Based Operations*, 39.
7. Bousquet and Curtis, "Beyond Models and Metaphors," 56.
8. Gharajedaghi, *Systems Thinking*, 11.
9. Schnaubelt, Larson, and Boyer, *Vulnerability Assessment Method*, 29–30.
10. Davis, *Effects-Based Operations*, 58.
11. Bousquet, "Cyberneticizing the American War Machine," 83.
12. Mattis to Zweibelson, letter, subject: Design for Defense Book PDF Manuscript, September 16, 2021.
13. Bousquet, "Cyberneticizing the American War Machine," 84. See Gray, *Postmodern War*, 95; and Edwards, "Why Build Computers?"
14. Mattis, "Memorandum for U.S. Joint Forces Command."
15. Col Kevin Benson, USA, retired, former SAMS director, interview by the author, August 4, 2021, mp3 audio file.
16. Labaj, "CARVER Methodology," 46.
17. For example, US Army officers in the early 2000s advocated for inculcating EBO logic into all Army tactical activities and suggested that many EBO concepts already existed for quick integration in Army doctrine. See Harris, "Effects-Based Operations," 76.
18. Chia, "From Modern to Postmodern Organizational Analysis," 582.
19. Chia, 582.
20. Chia, 583.
21. Gero and Kannengiesser, "Ontology of Donald Schön's Reflection in Designing."
22. Chia, "From Modern to Postmodern Organizational Analysis," 583.
23. Chia, 583.

Chapter 14

# Key Stakeholders and Necessary Illusions of Categorical Concreteness

While joint planning doctrine refers to "stakeholders" and implies analytical processes for commanders and staff in assessing the operational environment throughout the decision-making methodology, it does not formally present "stakeholder analysis" as Allied Joint Publication-5 does.[1] In the NATO-OPP doctrine, "stakeholder analysis is used to identify the driving and restraining forces for change in a situation. The eventual resolution of a crisis should satisfy the majority of stakeholders, or at least ensure that no powerful (and legitimate) stakeholder is left (too) dissatisfied."[2] It adds that "stakeholder analysis can take a number of forms, but the purpose is . . . to identify relevant stakeholders and the ways in which each may influence, or be influenced by, the situation."[3] This premise suggests causality within a particular system dynamic that will be addressed shortly but reinforces a NATO organizational expectation for how security contexts ought to behave or be acted upon in complex reality. NATO planning doctrine directs organizations to attempt to diagram actors and their influences to illustrate formal and informal relationships and to create a stakeholder network diagram. The UK version of the NATO-OPP process illustrates the use of checklists for stakeholder analysis (table 1).

The following table depicts a range of categorical, systematic models that function like CARVER, MSHARPP, SWOT, and COG analysis. Everything is rendered into objective, tangible, and categorized "bins" where subsequent formulaic relationships might be established by using mathematics, physics, and geometry and applying other natural science models and metaphoric devices. Modern militaries attempt to filter complex security contexts through lenses that sort and structure the complex, the emergent, even the chaotic into orderly, recognizable constructs that can be vertically positioned within some centralized hierarchical chain of principled or rationalized process.[4] The table shows that despite offering many tools and models, modern military decision-making methodologies employ them under an overarching framework of ends-ways-means logic that, in turn, reveals the entire belief system on warfare.

**Table 1. Analysis checklists**

| PESTLE | STEEPLEM | PMESII | Constituents of a nation | ASCOPE |
|---|---|---|---|---|
| Political | Social | Political | Rule of law | Areas |
| Economic | Technological | Military | Education | Structures |
| Social | Economic | Economic | Commercial | Capabilities |
| Technological | Environmental | Social | Humanitarian | Organization |
| Legal | Political | Infrastructure | Health | People |
| Environmental | Legal | Information | Information | Events |
| | Ethical | | Military | |
| | Military | | Economic | |
| | | | Diplomacy | |
| | | | Administration | |
| | | | Governance | |

*Source:* Allied Joint Publication-5, *Allied Joint Doctrine for the Planning of Operations*, Edition A, Version 2, with UK National Elements (Change 1) (Brussels: NATO Standardization Office, May 2019), UK fig. 3A.1, p. 3-21, https://assets.publishing.service.gov.uk/.

## Notes

1. See chap. 9, fig. 13, operational planning, sourced from JP 5-0, *Joint Planning*, fig. IV-1 (2020 ver.).
2. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, UK Annex 3A.2, 3-20.
3. AJP-5, 3-20.
4. Bousquet, "Cyberneticizing the American War Machine," 82–84.

Chapter 15

# Isolation Exercises in Warfare

## Constructing Quadrants of SWOT Logic

NATO-OPP and JPP rely exclusively on analytical models throughout the steps and sequences of their decision-making methodologies. Among a host of models is SWOT (strengths, weaknesses, opportunities, and threats) analysis, which is implied in joint doctrine but specifically highlighted in allied joint doctrine. NATO-OPP asserts that SWOT analysis, "frequently used in strategy formulation, helps to identify the (internal) strengths and weaknesses, and (external) opportunities and threats associated with a particular object (for example, country, group, organisation or tribe)."[1] Note that the term "formulation" metaphorically casts the activity within a mathematical expectation of objectivity, certainty, predictability, and a stable system in which to render input-output causal relationships. Once more, we see the natural science laboratory employed, with "internal" bounding the declared friendly forces and "external" bounding the outside environment. Lastly, NATO-OPP specifies that just as with COGs, SWOT analytical threats and opportunities observable in the externalized environment must be tangible *objects*, enabling systematic logic and analytical optimization.

Unlike COGs that originate from the Napoleonic era of warfare and Clausewitz's book On War, SWOT as a categorization model and heuristic aid did not come from a military theorist, leader, or organizational best practice. Instead, SWOT (in its recognizable contemporary framework) derives from modern business strategy applications first popularized by commercial industry in the mid-twentieth century. Yet epistemologically, its conceptual origins appear to link back to military decision-making. The abstract meanings behind SWOT likely are inspired from World War II constructs that migrated out of the military in the post-1945 exodus of military professionals into the civilian workforce. Concepts such as "strategy" and "strategic analysis" would enter industry and mature in the 1950s–1960s, with models like SWOT gaining popularity.[2]

After popularized in industry and marketed in the 1980s–1990s in training programs and leadership books, SWOT analysis would migrate back into military practice. It is significant that SWOT as a categorization model was designed for business and not warfare. Moreover, its purpose and organizing logic is devoid of the scientific methodologies, objectivity, and complexity theory considerations joint and NATO forces likely require—and may even assume their decision-making methodologies already possess. SWOT analysis considers competition "from a company-centered view within the confines of a given industry," which is situational and relative.[3] Complexity theorist Eric Dent critiques strategic efforts with SWOT:

> This [traditional view] of strategic planning . . . includes developing a vision, a mission, identifying stakeholders, and doing a SWOT (strengths, weaknesses, opportunities, and threats) analysis. This type of analysis assumes that the environment presents opportunities and threats, not that the organization is an active player in creating opportunities and/or threats. [H. Richard] Priesmeyer (1992) adds that the traditional strategic planning model is inaccurately simplistic because "it suggests that one can understand the state of the system by assessing current conditions, when in fact an understanding of evolving conditions is important."[4]

Yet today's NATO and joint forces are hardly alone in using SWOT in their methodologies and doctrine. Accredited to Kenneth R. Andrews, the SWOT analytical model has been widely adopted in marketing strategy, business strategic development, and commercial enterprise since the 1960s. Andrews sought to develop a more useful corporate strategy by "aligning environmental opportunity with corporate capability . . . in deciding what strategy should be. . . . Its principal sub activities include (1) identifying opportunities and threats in the company's environment . . . and (2) appraising the company's strengths and weaknesses. The strategic alternative which results (is) a matching of opportunity and corporate capability."[5] NATO and joint staff might recognize the industry-oriented origins of SWOT analysis as nonmilitary and independent of many of the security concerns for armed forces at the joint planning level and in national, strategic, and transregional contexts.

SWOT analysis is a tool developed for business strategic analysis and addresses the tensions between external developments and internal capabilities. The lack of any scientific or academic publication of SWOT analysis in military, health care, or other professions and disciplines is alarming in that its widespread popularity appears entirely as a process-specific, heuristic aid of unknown and potentially unscientific persuasion.[6] NATO and joint forces might consider if contemporary doctrine employs or promotes SWOT analysis because of legitimate analytical rigor or the institutional pull of joint planning processes and convergent behaviors in intelligence communities.

SWOT analysis is associated with a rationalized approach to management in business enterprise. At the abstract level, practitioners using SWOT assume that the environment and problem set they are focused on feature certain characteristics. These include the following: the centralized hierarchy of the organization leads with strategy in a top-down fashion; organizations are autonomous, and therefore NATO, a division-sized task force, or the West Virginia National Guard can apply SWOT to design new strategic or operational paths; organizations have clear demarcations (clear internal and external factors to analyze); and the organization is rational and should use reductionism and systematic logic to "solve complex problems."[7] Criticism of these assumptions is addressed next and is significant to NATO and joint forces because complex, dynamic systems *tend to reject the very premises* SWOT analytical reasoning rests upon. If we are conducting security activities in complex, dynamic conflict settings and facing creative, learning adversaries, we might be overinvesting in SWOT. By using it in contemporary military decisionmaking and doctrine, we are omitting alternative models and heuristic aids that could provide deeper insights.

First, SWOT functions on an implicit premise that centralized hierarchical organizations will generate overarching strategies via what is systematic logic (known input leads to desired output; A plus B formulaically results in C). Systematic logic here works so that declared ends are linked to ways and means in a reverse-engineered, sequential, linear process that forces the future to converge toward the present state exactly how the organization declares it must in response to planned actions.[8] Second, the autonomous aspect of SWOT violates modern organizational framing of networks and networked systems. In systems theory, complex systems are perpetually acting and influenced by many actors and organizations, often through loosely coupled systems of interdependent units. Interdependence is the norm and not the autonomous, isolated, and clearly defined entities SWOT expects for analytical optimization. NATO doctrine states that SWOT analysis contributes to operational analysis in that "a problem situation can thus be understood as a balance between protecting strengths, minimizing weaknesses, exploiting opportunities and mitigating threats."[9]

Readers may spot the Newtonian physics metaphors that reveal the deeper epistemological choices made in NATO doctrine. "Balance" suggests a classical physics challenge in warfare, while the rest of SWOT seems nested in the Clausewitzian metaphoric devices that "war is a duel but on a larger scale." Or as a former Joint Chiefs of Staff chairman said, "A good boxer's stance conserves energy while keeping the fighter balanced, protected, and ready to throw quick, powerful punches."[10] SWOT analysis implicitly directs military conceptualization of conflict into oversimplified physics and systematic, isolated contests of will where actions appear in linear-causal fashion.

The SWOT assumption of clearly demarcated organizations also hails from classical management theory (fig. 32). Its acceptance peaked in the 1950s prior to the awareness of systems theory, complexity theory, chaos theory, and social paradigm theory. SWOT thus requires "closed systems" and cannot account for open, complex, and emergent systems that are the mainstay of contemporary security affairs. This is why military assimilation of the model occurred; Newtonian physics and natural science metaphoric devices pair perfectly with how SWOT analysis seeks to simplify reality analytically. The SWOT dependence on rational, centralized hierarchical organizations as the core form for analysis is another area for critique. This "machine bureaucracy" mindset is associated with modern military decision-making and based in turn-of-the-century early management schools such as Taylorism that spawned steep hierarchical processes in the World War I and II eras.[11] Today's security organizations and the dynamic, complex systems that produce challenging security issues are not susceptible to this sort of oversimplification.

The application of SWOT analysis reflects convergent thinking that reinforces institutional shared values, a belief system (good versus bad, right versus wrong, strength versus weakness) that lacks reflective practice. "Reflective practice," from sociology and organizational theory, involves strategists knowing how and why they think and act as they do within any set process or methodology. It is thinking about one's thinking and the basis for critical self-inquiry to transform an organization toward beneficial developments and innovation.[12]

**SWOT Analysis**

SWOT analysis is carried out using the brainstorming technique. The relevant factors of the internal and external environment (strengths, weaknesses, opportunities and threats) are determined and included in the SWOT analysis as shown in the table below.

| SWOT group | Abbreviation | SWOT factors |
|---|---|---|
| Strengths | S1 | Effective armored units |
| | S2 | Attack helicopter squadron |
| | S3 | Stability of command & control systems |
| | S4 | Fast maneuvering capability |
| | S5 | High motivation and leadership |
| Weaknesses | W1 | Camouflage unavailability |
| | W2 | Lack of intelligence about enemy units |
| | W3 | Wrong tactical organization in the battlefield |
| Opportunities | O1 | Close air support |
| | O2 | Artillery support |
| | O3 | Logistics support and flexibility |
| | O4 | Reserved units on demands |
| Threats | T1 | Geographical positioning difficulties |
| | T2 | Unsuitable weather conditions |
| | T3 | Enemy raid |

**Structuring the Decision Hierarchy**

Normally, the result of a SWOT analysis is a list structure. Hierarchical structure is built for the AHP [analytic hierarchy process] pairwise comparisons of SWOT factors and groups.

**Hierarchical view of SWOT analysis**

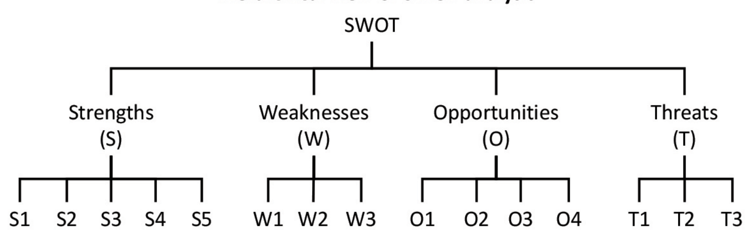



**Figure 32. SWOT analysis example used in a military proposed context.** (Reproduced from Ahmet Kandakoglu, Ilker Akgun, and Ilker Topcu, "Strategy Development & Evaluation in the Battlefield Using Quantified SWOT Analytical Method," Research Gate, January 2007, 3.1 and 3.2, p. 4. https://isahp.org/.)

SWOT analysis directs strategic planners to either generate their own group assessments of their categorical analysis or seek out stakeholders and prepare quantitative representations of majority positions. This process is consensus by convergent thinking. SWOT is based on "ideas, expertise, and assertions of experts. . . . The analysis lacks empirical testing." Further, the process itself is "superficially descriptive and mechanistic."[13] Often, as critics of SWOT analysis point out, "an important goal of SWOT-analysis is organizing support among stakeholders. . . . Some claim this was the only goal because SWOT-analysis only confirms what they already know."[14] SWOT analysis is, according to critics, "a catchy acronym that remains rooted in vagueness, which oversimplifies its findings and has numerous limitations."[15] SWOT "is not really an analysis or diagnosis at all. It is simply a list and categorization of the internal and external situational factors related to the subject that you're evaluating."[16] SWOT is often the result of a brainstorming session and produces piles of brief descriptions without any analytical rigor beyond assigning each descriptor to part of the quadrant.

NATO and joint planners might assume that SWOT analysis in mission analysis or subsequent "course of action" developmental steps provide some scientifically valid, objective evaluation that also engages with complexity. Thus, emergent, often difficult-to-anticipate outcomes to complex security activities can be made more easily understood for clear commander decision-making. SWOT analysis does not provide this clarity at all, except perhaps in the simplest security contexts that themselves hardly warrant such intense staff investment. Instead, SWOT is "a social process . . . mostly based on opinions and intuition. . . . It is more about rallying support among stakeholders than about optimizing rationality."[17] The analytical aspects of SWOT are limited in several ways potentially unrealized by military planners conditioned to plugging information into the quadrant to formulate causal outputs. In our often unrecognized "problem-solution" warfighter orientation of the modern military decision-making framework, "our natural instinct is to jump to solutions, particularly when it comes to listing opportunities."[18] With the reverse-engineered "future desired end state" established in advance, it becomes almost unavoidable to identify opportunities that seem to light a clear path from the present to that envisioned destination.

SWOT also tends to focus on increasing unit convergent thinking (groupthink), enabling potential conformation biases and oversimplifying acknowledged complex adaptive systems for the sake of reinforcing institutionalisms on how NATO or joint forces ought to conduct complex decision-making. SWOT promotes a linear, mechanistic single-frame future outlook. The organization launches toward a single desired goal, and SWOT supports organizational investment in which course to chart to arrive at that preconceived destination. What "strength" and "weakness" mean today to an organization is a limited, often heavily biased snapshot in time. Complex emergent systems prevent tomorrow's unknown "strength" or "weakness" from being linked clearly and predictably from today's or yesterday's strategic beliefs. If anything, today's beliefs are focused backward on the historical precedent of multiple yesterdays.[19] This perspective does not help in designing toward complex futures and often contains the seeds of counterintuitiveness and irrelevance. Tsoukas frames this important construct:

> Too heavy an influence by the past results in incapacity to see what has changed in the present and what is the likely shape of things to come. This is a problem inherent in formal organization. The latter tends to perceive the world predominantly in terms of its own cognitive categories, which are necessarily derived from past experiences. The world may be changing but the cognitive system underlying formal organization, a system that reflects and is based on past experiences, changes slowly.[20]

One last reason NATO and joint forces ought to consider modifying or replacing SWOT analysis (and other similar models) in their formal decision-making methodologies entails what it attempts to do at a process level. The quality of data that enters the analysis is often anecdotal or of well-intended supposition. SWOT was originally developed in the analog, predigital information era. Often, strategists insert information they determine is relevant but neglect information they do not possess or determine irrelevant based on subjective value propositions (good, bad, strong, weak) from the model. SWOT was never intended to lead to a clear plan of action either. Rather, "the resulting document is typically less than insightful and does not offer a clear path to action. . . . It is merely a snapshot of the current situation—or, worse, a snapshot of what's currently on the minds of brainstorming session attendees."[21] We open ourselves up to racing toward volumes of information collected so that we can maintain the original belief system (and subsequent desired goals, objectives, missions, roles, and purposes) without critically self-examining why we maintain these biases. The SWOT exercise can in fact compound institutional biases while creating an illusion of critical thinking.

Lists of things are simply that; they do not substitute for scientific research and thinking inductively or, better yet, abductively. Unlike deductive and inductive reasoning, abductive reasoning is best associated with design and appreciates complex, dynamic systems preventing any specific observations carrying into general conclusions (inductive reasoning) or general rules tested to result in specific conclusions (deductive reasoning). Abductive reasoning attempts to make a probable conclusion within a systemic view that recognizes the observation as incomplete (missing parts or perspectives due to a complex system being impossible to ever understand fully). The conclusion itself will be *tailored and contextual, and it might be applicable in this instance but not the next*. Complex systems are dynamic, meaning they are learning, changing, mutating, or emerging as we think and act within them. Abductive reasoning recognizes that our own reasoning attempts will influence the system to depart from the context this abduction occurred within. Thus, the system will potentially shift (and in systemic drift as well) toward a novel configuration where new abductive reasoning must be applied to a fresh, changed context. Deductive and inductive logics are readily associated with analysis, while abductive logic associates best with systemic (synthetic) thinking that is unlike analytical, systematic thinking.

SWOT permits deductive reasoning to masquerade in the form of analytical reasoning, often at the expense of the organization attempting to cure itself of leaping to favorite solutions. SWOT "lacks guiding policy. . . . It is simply a statement of facts, and not all of them."[22] Arguably, the facts themselves are likely inserted into the process through nonscientific, potentially arbitrary criteria. The traditional SWOT analysis "and its outputs do not constitute analysis at all, because they are superficially descriptive and only of general perception. . . . SWOT analysis is usually exercised as a simplified process which, for the most part, leads the strategic planning to major inefficacies."[23] SWOT-like activities can add value, but often they allow an organization to continue bad practices instead. The ritualization of Newtonian-styled language, metaphoric devices, and underlying belief systems about war into an analytical, closed-system model produces outputs often riddled with bias. Yet SWOT is far from being the only unscientific, bias-riddled military model employed in modern military decision-making.

**Notes**

1. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, 3-20.
2. Shaw, “Marketing Strategy,” 33.
3. Chen and Miller, “Relational Perspective as a Business Mindset,” 12.
4. Dent, “Complexity Science,” 13.
5. Shaw, “Marketing Strategy,” 41.
6. Wijngaarden, Scholten, and Wijk, “Strategic Analysis for Health Care,” 35.
7. Wijngaarden, Scholten, and Wijk, 38.
8. Tsoukas and Hatch, “Complex Thinking, Complex Practice,” 992–93.
9. AJP-5, *Allied Joint Doctrine for the Planning of Operations*, 3-20.
10. Dunford, “Maintaining a Boxer’s Stance,” 2.
11. Mintzberg, 191–92; Waring, “Taylorism and Beyond”; Waring, *Taylorism Transformed*; Paparone, *Sociology of Military Science*; and Paparone, “How We Fight.”
12. Schön, *Reflective Practitioner*; Paparone and Reed, “Reflective Military Practitioner; and Visser, “Schön: Design as a Reflective Practice.”
13. Vlados and Chatzinikolaou, “Restructuration of the Conventional SWOT Analysis,” 77.
14. Wijngaarden, Scholten, and Wijk, “Strategic Analysis for Health Care,” 44.
15. Vlados and Chatzinikolaou, “Restructuration of the Conventional SWOT Analysis,” 77.
16. Minsky and Aron, “Are You Doing the SWOT Analysis Backwards?”
17. Wijngaarden, Scholten, and Wijk, “Strategic Analysis for Health Care,” 44.
18. Minsky and Aron, “Are You Doing the SWOT Analysis Backwards?”
19. Daft and Weick, “Model of Organizations as Interpretation Systems,” 287; and Tsoukas, *Complex Knowledge*, 242.
20. Tsoukas, “What Is Organizational Foresight?,” 273. Tsoukas cites Blackman and Henderson.
21. Minsky and Aron, “Are You Doing the SWOT Analysis Backwards?”
22. Briggs, “Death of the SWOT Analysis.”
23. Vlados and Chatzinikolaou, “Restructuration of the Conventional SWOT Analysis,” 76.

Chapter 16

# How Bombing and Demolition Formulas Carved Illusions of Control

Militaries do love categorization models that can be remembered with useful mnemonics in the form of indoctrinated acronyms. We have COGs, SWOT, and COAs. We assess courses of action with yet another mnemonic, AFDSC (acceptable, feasible, distinguishable, suitable, and complete). Thus, COG and SWOT analysis are far from the only analytic-oriented categorization models NATO and joint forces employ in modern military decision-making. In NATO-OPP and JPP targeting cycles and analysis, intelligence analysts perform elaborate calculations on potential vulnerabilities from enemy center of gravity assessments. COGs as a construct are foundational to most other NATO-OPP and JPP activities (the industrialized West's preferred decision-making methodology),[1] with a range of suggested or directed targeting models used to determine how to target enemy infrastructure, personnel vulnerabilities, and facilities, units, cultural or symbolic structure or things deemed critical for enemy operational or strategic strength. We even establish our military targeting through more of these mnemonic, pseudoscientific models that, like SWOT, are entirely convergent toward groupthink and reliant on systematic and reductive processes.

Historically, the DOD has employed two primary targeting models in decision-making. Both are acronym-based and use weighted matrixes to cumulatively determine "a relative value as a target or the overall level of vulnerability" to apply violence of action toward some tangible thing in war.[2] The first targeting model is CARVER, and the second is MSHARPP.[3] Both are categorization models for converging analytical content so that planners can file and sort data to make subsequent value assessments via formulaic relationships through deductive logic. As MSHARPP and CARVER are structurally similar and employed in Army planning doctrines and NATO-OPP and JPP activities, the older CARVER model is examined next.[4]

The CARVER model predates MSHARPP and is extensively used by engineering, aviation, and special operations forces for targeting enemy structures, forces, and social networks, such as terrorist groups or improvised explosive device (IED) cells. These categorizing models employ matrixes and established values to quantify some cumulative number or score. The scoring is used for decisions by leadership and is directly linked to enemy COG vulnerability assessments. Once again, NATO-OPP and JPP processes are hierarchically nested and branched in a reverse-engineered, linear-causal mode of systematic logic. Quantifiable inputs link to historically established outputs. Destroying those critical sites linked to an enemy's operational COG vulnerability in time and space should advance a campaign toward reaching strategic goals along clear lines of operation or effort. A wide range of objects might be assessed through a series of COG, SWOT, MSHARPP, and/or CARVER analytical processes. They branch and nest hierarchically from larger strategic contexts to operational and subordinate tactical, scaled contexts, cross-referenced by geographical and unit mission specialization. Special operations forces—the original creators of CARVER—would use the model to demonstrate direct support of broader (non-SOF) and higher operational or strategic objectives. As of 2017, the joint staff employs various CARVER models and versions for aiding their targeting process.[5]

The CARVER matrix is a target acquisition system developed by US special forces during the Vietnam War (based off earlier World War II specialized warfare techniques). Essentially, it is a reductionist, linear, and systematic heuristic aid (model) to identify and rank specific military targets so that offensive resources are used efficiently. CARVER uses analytic optimization and again demonstrates the military preference to assign some perceived objectivity to as much of reality as possible in a deliberate effort to rationalize decision-making in warfare. CARVER matrixes use a table of numeric values, assigned by analysts to a target, with quantified totals that provide a "target score" for each potential target. The better the score, the greater the expected military payoff. Risk is put into a parallel assessment that corresponds with whether the increased risk meets leadership demands to accomplish the targeting promised payoff if executed. In the twentieth century, these formulaic models would render many warfare activities into elaborate, cold, mathematical problems where bombs, bodies, or kilometers of controlled territory could be reduced to whether one side was increasing or decreasing its chances of imposing its will on the opponent. In total war, the "totality" could be quantified in ways that could always link to kinetic and tangible things that might be articulated using the explicit knowledge of the modern warfighter.

Using CARVER, analysists determine a prioritization of resources under the assumption that targets with higher or larger totals likely require more unit resources (e.g., time, money, tools, personnel). CARVER itself is part of a military movement during the Cold War where systems analysis reigned supreme. Analysts sought to "quantify every single factor of a strategic bombing campaign . . . the vulnerability of the target, the bomb's 'kill probability'—and put them all into a single mathematic equation" as RAND researcher and father of systems analysis, Edward Paxson, would attempt in planning for nuclear war against the Soviet Union.[6] Special operations in the Vietnam War developed this targeting methodology directly from these systems analysis origins. A simplified version of the CARVER matrix from contemporary US Army doctrine is depicted below (table 2).[7] More sophisticated versions have also been promoted across joint and special operations forces, attempting to quantitatively strengthen the weight criteria of how CARVER categories are assessed.[8]

**Table 2. CARVER matrix example**

| Potential targets | C | A | R | V | E | R | Totals |
|---|---|---|---|---|---|---|---|
| Commissary | 5 | 7 | 10 | 8 | 8 | 10 | 48 |
| Headquarters | 1 | 4 | 10 | 8 | 6 | 6 | 35 |
| Communications center | 10 | 10 | 6 | 8 | 3 | 4 | 41 |

*Source:* Army Tactics, Techniques, and Procedures (ATTP) 3-39.20, Police Intelligence Operations, July 2010, table 5-5, 20, https://irp.fas.org/.

CARVER was originally intended as a means for analysts to determine where bomber pilots could most effectively drop their munitions on enemy targets, with special operations aviation employing advanced technology, experimental methods, and sensitive activities against difficult or politically delicate objectives.[9] Special operations bombing came with significant risk, and justification to execute dangerous, often covert missions required this mathematical rationalization to frame "risk" to "reward." The level of destruction would factor in similarly; destroying a hardened bunker in a high-risk location using covert assets (bombing or demolitions) would require a CARVER worksheet to meet leadership concerns for kinetic payoffs. Unlike SWOT that was developed in the business world for commercial enterprise and later adapted by the military, CARVER is the reverse. It was designed for analytical optimization in modern warfare bombing decision-making but has been snatched up by industry. Today, CARVER is frequently sold online by ex-military as a "qualitative and quantitative" assessment tool. It is promoted as a way corporate leaders might expect to learn secrets of how to annihilate industry competitors just like special operators and the Central Intelligence Agency (CIA) targeted the North Vietnamese.[10] The exchange of military and industry models across the professions has a certain irony when viewed comprehensively in the historical context.

CARVER as a method functions to emphasize "*criticality, recuperability*, and the short- and long-term effect on the threat network" (emphasis in original).[11] However, examples of SOF units applying CARVER in the 1960s–1970s for bombing targets and demolition activities shifted in the post-9/11 period to social networks and far more complex security challenges. Small special operations teams would attempt to understand, map, and target socially complex insurgent IED networks using the same mathematical and engineering logic of CARVER. The subjective, irrational, emergent, and nonlinear behaviors of human beings were analyzed as if they were akin to hardened targets.[12] This application becomes problematic because elements that cannot be assigned a number or articulated in pure mathematical analytic terms or logical relationships will be excluded, ignored, or marginalized.

The claim that CARVER supports qualitative and quantitative data is tenuous. Its advocates write most of the current literature, promoting CARVER certifications, classes, consulting, or programs to corporate and defense organizations in a commercial sales manner.[13] Limited legitimate academic research exists on the methodology outside of self-serving promotional documents, opinion pieces, and nonscientific reports written by what appear to be special interest groups or career military analysts emotionally invested in various models or practices. CARVER is a closed-system model for analytic optimization; any appearance of mathematical precision outside of simple kinetic ratios is projected (usually inappropriately) onto a security context extending well beyond determining the size of a bomb to collapse a bridge.[14]

A military force certainly can use CARVER to destroy a critical bridge, but expectations that the kinetic destruction of a bridge somehow leads to a behavior change of enemy forces in the area cannot be reduced to such oversimplifications.[15] Such models attempt to render complex security situations into vertical chains of linear-causal activities that can be isolated, knocked over like a row of dominos, and controlled by the stakeholder with superior technology, information, and capability to act. This premise violates the characteristic of emergence in complex systems. Emergence generates nonlinear processes and a dynamic, complex reality where initial desired future frames (ends, goals) are often later realized as entirely wrong, counterproductive, or nested in a legacy system framing the emergent future has little to do with.[16] One can destroy the bridge, but how that action ripples through time and space cannot also be understood *with the same quantitative targeting model* used to seek and destroy the bridge. While wars are complex, many things in war can be quite simple. It is when analysts expect the characteristics of simplistic systems to extend to the complex or chaotic that they begin to misapply models, methods, and belief systems.

Readers with extensive military engineering backgrounds might balk at these criticisms concerning CARVER in that under specific, arguably narrow conditions such kinetic targeting can and does work in warfare. Categorization models reliant on systematic logic are the best option when those conditions exist within any system. A specific weapon effect will physically create predictable damage to a hardened bunker if a demolitions team intends to destroy that target. However, when military forces extend these precise formulas outside the narrow technical or local limitations in warfare, targeting models like CARVER become problematic. In another example, when NATO forces were building barracks for Afghanistan security forces, engineers first built Western-style buildings inappropriate culturally, technologically, and economically for the Afghans. Millions of dollars of damages, losses, and waste occurred despite the engineers building perfectly sound buildings. Afghans destroyed porcelain sinks and toilets squatting or standing on them, burned wood in indoor electric stoves when out of power in the winter, and sweltered in the hot summer, looking at expensive air conditioning systems that were dormant due to a lack of Afghan diesel.[17] The engineers correctly built incorrect structures without understanding beyond the frame limits of their Western design. CARVER targeting applied outside of precise, technical applications will produce similar failure, waste, and confusion.

Such unanticipated results occur because CARVER works under a cognitive framework of reductionism and rationalism. Tsoukas states that "traditional mission analysis, a hallmark of reductionism, is ineffective except perhaps for assuring that routine and engineered-type tasks are performed in support of localized craftwork and emergent tasks" (those things that cannot be done exclusively with reductionism/rationalism logics).[18] Rationalism—working in conjunction with reductionism (breaking things down to seek out fundamental governing principles/laws and simplification)—attempts to standardize actions into task lists and prescriptive doctrinal instructions. Rationally derived activities such as CARVER orient toward predetermined, objective end states where all contributing sub-actions (e.g., CARVER activities linked together in a chain of sensitive activities) will add up to the overall meaning for the action desired (the campaign, strategy, overarching goal). A recent article on the subject notes that "the CARVER method is the prevailing Special Forces targeting framework related to center of gravity (COG) analysis," which by extension draws JPP methodological frameworks into how special operations and joint forces consider targeting.[19]

CARVER (and similar analytical models in JPP/NATO-OPP) emphasizes quantitative interpretation of data by artificially masking subjective and qualitative aspects of a complex system through renaming and labeling the phenomena in a purely analytical expression. Doing so is an example of cybernetic thinking originating in the technological advances of World War II and would subsequently become standardized into a linear, mechanistic, and systematic formulation for kinetic military effects. Cybernetics is not a traditional scientific discipline. Rather, it is "a convergence of engineering techniques, scientific ideas and philosophical principles under a common discourse that allowed the discussion and analysis of artificial machines, biological organisms, and social organization as equivalent systems of control and communication operating under a single set of principles."[20] CARVER originated from aerial bombing and was later applied to engineering applications for demolitions through special operations activities. This cybernetic logic for warfare developed in air and demolition applications; "the greater simplicity and homogeneity of the aerial and marine environments certainly played a crucial factor in the success of OR [operations research] since warfare in those milieus was easier to model mathematically than land operations."[21] Yet today, NATO and joint forces (particularly in special operations, sensitive activities, demolitions/engineering and sabotage operations, and aerial bombing applications) apply CARVER to sensitive activities well beyond the narrow confines of the simpler, homogenous kinetic (strike-hardened site with ordnance of certain size) contexts.

CARVER, originally called CARVE, originated in the Vietnam War and first made its way into target analysis for the CIA, special operations in the US Army, and covert activities in the Vietnam Conflict. In one of the few military-oriented articles on CARVER, Leo Labaj notes that the "CARVER methodology was developed in the mid-1970s to meet the emerging threat of international (or global) terrorism. As the acronym implies, 'CARVER' was born out of the earlier 'CARVE' method. CARVE was defined as an offensive methodology used to identify a target or asset that, if compromised, meets a prescribed strategic or tactical objective."[22] This systematic approach appeals to objectivity in warfare, yet modern militaries continue to assume that techniques and methodologies that function in simplistic or complicated system settings ought to be extended into the complex. For CARVER and many other kinetic-oriented constructs, one cannot seek simplification of complexity or force best practices to engage in situations where only novelty and fluid experimentation generally work best.

Labaj indicates that CARVE examined potential targets to determine military/intelligence importance, priority of attack, and weapons required to obtain the desired level of damage or casualties. CARVE would commence with a statement of requirement. Labaj notes that "a target analysis would then begin at the system (strategic) level and eventually work its way down to the asset of interest (tactical)."[23] This process demonstrates a centralized hierarchical form (top to bottom linkages) and an implied systematic (input to desired output, linear-causal) logic of a closed system. We will later expand on this reductionist, rationalist construct on the limitations of CARVER (and SWOT, COG analysis). Labaj also identifies "closed system logic" as the purpose for using CARVER today in the twenty-first century. He affirms that "global terrorism has become an unbounded reality, utilizing more aggressive, horrific, and deadly tactics. To meet this emerging threat, more advanced target, or asset, hardening is imperative."[24] The term "unbounded reality" illustrates a desire for a functionalist paradigm core belief. That reality can be stable, bounded, and uniform in structure for analytic optimization and knowledge curation that is cumulative and increasingly accurate with refinement over time.

Essentially, warfare must obey fundamental laws and rules—mirroring the classical mechanics of physics so that military "science" can bring order and reliability to analysis, risk reduction, prediction, and control through centralized hierarchical forms relying on systematic logic. The RAND Corporation's vulnerability assessment guide featuring COG and CARVER analysis states, "A corollary approach [to answering the question of 'center of gravity of what?'] is to imagine destroying a single element of the adversary's resources and estimating how this would affect friendly ability to produce the desired end state."[25] This reasoning again demonstrates systematic logic, where quantitative inputs are paired sequentially (linear-causal) with expected outputs. These activities can be objectively linked in time and space to move incrementally forward to predetermined, pre-assessed, and envisioned strategic end states. Army planning doctrine further states that "targeting methodology [such as CARVER] is designed to facilitate the engagement of the right target, at the right time, and with the most appropriate assets to achieve effects consistent with the commander's intent."[26]

Original CARVE matrixes were, according to Labaj, "primarily qualitative in nature and were solely based on the experience of the assessor. . . . No single methodology prevailed; as a consequence, there was no consistency in assessment results."[27] The inability to quantifiably (versus qualitatively) measure in warfare demonstrates an institutional bias toward hard science, endorsing the core logic of classical mechanics reasoning underpinning modern military decision-making. This Newtonian-styled logic is how society began to approach the world from the late seventeenth century onward.[28] Labaj suggests that "what was needed was a more nuanced and quantifiable approach to the vulnerability assessment process to ensure that scarce resources could be applied where they would do the most good."[29] Yet just as in SWOT analysis, "good" and "bad" are entirely subjective value propositions generated by the organization through a shared belief system and limited to largely immediate, simplistic causal rationale.

The systematic logic paired with reductionist models does not bode well for any security context outside of a simplistic or complicated one. For instance, if a joint task force using a SOF asset encounters a potential target in a Mexican narco-cartel moving Chinese fentanyl through the US southern border, a linear/simplistic assessment may look at covertly destroying the shipment in convoy. However, if that cartel is expanding territory and threatening the larger Sinaloa Cartel nested in broader strategic goals in that area, is it "most good," "less good," or perhaps "some other good" to consider not targeting it at all and allowing an intra-cartel territorial battle to damage the Sinaloa Cartel? Such quandaries are where closed-system analysis and reductionist, categorical models, including CARVER, tend to fail. As CARVER gives all decision criteria equal weights, organizations employing this targeting model again rely on internalized belief systems and value sets to rationalize how a commander or planner weighs or ranks the elements analyzed.[30]

In a closed-loop form of nonreflective thought and action, a military force can identify the target, assess vulnerabilities, seek and destroy the target, and collect information to assess an opponent's effectiveness. Of the potential targets any joint force commander might consider, the organization conducts detailed analysis and assessment of only targets acted upon while those not acted upon are considered outside the scope of focus. Further, all assessments are recycled through the same language, metaphoric devices, and targeting/assessing models in a vertical, hierarchically nested chain of linear causality. Targeting a first objective and destroying it advances the script forward to preplanned lines of effort. The organization moves to the next target in a series of many future targets (all identified and assessed by the same models/terms/methods) to eventually reach strategic goals in the desired future state.

The Vietnam-era CARVE model would become popular in the 1980s onward in broader military planning and doctrine despite the Vietnam War ultimately being criticized for overemphasizing kinetic actions and statistical analysis of objects (body counts, tons of explosives dropped, infrastructure destroyed, enemy captured). Despite this critique, CARVE was changed to CARVER by extending the original assumption that systemic effects could be factored into some preconfigured (before acting within a complex system) and systematic reasoning. CARVE became CARVER so that "Effect was added to quantify consequences, Recuperability was changed to Recoverability and Espy (catch sight of) to Recognizability—CARVE was transformed and modernized to meet an evolving threat."[31] Note that proponents of CARVER would attempt to extend the utilization of that model into future conflicts by seeking to "evolve" the model so that it might parallel a suggested evolution in modern warfare.

The RAND organization would add that CARVER "focuses on the enemy's viewpoint to enable an analyst or assessment team to determine *the hardness or softness* of assets in criminal or terrorist actions" (emphasis added).[32] Once again, we see a Newtonian physics epistemological position in the metaphoric devices and language used with CARVER. Despite how NATO-OPP and JPP acknowledge that dynamic, ever-learning complex systems require different ways of thinking in warfare, analytical tools in doctrine such as CARVER seek to categorize complexity in natural science descriptors with "hard," "soft," or similar physical domain, tangible coding. This is, as military practitioner Bill Moore critiques, a failed approach to thinking about networks and warfare.

Unfortunately, this EBO-like process has manifested in other ways, with US forces inappropriately applying a CARVER matrix to terrorist and insurgent organizations. Doing so resulted in the failed network approach where one attempts to destroy an insurgency by killing or capturing its so-called key nodes (important individuals). In limited cases this method will work, and in most cases it is a key supporting role but not at the expense of failing to protect the population. What worked in Iraq, where the focus was protecting the populace, were large-scale population control measures that the surge enabled.[33]

Military analysts likely fall right into this bias for rendering complex warfare into objective Newtonian stylings when considering the mental models and social framings/decision-making patterns of those adversaries outside their own culture, group, and social paradigm context. What we project (often falsely) onto others helps reinforce our own belief systems. As science and technology have assumed a nearly indisputable status in modern society, "they have [also] acquired unprecedented ideological powers. . . . The things, meanings and processes that are deemed normal, natural, and ordinary are rarely questioned."[34] Military staffs, strategists, and analysts fail to question whether a network of living, thinking humans can ever be assessed meaningfully using mathematical or engineering constructs. Moreover, they often are pressured institutionally to obey and accept such ideas codified in military doctrine. The metaphoric devices exhibited in "hardness" and "softness" illustrate classical mechanics (Newtonian reasoning) that may have value in quantifiable, technological, and immediate tactical aspects of weapon effects (for CARVER targeting). However, they are likely irrelevant or wild guesses in social, cultural, and systemic (strategic, complex, dynamic) contexts of the broader security challenge.

**Notes**

1. The Westphalian, Clausewitzian, Newtonian frame for warfighting is used across the industrialized West. See Ben Zweibelson, *Understanding the Military Design Movement: War, Change and Innovation* (Routledge, 2023), 74–94.

2. Schnaubelt, Larson, and Boyer, *Vulnerability Assessment Method*, 29.

3. MSHARPP refers to mission, symbolism, history, accessibility, recognizability, population, and proximity and CARVER to criticality, accessibility, recuperability, vulnerability, effect, and recognizability.

4. ATTP 3-39.20, *Police Intelligence Operations*, 5-18–5-20.

5. Greaver et al., "CARVER 2.0," 9.

6. Bousquet, "Cyberneticizing the American War Machine," 91.

7. The term "contemporary" is used here not in the military doctrinal sense but in an academic sense, as military doctrine is decidedly nonacademic. Despite new doctrine automatically replacing earlier versions (an ideological and not an academic or scientific process), the military as an institution continues to use concepts, terms, and practices often superseded by some new version because the institution still views such content as relevant and useful.

8. Greaver et al., "CARVER 2.0."

9. Bencie and Araboghli, "6-Part Tool for Ranking."

10. Security Management International, LLC, "CARVERCON 2021."

11. Eriksson and Pettersson, *Special Operations from a Small State Perspective*, 167.

12. Awe, "Trying to Work Smarter."

13. Security Management International, LLC, "CARVERCON 2021."

14. Original CARVER, CARVE, and other demolitions and bombing formulas are entirely objective and quantifiable. Scientists can determine the necessary explosive ordnance to use against a hardened target with proper information and calculations. Yet outside this limited, technological setting, military forces have misused these targeting calculations for things that cannot be reduced to mathematical certitude.

15. In classical military contexts purely expressed in physical domains, a destroyed bridge will force an enemy armor unit to find an alternative crossing point. Outside these complicated, even simple system contexts of immediate, tactical, and local "cause-effect" dynamics, such logic becomes entirely inappropriate.

16. Bedau and Humphreys, "Philosophical Perspectives on Emergence," 7–18; Hempel and Oppenheim, "On the Idea of Emergence," 61–68; and Stanley and Lehman, *Why Greatness Cannot Be Planned.*

17. Partlow, "Helping Afghanistan Build Up Its Security Forces."

18. Paparone, *Sociology of Military Science*, 97.

19. Greaver et al., "CARVER 2.0," 111.

20. Bousquet, "Cyberneticizing the American War Machine," 81.

21. Bousquet, 90.

22. Labaj, "CARVER Methodology," 43.

23. Labaj, 43.

24. Labaj, 44.

25. Schnaubelt, Larson, and Boyer, *Vulnerability Assessment Method*, 13.

26. ATTP 3-39.20, *Police Intelligence Operations*, 5-20.

27. Labaj, "CARVER Methodology," 44.

28. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 990; Tsoukas and Dooley, "Towards the Ecological Style," 730; and Gharajedaghi and Ackoff, "Mechanisms, Organisms, and Social Systems," 290.

29. Labaj, "CARVER Methodology," 44.

30. Greaver et al., "CARVER 2.0," 2.

31. Labaj, "CARVER Methodology," 44.

32. Schnaubelt, Larson, and Boyer, *Vulnerability Assessment Method*, 29.

33. Moore, "Council Weighs In" (blog).

34. Malešević, *Sociology of War and Violence*, 334.

# PART 3

# Designing Military Decision-Making Systemically

Chapter 17

# How Do Entrenched Institutional Processes Prevent Innovation?

The term "synthesis" is critical to how operators must purposefully shift from systematic logic and embrace reflective practice through systemic design. Modern militaries invest entirely in analytical thinking and have little appreciation for synthetic thinking as indicated in modern doctrine, education, and training and their decision-making methodologies. Complexity theorist Russell Ackoff explains synthesis, its difference from analysis, and how organizations tend to misunderstand the relationship of both efforts toward complex systems:

> The perceived wrongs in a system can seldom be considered separately and removed one by one; wrongs are generally systemic properties that arise out of the interaction of the system parts. To right the wrongs one must deal with them holistically (synthetically), not analytically. Research is the paradigm of analytical thinking; design is the paradigm of synthetic thinking. Therefore, by redesigning systems, one can right its wrongs. But, . . . there are two types of wrongs: Doing things wrong (incorrectly), a matter of means, and doing the wrong things, a matter of ends. . . . Correcting these errors involves *doing things right* (efficiency), and *doing the right things* (effectiveness) (emphasis in original).1

NATO and joint forces have significant opportunities to transform much of their decision-making methodologies, targeting behaviors, models, language, and deeper institutional patterns, frames, and sensemaking constructs. Doing so requires a shift from exclusively analytical problem-solving (the current NATO-OPP/JPP) to strategic design and synthetic thinking. With the fall of Kabul, the return of some Cold War form with Russian and perhaps Chinese rivalries, the recent rise in aggression of non-Western adversaries, and emergent developments of unorthodox or unfamiliar nonstate rivals capable of organized violence, NATO and joint forces are at a crossroads. Clearly, there is a need for deep reflection and potential disruption and replacement of more than a few sections or steps in existing military decision-making.

Military organizations need to consider actions beyond restoration or maintenance of traditional or institutionalized military decision-making for strategic, operational, and tactical synchronization of forces for security challenges. NATO and joint forces can use design concepts and praxes to deconstruct existing organizational methodologies, behavior patterns, language, and procedures so that NATO-OPP, JPP, and other activities break out of repetitive, non-reflective cycles of convergent behaviors.[2] That is, "non-reflective practitioners, novice and experienced, work with single details in an elemental, procedural way which appeared to diminish their need to critically challenge proposed alternatives. . . . Non-reflective educators made the decision themselves about which problem solution would make the difficult situations somewhat more acceptable within the immediate context."[3]

Again, when militaries are engaged in single-loop thinking, they are stuck in a means-end framework that subscribes to how the modern military paradigm functions. Ironically, everything begins with the end; "ends are set and then a search begins for the best means of meeting those ends."[4] Organizations reliant on single-loop (non-reflective) thinking remain fixated on how to optimally achieve the desired or leader-directed ends, including end states, goals, or operational effects in an input-output (systematic) logical arrangement. They define and plan backward from only predetermined, institutionally validated ends while "other definitions of ends are either not recognized or not valued."[5] This approach is immediately observable when an organization identifies a single desired future or end state. Through war-game simulations or course of action selection and comparison, it then converges on a single, planned COA to reach a single predefined end corresponding to clearly understood and linked ways and means.[6]

Ackoff asserts that "creative solutions to problems are not ones obtained by selecting the best from among a well- or widely recognized set of alternatives, but rather by finding or producing a new alternative."[7] Yet COA production directs strategists and planners to follow institutionalized sequences of recognizable, historically validated forms of organized action, complete with doctrinally approved language. A lack of multiple futures, scenario planning, or strategic foresight indicates that alternative ends are not considered or valued. Linear-causal effects linking the present state through ways and means to desired future ends are the singular focus for analyzing and planning military activities. Further, when we dismiss any critical reflection of why we frame conflict in a centralized hierarchy of strategic-operational-tactical with no scientific basis because we feel it is simple enough to work sufficiently, we insulate ourselves from innovation. Doing the same things because they are familiar to the institution is useful as long as complexity humors the organization sticking with the concept. Change is painful only until the pain of failing to change garners sufficient attention.

Single-loop practitioners are also "task oriented, oriented exclusively to identifying the best means to meet their defined ends. Identification of ends and the best means to achieve them is not considered to be problematic. . . . The consciousness of single loop learners is non-reflexive, leading to an obsession with the best means to meet their defined ends."[8] Single-loop practitioners focus on "Are we doing things right?" and, more specifically, "How should we do an activity to accomplish something?" The ends are often accepted without critical examination beyond a rationalization that accomplishing a predetermined end will produce a desired output. This output is directly associated with the historically validated input where ways and means correlate to efficiency and control/prediction for cycles of input-output activities. Thus, "the means . . . is a search for a radically improved set of processes to do this."[9] Capability and capacity become woven together in an ever-tightening cycle of military decision-making through reverse engineering adhering to formulaic, systematic logic pairing inputs to outputs.

Accordingly, the organization asks what the goal is and then directs all movement toward its accomplishment. Evaluation of activities is based on analytic optimization, adherence to institutional practices and methods, and confirmation of the organization's historical input-output (problem-solution) knowledge curation. When the modern military institution considers NATO-OPP processes or some JPP variation, they generally demonstrate single-loop thinking. Regardless of where one is within the process, evaluation is conducted to determine what one is doing and how one might better execute the "what-centric" activity linking singular ends to institutionally defined ways and means. Similarly, after-action reviews in military training environments primarily assess performance according to how well one (individual or unit) adhered to the doctrinal sequence or methodology. They also examine how to adhere to it more effectively in a future attempt at the same training challenge.[10]

The modern military paradigm also incorporates double-loop thinking, as that becomes how the frame allows formal change without disrupting core frame structures. Double-loop thinking and learning advance warfighting *procedurally* by asking, "Are we doing things right and are we doing the right things? . . . There is a bid to preserve the 'How' and 'What' centers that the two questions bring forward respectively, thus de-emphasizing the task-oriented nature of intervention."[11] To engage in double-loop thinking means that practitioners still describe the theory and logic of their activities but take a more abstract or detached perspective. Thus, they can clarify their vision by acting toward the preferred means-ends relationship the institution has defined. An organization may indicate double-loop thinking when it repeats behavior patterns and members perceive or remark, "Here we go again." For example, planners who examine the Newtonian physics of gravity centers might determine that gravitational equations have no utility in warfare applications. Nevertheless, they will rationalize with, "We know how militaries use COGs is artificial and unscientific, but they are part of our doctrine and appear good enough to continue the practice." If we were to remove COGs, we would need to replace them with something better but also COG-like.

Conformation to the institutional form and established process (input to output, ends-ways-means) is retained in double-loop thinking. The "how" question is expanded to consider, "How might our organization execute this action using institutional (legacy) processes more effectively?" so that "how might we?" opportunities are generated in double-loop thinking over single-loop practice. However, practitioners evaluating within single- and double-loop contexts refrain from critically reflecting on their own premises. Single-loop practitioners evaluate how effectively they performed a center of gravity analysis in NATO and joint planning methodology so that they can improve their performance. A double-loop practitioner further describes why effective COG analysis *is essential for executing that particular methodology* to accomplish institutional goals.

On the other hand, decision makers using the modern war paradigm model to think systemically about the entirety of the modern military institution are using reflective practice or triple-loop thinking. Again, triple-loop thinking (and learning) seeks to explain why individuals and institutions desire such conformity and a shared frame for linking thought and action in complex reality. All frames are inherently limited, but a dynamic, adaptive system will learn and transform through emergence as the organization interacts with it. The single-loop thinker repeats best practices expecting each time to gain some improvement. The double-loop thinker may move to framing "good-enough practice" that still reinforces institutional frames but expands input-output to "How might we reach the ends desired, and have we been doing the process wrong previously?" Only the triple-loop thinker considers, "Is our idea of ends-ways-means flawed in this application? Or have our institutional preferences blinded us to emergent opportunities that require entirely different cognitive tools for us to navigate in ways previously unimagined or unrealized? If so, what might we do differently to explore these options, and what favored tools must we let go of so that we can learn different ways of praxis?" There is a high degree of self-awareness, critical examination, and a flexible, in-the-moment appreciation of complexity, change, and systemic thinking in triple-loop learning. In the figure below, these loops for thinking are set across a timeline for how an organization might advance toward reflective practice and escape single- or double-loop traps (fig. 33).

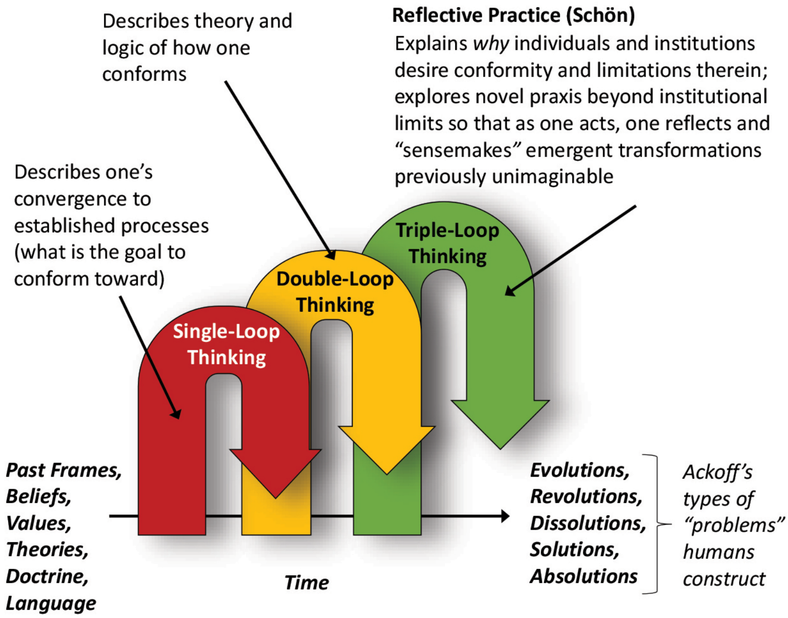



**Figure 33. Moving from single-loop thinking to reflective practice**

The horizontal timeline above illustrates that when organizations or individuals move from single-loop toward double- and later triple-loop thinking, they diverge from closed-system thinking that attempts to pair problem-solution in an input-output systematic logic. Instead, designers begin in triple-loop thinking to gain access to designing evolutionary (progressive developments), revolutionary (game-changing, radical, and systemic developments) opportunities as well as single-loop "solutions" to particular problem sets. The term "dissolution" in figure 33 indicates the complexity work of Ackoff, where problem-solution constructs can exist in simplistic or complicated systems. David Snowden, a researcher in knowledge management, later posits that simplistic systems permit best-practice, optimized solutions, and complicated systems yield to good-practice solutions.[12] Problem dissolution can only be accomplished within the triple-loop cognitive space:

> Dissolution involves idealization rather than satisficing or optimization, because its objective is to change the system or its environment as to bring the system closer to an ultimate desirable state, one in which the problem cannot or does not arise. This is what I call the design approach. The designer makes use of the methods, techniques, and tools of both the clinician and the researcher, but he uses them synthetically rather than analytically. He tries to change the way the system as a whole functions within it. Dissolutions are found in the containing whole; solutions are found in the contained parts (emphasis in original).[13]

Ackoff's explanation above, particularly his last sentence, is key for NATO and joint planners concerning how NATO-OPP and JPP approach decision-making for complex security challenges. The current NATO-OPP/JPP is structured entirely for problem-solution constructs; each deliberate activity becomes a "contained part" with a paired military solution (historical, known, ritualized, static) therein. Modern military institutions should consider how problem *dissolution* would approach transforming the entire (whole) system, thus, a systemic design that avoids input-output, reductionist problem-solution or systematic logic in complex security challenges. Problem dissolution (further explained in a later chapter) does not equal "solution" at a methodological or epistemological level. Yet before presenting those considerations in how to reframe what military problems are (and are not), a robust explanation of what reflective practice is for military designers is necessary.

Donald Schön created the theoretical basis of "reflective practice," which gained prominence in the 1980s using sociology, complexity theory, systems theory, cognitive science, and organizational studies. Schön's work would deeply influence the design movement as well, leading to later adaptation of his ideas into security design praxis since the late 1990s. Schön viewed reflective practice as the interaction of tacit knowledge (deep, rich understanding difficult if not impossible to articulate) with changing, emergent conditions where the practitioner is doing and thinking in a complementary fashion.[14] Lt Col Grant Martin, US Army special forces and systems design theorist, relays this concept of reflective practice in describing his military design team's failings in Afghanistan:

> Somehow the Design group had to be able to question underlying assumptions and that questioning had to be able to permeate out to the rest of the command. Underlying assumptions like questioning the motivations of those you are working with, why they are doing what they are doing, and why they aren't doing what you want them to. Assumptions like why we are there and what we are driving at. Assumptions like what "success" will look like, what our people will support, and what our politicians will accept. And assumptions about what drives people or groups of people to do what they do. We can't accept doctrine or popular psychology as dogma. We can't be attracted to the conventional wisdom of the day. We have to constantly question "why" we think something is the way it is.[15]

While military education, training, and institutionalized doctrine are centered on generating "explicit knowledge" simple to convey, clear in meaning, and able to be practiced uniformly and reliably across a wide population in a range of contexts, complex reality prohibits everything that is tacit from being converted into the explicit.[16] This contradiction is a core tension in organizational theory and why knowledge curation is difficult for most organizations. Nonreflective practitioners (those stuck in single- and double-loop thinking) will repeat activities and pay exclusive attention to their adherence to the set methodological or indoctrinated practices as offered by their institution. Figure 34 illustrates how nonreflective practitioners will consider the what and how of any challenge using imposed legacy frame constructs exclusively (and often unwittingly or nonreflectively).

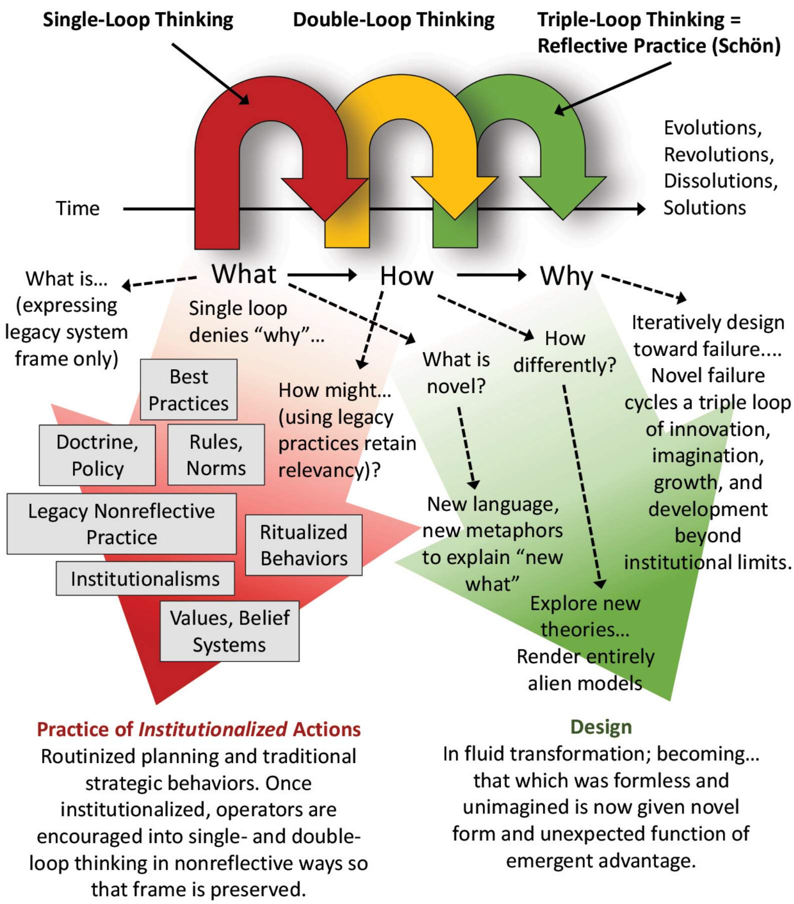



**Figure 34. Reflective practice versus institutional self-preservation**

Nonreflective decision-making methodologies attempt to channel any "what" discussions into descriptive orientations reinforcing legacy system beliefs. These methods tend to be considered best practices; are indoctrinated into policy, procedures, and military doctrine; and become the (unquestioned) rules and norms of organizationally sanctioned behaviors. In turn, these norms can become ritualized, where what was perhaps originally a scientific or experience-based pattern over time becomes tangled in organizational values. Norms become symbolic and nested in how the organization views itself (self-relevance) regarding its role, purpose, and contribution to other key stakeholders.[17] In the above graphic, this nonreflective pattern of thinking moves toward what is defined as a "practice of institutionalized actions" largely correlating to traditional planning (tactical, operational) and strategic behaviors and policy. This nonreflexivity "entails a refusal to use intellectual resources outside a narrow and 'safe' terrain. It can provide a sense of certainty that allows organizations to function smoothly. . . . However, [it] can also have negative consequences such as trapping individuals and organizations into problematic patterns of thinking."[18]

With reflective practice, security designers using triple-loop thinking can reframe the "what" and "how" and introduce "why," where complex security challenges are not treated "primarily as a form of 'problem solving,' 'information processing', or 'search.' . . . Naming, framing, moving and evaluating are central in Schön's view of design. . . . The designer *constructs* the design world within which he/she sets the dimensions of his/her problem space. . . . The situation talks back, the practitioner listens, and as he/she appreciates what [he/she] hears, [he/she] reframes the situation once again" (emphasis in original).[19] Thus, to design in reflective practice means there is fluid transformation, and that which was formless and unimagined should be given the novel form and unexpected function of emergent advantage toward the complex security challenge.

Instead of moving toward "what-centric" descriptions that reinforce legacy sanctioned activities, reflective practitioners consider "knowing in action" where "doing and thinking are complementary. Doing extends thinking in the tests, moves, and probes of experimental action, and reflection feeds on doing and its results. Each feeds the other, and each sets boundaries for the other."[20] As depicted in figure 34, operators armed with a model of how the modern military paradigm functions and an understanding of reflective practice might be in a better position to challenge and disrupt the existing military institution. While doing so may be unpopular in times of stability and prosperity, by the time an organization is failing and in desperate need of innovation, the window of opportunity may have sailed by.

Figure 34 frames the overarching shift necessary for NATO and joint forces to transform their decision-making activities in a manner that breaks from previous efforts. It is not useful to make incremental changes that negligibly improve previous versions of doctrine or to replace recently unpopular terminology with the latest military buzzwords that have captured institutional attention during the review process. The what-how-why dynamic moves NATO and joint forces toward reflective practice. Thus, they can design "toward failure" iteratively in that novel failure cycles a triple-loop learning process of innovation, imagination, growth, and development beyond original (legacy) institutional limits. This process does not mean that failure becomes an objective; failure needs to take on a different institutional understanding for modern military forces where *an indirect strategic approach* is appreciated. This notion of "indirect strategy" is found in the work of Robert Chia, François Jullien, Haridimos Tsoukas, Robin Holt, and other organizational, complexity, and systems theorists in nonmilitary applications. No military organization has yet considered applying these concepts to decision-making in complex security applications. NATO and joint strategists, analysts, and planners could become pioneers in transforming how their military organizations approach complex warfare in a clear departure from the legacy system of yesterday's warfighter.

**Notes**

1. Ackoff, "What's Wrong with 'What's Wrong With?,'" 81.
2. Tsoukas and Vladimirou, "What Is Organizational Knowledge?," 973; and Alvesson and Spicer, "Stupidity-Based Theory of Organizations," 1196.
3. Ferry and Ross-Gordon, "Inquiry into Schön's Epistemology."
4. Flood and Romm, "Contours of Diversity Management," 157.
5. Flood and Romm, 157.
6. Meiser, "Ends + Ways + Means = (Bad) Strategy"; and Monk, "End State."
7. Ackoff, "Future of Operational Research Is Past," 101.
8. Flood and Romm, "Contours of Diversity Management," 157–58.
9. Flood and Romm, 158.
10. The author bases this on personal experience including assignments at the Joint Readiness Training Center, Mission Command Training Program, and multiple iterations at the Jungle Operations Training Center, Joint Multinational Readiness Center, and other similar activities with the same evaluation approaches. In all these training centers, evaluators perform nearly identical assessments using these criteria exclusively.
11. Flood and Romm, "Contours of Diversity Management," 159.
12. Snowden and Boone, "Leader's Framework for Decision Making"; Snowden, "Application of the Cynefin Framework"; and Ackoff, "On the Use of Models in Corporate Planning."
13. Ackoff, 355.
14. Schön, *Displacement of Concepts*; Schön, "Knowing-in-Action"; and Schön, *Reflective Practitioner*.
15. Martin, "Tale of Two Design Efforts," 14.
16. Tsoukas and Vladimirou, "What Is Organizational Knowledge?," 975.
17. DiMaggio and Powell, "Iron Cage Revisited," 150.
18. Alvesson and Spicer, "Stupidity-Based Theory of Organizations," 1196.
19. Visser, "Schön: Design as a Reflective Practice," 23.
20. Schön, *Reflective Practitioner*, 280.

Chapter 18

# Introducing Silent Transformation

## An Indirect Strategy of "Letting Happen"

Theorists in the areas of complexity, systems design, and organizations as well as sociologists have since the 1970s explored and proposed an ever-increasing range of strategic alternatives that break decisively with the traditional Western approach to strategy and complex human affairs. Most security affairs, national strategic themes, and overarching war paradigms of Western industrialized (and developing) nations subscribe to a natural order of war based on the theories and models of Carl von Clausewitz, Antoine-Henri Jomini, Alfred Mahan, Gerhard von Scharnhorst, Giulio Douhet, Basil H. Liddell Hart, and later still, Aleksandr Svechin, John Boyd, Shimon Naveh, among others.[1] These war theorists—spanning centuries of modernization, industrialization, and professionalization of the military institution—drew inspiration from natural science theories and models that transformed Western society out of earlier Feudal Age reasoning. Militaries adopted these concepts so that war itself could become understood as the timeless "nature of war" regulated by observable tenets, principles, and rules; war would become scientifically framed and rigorously tested versus ideologically or philosophically (i.e., logic-derived) and ritualized through routinized practice.

War would be described not exclusively through divine decrees but include measurable edicts of Newton and other experts of natural science. A consequence of this embrace of a Newtonian style of interpreting reality is that the framework becomes "both acontextual and ahistorical"—one can formulate principles or rules that appear to function universally and across time.[2] In this framing, Jomini's "principles of war" and Clausewitzian maxims apply to every battlefield in every period—past, present, and future. Warfare thus becomes a "science" that mimics natural science objectivity, uniformity, and analytical optimization in description, collection, and prediction. Warfare would undergo not only methodological and organizational change in this great shift but also deeper epistemological and ontological transformations that would soften or even abandon earlier, ancient, and highly institutionalized constructs curated and protected by generations of believers. Older ways of warfare would be lost or rejected, with some aspects retained as the military community of practice would professionalize to join contemporary fields and disciplines also using natural sciences to advance their abilities and expertise.

Today, the modern war paradigm maintains this epistemological framework in how it formulates decision-making, organization, and administration and rationalizes how warfare must (and must not) be expressed. Yet within this dominant frame, the military as an institution created a scalable, uniform way to establish similar baselines for explicit knowledge across an organization or institution. It became the established military decision-making encapsulated in doctrine that directs how one will (and will not) think about warfare. Naveh et al. remark, "Just as literacy facilitates bureaucratic, administrative centralization, it also makes possible the codification and logical centralization of doctrine."[3] This codification therefore eliminates any consideration of ideas outside or beyond the institutional limits of the modern war paradigm. Modern, industrialized (Western) militaries understand all strategic thought and action exclusively and at the expense of alternative modes of strategic thinking. Robert Chia explains,

> Planned change is usually associated with highly visible, "top-down," and large-scale, system-wide initiatives involving significant disruptions such as structural reorganization, downsizing, a disruption of existing routines and/or an overall emphasis on the radical discontinuing of existing organizational practices. . . .
>
> Much of the extant literature on the management of change continues to emphasize high-profile and often "heroic" change initiatives as a *modus operandi* in achieving desired organizational outcomes; change is thought of as an exceptional event that must be made to happen through decisive intervention. Advocates of this "Planned" approach to change insist that radical change cannot take place gradually . . . or in a piecemeal manner, but must be rapid, disruptive, and even revolutionary . . . to be effective.[4]

Military strategic thinking informs all operational and tactical activities in part due to the emphasis on centralized hierarchies,[5] the organizational form and function of security forces, and the shared history of Western military forces over the ancient, Feudal Age into modern military developments. This mode of thinking disregards nonlinear and emergent or unintended but favorable outcomes that often occur through spontaneous and entirely unplanned developments. Essentially, if an organization did not previously identify, target, and action something through strategic (down to tactical) designs to *cause the change* through direct action, the change itself would be marginalized or ignored as a useful happenstance (luck). Yet this issue of unintended or unforeseen consequences works both ways so that "large-scale, high-profile and planned interventions develop a curious propensity for generating internal resistance and reactions that often work to thwart the very aims of such change efforts."[6]

Robert Chia and Robin Holt find that "*the more directly and deliberately a specific strategic change is single-mindedly sought the more likely it is that such calculated actions eventually work to undermine and erode their own initial successes, often with devastating consequences*" (emphasis in original).[7] The negatives of focusing direct, action-centered strategic change through deliberate (systematic) intervention as illustrated by modern military decision-making methodology may paradoxically exceed the apparent advantages when considered systemically. This approach requires more than cataloging a series of activities and tactical results in isolation. Instead, it entails a holistic, broad framing of systemwide change in areas that NATO or joint forces are focused on for complex security challenges. In a critique of military technological overmatch against terror networks in Afghanistan and Iraq, Sebastian Gorka remarks, "We are peerless in our capacity to apply kinetic force on target. . . . But counting Reaper hits against jihadi high-value targets is just as bad a metric of victory today as counting Viet Cong body bags was during the Vietnam War."[8] Scott Atran, in addressing revolutionary movements and their resistance to previously well-engineered, modern military solutions to security challenges, observes that contemporary terror networks such as the Islamic State are paradoxically able to exist and even thrive under conditions that used to entirely defeat and destroy previous adversaries.[9] He states,

> During the surge of American troops in Iraq, up to three-fourths of the fighters were neutralized in al-Qaeda's Iraqi affiliate, which would become ISIL, and an average of about a dozen high-value targets were eliminated monthly for 15 consecutive months, including its top leader, Abu Musab al-Zarqawi. Yet, the organization survived and the group went on to thrive beyond all expectations amidst the chaos of Syria's civil war and Iraq's factional decomposition.[10]

The desire to understand "change" as exclusively nested in large-scale interventions is, according to Chia, "irresistible because it is intimately linked to an inherent 'heroism' prevalent in the Western collective psyche."[11] This precept is not limited to military and defense contexts; most commercial, political, ideological, and academic communities share this view of "change." In studying criminal and terrorist organizations, Christopher Dishman notes that in the past, analysts were better at determining the goals, motives, and impacts of terror groups and criminal entities like drug cartels because they followed a modern, centralized hierarchical form—familiar to those using the modern war paradigm and seeking similar structured adversaries.[12]

Counterdrug activities in the last 25 years have dismantled large, centralized hierarchical cartels such as the Medellín and Cali criminal organizations, yet Colombia has seen a "rapid fragmentation and dispersion of criminal networks that have proven far more difficult for law enforcement authorities to track down and dismantle than their larger and more notorious predecessors. . . . The basic lesson to emerge from Colombia appears to be that smaller criminal networks are less vulnerable."[13] What worked before no longer does, and the destruction of legacy forms and functions appears to promote emergent ones that differ so that they avoid the same fate. Is NATO-OPP or JPP an obsolete decision-making methodology for complex security challenges purely because it was previously too successful in earlier security contexts? Or instead, are contemporary adversaries able to understand and anticipate how the modern military enterprise approaches warfighter activities and, in turn, operationalize differently to mitigate the effects that previously were far more effective strategically? Note that tactical and technological effectiveness are not in question here; strategic effectiveness in dynamic, complex security challenges is the primary interest.

NATO-OPP and JPP exemplify a decision-making methodology based on a Cold War era of utilization where in a previously bipolar world, state and nonstate actors appeared more susceptible to this Western mode of strategy and direct-action employment of military instruments of power. Douglas Farah argues that the new relationships between adversarial nation-states and criminal as well as terror groups have changed and, along with them, the dynamics for understanding and acting for security challenges in this new world (a post-modern, post-structural, or perhaps postindustrial transformation).[14] He observes, "In the construct of the new rules they are writing for their game, none of the state-sanctioned or state-sponsored activities with TOC [transnational organized crime] groups or terrorist groups are illegal or questionable—they are revolutionary tools to obtain a strategic objective."[15] While the modern military institution continues to employ technical rationalism so that future wars might be better predicted, managed, controlled, and dispatched using scientific principles and more efficient lethality, postmodernists disrupt this stance. They posit that the appearance of objectivity in scientific texts is misleading and that "there is no methodology capable of achieving an unmediated, objective representation of the facts."[16] Exposing this illusion is just the first step in realizing alternative modes of thought and action.

That NATO and joint forces struggle with applying their decision-making methodologies in practice, operational design for campaigning, and strategic design for national policy while tied to legacy theory, models, methods and indoctrinated military language is troubling. One telling aspect is that modern military strategists and analysts are expected to apply the same strategic and operational constructs and methods to state and nonstate actors regardless of whether such correlation is relevant or applicable. All competitors and adversaries—whether near-peer nation-state or decentralized, self-organized online eco-terror group—must be susceptible to existing (legacy) decision-making methodologies. But is this deep-seated approach sound reasoning in complex warfare? Can one group impose a series of laws upon what is "infinitely changeable phenomena" where an expansion of knowledge does not also produce an expansion of ignorance?[17] Or is complex reality dynamic enough where nimble, clever adversaries might innovate in ways that clearly escape the logical limits of an institutionalized war frame so that regardless of any overmatch of technology, resourcing, and skill, wars remain unpredictably chaotic?

Along with nationstates, non-state actors are increasingly able to assume state-like capabilities and characteristics for applying organized violence despite not being "states." Today, as framed by Christopher Dishman, nonstate actors are "ungoverned by hierarchical rules. . . . Today's networked actors are increasingly polymotivated and pursue a spectrum of criminal and terrorist activities."[18] Antagonist groups such as Hezbollah—previously understood as a "proxy" under the Iranian nation-state and a regional threat tied to particular geopolitical and cultural frameworks—are now presented as an entirely new sort of threat requiring new thinking and terminology and a change in how militaries understand and act to deal with it. Should NATO and joint forces continue to wrestle with legacy models and methods, particularly when so few adversaries and competitors wish to operate in familiar ways that play to Western tactical and strategic advantage on today's battlefields? Are legacy frames, terms, and methods still applicable? Or is the cause-effect and deliberate change agent mentality no longer as relevant as in earlier contextual settings?

Matthew Levitt posits that "the challenge Hezbollah poses has become global in nature. . . . [It] can no longer be seen as an Iranian proxy and terrorist organization alone; it is now a powerful military force, a globally lethal terrorist organization, and a complex criminal and money laundering network."[19] Christopher Fussell and D. W. Lee illustrate the paradoxical "cause-effect" relationship of terror attacks across the world in 2003 prior to the invasion of Iraq, where the most technologically advanced, resourced, and trained military force arguably in human history commenced direct action against Iraqi conventional forces. US special operations forces should be highly qualified to conduct an analytic optimization for kinetic actions, sensitive activities, and other SOF-exquisite activities (even in 2003), yet "by the end of the year, there had been more terrorist attacks in Iraq alone than there had been in the entire world in 2003. And it only got worse. The forces that comprised the Special Operations Task Force had clear and undeniable points of superiority. . . . Despite all of these advantages, it was clear by 2004 that . . . [al-Qaeda in Iraq] was somehow outpacing some of the world's most highly trained and well-funded units."[20] This pattern continues today, with powerful, well-trained forces winning tactical engagement after tactical engagement, still trapped in a briar patch of unwinnable operational and strategic morass that bleeds political and popular support over time.

The best in modern, high-technology, and sophisticated special warfare was only able to keep pace with the growth and adaptation of one of the poorest, least trained, and under-resourced rivals employing a different operating logic and defying the rules of the established game. Sean McFate offers another interpretation: "traditionalists cannot contemplate wars without states, even though such wars surround us."[21] The most technologically sophisticated, lethal forces are generated by first-world nations able to afford them, yet even these exquisitely lethal assets become frustrated by third-world innovation below the poverty line. As special and elite forces occupy only a fraction of broader, general-purpose military force projection, the modern nation-state's sunk cost into strategic capacity and capability is a wickedly complex challenge.

This institutional desire to consider direct, dramatic, and spectacular actions as the primary (if not exclusive and analytically quantifiable) means to accomplish transformation fits within traditional centralized, hierarchical organizations, such as militaries, corporations, academia, government agencies, and most national to local political structures. In all these, leaders are positioned to make overarching decisions so that desired change can be accomplished through orchestrated activities to bring about select future (and desired) states. Chia indicates that "leaders are construed as specially endowed causal agents armed with the capacity to take decisive actions in bringing about significant changes, thereby warranting their elevated status and their sometimes excessive rewards."[22] He further frames characteristics of modern organizational strategies:

> The typical approach favours direct, frontal engagement; (a) identify problems and obstacles to the attainment of pre-specified organizational goals; (b) face them head-on with the maximum concentration of effort, energy and resources; (c) and then decisively eliminate or overcome them in the most expedient and efficient manner possible . . . [This] management of change is often expressed in heroic and/or "spectacular" terms. . . . When success ensues, it is the decisive actions of significant individuals . . . that are deemed to be causally significant in bringing about the successful state of affairs. . . . Such a Western tendency to causally assign success to the high-profile actions of identifiable individuals has been historically linked to the influence of significant changes in the method of warfare that took place in ancient Greece.[23]

"Strategic indirection" takes a paradoxical approach, thus threatening to upend many of the cherished beliefs of modern military organizations. Change becomes what Haridimos Tsoukas and Chia describe as "the reweaving of actors' webs of beliefs and habits of action as a result of new experiences obtained through interactions. . . . Organization is an attempt to order the intrinsic flux of human action, to channel it towards certain ends, to give it a particular shape, through generalizing and institutionalizing particular meanings and rules."[24] Indirect strategy requires a different way of using war theories, complete with new mental models that break from existing (legacy) ones, where NATO or joint forces might construct entirely different decision-making methodologies that accomplish what their current ones seek in profoundly dissimilar ways. Doing so requires that both institutions consider alternative language and metaphoric devices to apply "strategic indirection" toward military activities in security applications.

Strategic indirection shifts strategists toward a reversal where large-scale, high-profile, planned actions are not sought after for short-term effects or "quick wins" that appear to advance institutional self-relevant beliefs, values, and interests.[25] In strategic indirection, an organization revises its appreciation "of the crucial role that such nuanced forms of responses and indeed non-action can play in shaping outcomes, . . . [which] will help reorient and re-educate our attention towards the mundane and the everyday in accounting for success in human endeavors."[26] Modern military organizations should consider strategic action by "paradoxically [letting go] of the attempt to control and to predetermine outcomes. Managing change then consists not so much of willfully imposing our pre-designed order onto reality and forcibly making it conform to our will and fancy."[27] Instead, NATO and joint forces will want to resist this urge to confront reality with a strategic, head-on mindset and, as Chia advises, " 'let change happen' of its own accord."[28] The key for complex military decision-making considerations now is precisely how one might go about accomplishing warfighter activities using this strategic shift to indirectness.

First, there must be a new emphasis on unintended consequences of localized, seemingly insignificant actions. Chia asserts, "The key implication . . . is that successful outcomes can be attained *without any intention on the part of actors* and it is an acknowledgement of this possibility, rather than whether it is incremental or planned and large-scale[,] that truly differentiates the Emergent approach from the Planned approach to change" (emphasis in original).[29] This idea is of paramount concern for NATO and joint forces in that currently, NATO-OPP, JPP, and most analytical thinking on associated military activities continue to use the "modern" style of thought that "accentuates a view of social reality as comprising discrete, static and hence describable phenomena. . . . According to this thought style, social phenomena such as 'individuals,' 'organizations,' 'cultures' and 'societies' are concrete and isolatable real entities or attributes which can be systematically described and explained and, therefore, meaningfully compared."[30] As a result, nearly all analytical mapping of networks, groups, or target "chains" have tangible actors, groups, or things inside each bubble or geometric shape depicted, and even the linkages are linear, causal, and systematically (input leads to output) related to form a system. Modern military forces should shift away from an institutionalized mindset of modern strategic thinking toward a postmodern one (fig. 35).[31]

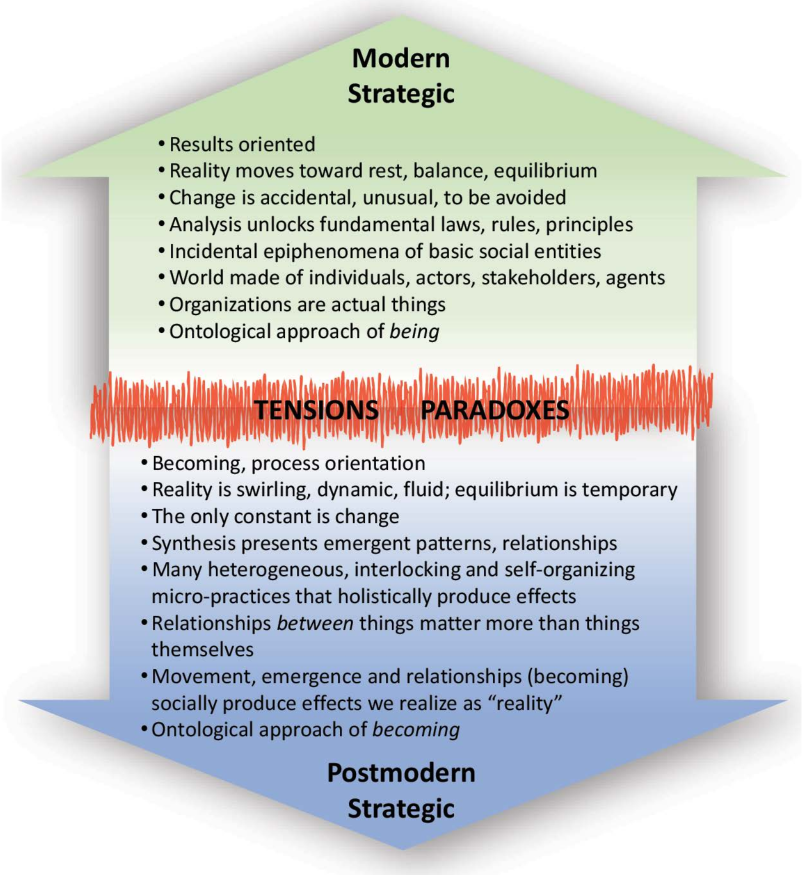



**Figure 35. Modern and postmodern core tensions in security affairs**

Depicted above are the core tensions between how NATO and joint forces previously would form and understand strategic decision-making for warfare in earlier (legacy frame's apex in both World Wars) security challenges and those emerging since at least the Vietnam War. Even using the term "postmodern" in addressing security and foreign policy matters is disruptive because these concepts have been routinely dismissed as irrelevant or incompatible with the modern military frame for making sense of reality. However, it highlights the ontological tension (see fig. 35) concerning whether war itself has gone from a modern to postmodern form and function. If so, many of the beliefs, models, theories, and methodologies previously employed in modern war are vulnerable to evaluation and possible elimination for new ones. This postmodern stance threatens the bedrock of military doctrine, theory, and practice; the war precepts of Clausewitz, Jomini, Douhet, and others are no longer necessarily applicable. This postmodern model of new war is viewed as so radical and adversarial to modern military beliefs that rarely are these ideas taken seriously or even considered in most military educational platforms, professional reading lists, mainstream academia, or military training centers.[32]

Postmodern theorists span a wide range of disciplines, fields, and academic communities of which only a scattered minority focus on war, security affairs, and military organizations. It is within this smaller group of postmodern thinkers that military designers in the last three decades have taken inspiration, information, and ideas to apply in transforming the modern military. Briefly, postmodernist military scholars who argue the transformation of modernity into a postmodernity subsequently also bring the entire understanding of "war" as part of the shift. They primarily posit that this shift occurred either at the height of the two World Wars spanning a generation in the early twentieth century or immediately following the use of atomic weapons in 1945. Chris Gray captures this suggested transformation of war from the modern context to the postmodern in not just the accelerated speed of information, technology, and violence but the meaning and prominence of information set within postmodernity:

> I call it postmodern war. Why choose "postmodern" over the other possible labels? There seem to be two good reasons. First, modern war as a category is used by most military historians, who usually see it as starting in the 1500s and continuing into the middle or late twentieth century. It is clear that the logic and culture of modern war changed significantly during World War II. The new kind of war, while related to modern war, is different enough to deserve the appellation "postmodern." Second,

> while postmodern is a very complex and contradictory term, and even though it is applied to various fields in wildly uneven ways temporally and intellectually, there is enough similarity between the different descriptions of postmodern phenomena specifically and postmodernity in general to persuade me that there is something systematic happening in areas as diverse as art, literature, economics, philosophy and war.[33]

While Gray joins most postmodern military theorists who position the start of the "postmodern era of war" as 1945 and the conclusion of World War II with atomic bombings, other military academics promote postmodernity occurring later. They varyingly view the changing point into postmodernity as occurring with the Vietnam War, the collapse of the Berlin Wall, the First Gulf War, or the terror attacks of September 11, 2001.[34] However, Gray himself later states that the Vietnam War would be the first postmodern war, although he may merely see the period of 1945 through the American withdrawal of forces from Vietnam in 1975 as one major shift in how society understands and conducts war. Readers should consider the application of "postmodern" used in this book as indicative of these specific arguments on the reality of war and transformation of society, such as how we make sense of reality (including war and security affairs), and not become distracted by other postmodern endeavors that focus on topics well outside this area of study.[35]

Once more, the methodological options for devising the current military decision-making methodologies that all NATO, allied, and joint forces use come exclusively from historical and Department of Defense doctrinal origins. The dominance of "modern warfare framing" is universal and all-encompassing in how the natural sciences inspired such form and function. All models, methods, theories, and language share in the ontological and epistemological choices enabling this modern warfare perspective on reality. In reviewing contemporary doctrine and methods, militaries might continue to rearrange concepts and reinterpret contested language—such as redefining "competition" as "integrated deterrence" for socialized or even political shifts in the institutional climate within which NATO is a stakeholder—so that this modern frame remains intact. Or these organizations can attempt to dismantle and reform modern military decision-making for the ever-expanding range of complex security activities in a bold, *postmodern way forward.* To accomplish this reform, commanders, analysts, and planners require not just symbolic word changes to appease shifting winds in broader political or social stances (where nothing beyond the terminology is challenged or replaced). Instead, they need real and different theories, models, language, and metaphors to generate a new military decision-making methodology (or methodologies) that generates dissimilar outcomes in war. To shift from modern strategic (legacy) constructs, one must build a bold, alternate path into uncharted and perhaps unrecognized (unimagined) directions in strategic thought.

The first concept offered for NATO and joint forces in breaking from the legacy war paradigm is to introduce a "silent transformation: indirect strategy" (as this chapter is titled) postmodern concept. With this concept as the overarching paradigm shift in security activities and decision-making, NATO and joint forces might consider new postmodern strategic concepts, explained in subsequent chapters. They include emergence and nonlinearity, rhizomes, multiple futures (scenario planning/strategic foresight), semiotic squares, Deleuzian folds, and additional observations and suggestions. These concepts do not exist in contemporary NATO or joint planning doctrine or in DOD strategy or policy. Their introduction here positions these military organizations in a unique, game-changing—and higher conceptual risk space—position to present alternative decision-making and organizational behavior activities for policy, national, strategic, and other primary stakeholders in military activities throughout complex reality. The tensions and paradoxes outlined in figure 35 will be reoccurring, significant features in any emergent path forward should NATO or joint forces move to experiment with the concepts described in the following chapters.

**Notes**

1. Clearly, this list of theorists is abbreviated. However, readers interested in the ideas of these primary military theorists used in most modern military decision-making should see, for instance, Shy, "Jomini"; Paret, "Clausewitz"; White, *Scharnhorst*; Paret, *Clausewitz and the State*; Svechin, *Strategy*; Liddell Hart, *Strategy*; and Naveh, Schneider, and Challans, *Structure of Operational Revolution*.

2. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 990.

3. Naveh, Schneider, and Challans, *Structure of Operational Revolution*, 23.

4. Chia, "In Praise of Silent Transformation," 11.

5. Kelly and Brennan, *Alien: How Operational Art Devoured Strategy*.

6. Chia, "In Praise of Silent Transformation," 13. Chia cites B. Flyvbjerg, *Rationality and Power: Democracy in Practice* (Chicago: The University of Chicago Press, 1998); F. Jullien, *The Propensity of Things: Towards a History of Efficacy in China* (New York:

Zone Books, 1999); and J. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press, 1998).

7. Chia and Holt, *Strategy without Design*, x.

8. Gorka, "Adapting to Today's Battlefield," 355.

9. The Islamic State is a far less dangerous terror threat compared to the height of its power in 2015. However, it is a useful example here in that surrogates and other emerging rival organizations learned from its successes and failures and continue to improve on its model.

10. Atran, "Islamic State Revolution," 67.

11. Chia, "In Praise of Silent Transformation," 13.

12. Dishman, "Terrorist and Criminal Dynamics."

13. Bagley, "Evolution of Drug Trafficking," 108.

14. Tetreault and Haines, "Postmodern War and Historic Memory"; Gray, *Postmodern War*; and Lucas, "Postmodern War."

15. Farah, "Convergence in Criminalized States," 181.

16. Kilduff and Mehra, "Postmodernism and Organizational Research," 464.

17. Kilduff and Mehra, 466.

18. Dishman, "Terrorist and Criminal Dynamics," 137.

19. Levitt, "Hezbollah's Criminal Networks," 173.

20. Fussell and Lee, "Networks at War," 372.

21. McFate, *New Rules of War*, 182.

22. Chia, "In Praise of Strategic Indirection," 667.

23. Chia, "In Praise of Silent Transformation," 14.

24. Tsoukas and Chia, "On Organizational Becoming," 570.

25. Although many sensitive activities are clandestine and might not be considered "high profile" in execution, the term is used here in how an organization conceptualizes the role such a direct activity might have with expected (direct) effects on the system targeted.

26. Chia, "In Praise of Strategic Indirection," 668.

27. Chia, "In Praise of Silent Transformation," 10–11.

28. Chia, 11.

29. Chia, 12.

30. Chia, "From Modern to Postmodern Organizational Analysis," 586; and Tsoukas and Vladimirou, "What Is Organizational Knowledge?," 977.

31. Kilduff and Mehra, "Postmodernism and Organizational Research," 453–59.

32. Zweibelson, "Thinking beyond the Books," 15–37.

33. Gray, *Postmodern War*, 22.

34. Gray, 125; Gibson, *Perfect War*; Moskos, Williams, and Segal, "Armed Forces after the Cold War," 4–7; and Mäder, *In Pursuit of Conceptual Excellence.*

35. Military academics historically argue against postmodern theory because they object to terms and concepts alien to those of the modern military Newtonian-styled worldview or reject a singular postmodern position as indicative of the entire multidisciplinary postmodern movement. Doing so is akin to arguing that because bullfighting is a sport and the murder of live animals for modern entertainment is disgusting to a particular observer, all sports are therefore repulsive and support the wanton killing of innocent animals by association of "sport."

Chapter 19

# Moving Beyond "Problem-Solution" Logics in Military Decision-Making

Modern military decision-making—to include how NATO and joint forces approach complex warfare activities with NATO-OPP, JPP, and other associated decision-making practices—focuses exclusively on a *systematic* "problem-solution" relationship (cause-effect, input-output). Systematic logic works best with closed, simple systems where there is one best or only solution. An M4 rifle is an example of a simple system: only a 5.56-millimeter round can be loaded into the magazine and only in a specific way. The rifle can fire only when mechanically operated, and once fired, the bullet cannot be returned to its earlier form. Many types of military decision-making require closed-system, systematic thinking in simple contexts because best practices occur where clear causes lead to established, reliable effects. Standard operating procedures, checklists, tactical sequences, and rote memorization of drills and exercises all function remarkably well in warfare, with military knowledge curation secured through doctrine, repetition, uniformity, risk reduction activities, and standardization.

Yet simple systems are the lowest form of system variation in complex reality. Complicated systems require humans to frame "problems" in more than an "optimized solution to clear, closed-loop problem identified" as available in simple system contexts. They do not feature a single "best solution," and often multiple, dissimilar solutions exist for what is conceived as a problem. Further, the clear optimization available in simple systems is absent. In complicated systems, often only a slew of "good enough" solutions are available for application. Perpetually some may perform better or worse than others in an ever-changing, emergent context of complicated system behavior.

It is in complicated systems where militaries still apply problem-solution patterns for decision-making. Modern military decision-making adds concepts such as "course of action development, comparison, and selection" to acknowledge that complicated system challenges feature a wider range of possible decisions with a range of outcomes. Complicated systems feature patterns of causes leading to effects where, repeatedly, many rules, maxims, and principles can be developed to produce some sort of order and prediction where chance still plays a role that did not exist in simple system contexts. Military theorists such as Jomini would popularize "rules of warfare" capitalizing on conflict unfolding in complicated systems, such as pitched battles with ground forces, where both sides generally agree on a code of conduct and behavior and share values on what warfare is and is not.

Complexity theory comprises two other important types of systems. A complex system does not feature a clear cause-effect relationship in that the cause and effect are interwoven and impossible to distinguish (the origin of the word "complex" means woven). Complex systems reject linear causality logic, and systematic thinking will fail when applied to complexity. They also reject the artificial concept of chronological time where one attempts to "create conditions for a standardization of time whereby events and processes are placed in a patterned chronological order. . . . Chronological time is superimposed over the subjective time of individuals so that synchronized carrying out of organizational tasks is [thought] possible."[1]

Complex systems resist this effort in predictability, partly due to the irrational, nonprogrammable, and infinitely dynamic human nature always present in complex systems. There are no "best practices," and the reliability and uniformity of "good enough" practices found in complicated systems also lose relevance in complex, dynamic systems. Problem-solution is no longer reliable because complex systems feature nonlinearity and emergence (explained in the next chapter). While rules "are generalizations connecting types of behavior by types of actors to types of situations," complex systems deny these linkages.[2] Any possible relationship is fluid, in flux, or emerging into a new variation that breaks from any earlier rule formation effort. Because there is no correlation between cause and effect in chaotic systems, the only possible practice is novelty. A chaotic system will reject every possible expected "solution" because its state or characteristics make it entirely unlike any historical context where any past solution would correspond to the novelty.[3] The four primary types of systems—simple, complicated, complex, and chaotic—as understood by complexity theory and systems theory are significant for how NATO and joint forces might change how they perform complex decision-making in the wide range of security and defense activities.

First, militaries should consider this overdependency of NATO-OPP and JPP on analytical optimization toward problem-solution reasoning that functions effectively only in simple and complicated systems. Technical and tactical applications require these approaches, but NATO and joint forces (or coalitions of allied forces) are tasked to make decisions for their nations and societies at a dynamic, changing, complex (if not at times chaotic) level for warfare and defense activities. Thus, they must adopt alternative approaches to reform decision-making methods and move beyond problem-solution linear causality. Russell Ackoff, a complexity theorist pioneer, distinguishes ways that humans formulate problems. While his concepts influenced many disciplines and fields from the 1950s onward, the military community of practice has traditionally held to the Newtonian stylings of physical domain-centric rationalization for warfare established centuries before complexity theory was even realized. Contemporary military doctrine relies not on the likes of Ackoff but Jomini, Clausewitz, and Taylor for theoretical, managerial, and philosophical framings of war.

In his work "On the Use of Models in Corporate Planning," Ackoff presents four ways humans (and organizations) frame "problems" in reality.[4] They are referenced in this book so that modern military forces might apply a different decision-making methodology toward complex security contexts. While Ackoff addresses industry and commercial organizations in his discussion, these concepts extend to all security organizations and to how agencies, governments, and state-enabled instruments of power from the local to national level also consider "problems." Ackoff discusses problem-solution, which is, again, the most popular concept for nearly all military affairs, but also presents problem resolution as another form of problem realization. Most organizations combine some form of problem solution and resolution, expressed in policy, decision-making methodology, doctrine, or standard practices and in on-the-ground applications. Finally, he describes problem absolution and problem dissolution.

According to Ackoff, the first way humans (and organizations) frame problems is through problem *solution*, which is "to select a course of action that is believed to yield the *best possible* outcome, one that *optimizes*" (emphasis in original).[5] Ackoff pairs this option with a "research approach" in that the problem-solution framework best matches a scientific methodology and suits the terminology, tools, and techniques of the scientific approach to interpreting reality. In military applications, problem-solution ideation pairs this reasoning with "systematic" logic where organizations seek a causal, clearly defined "input to output" relationship that supports this "problem and solution" construct.[6] Most organizational management structure, policy, formal military doctrine, and best practices attempt to infuse scientific concepts and mathematical terminology so that a quantifiable, largely objective process is constructed for the organization to identify problems, associate a proposed solution to them, and implement said solution so that a measurable success or failure can be observed and subsequently repeated.[7] The modern military force applies problem-solution in most activities within the decision-making methodology again by centralizing ends-ways-means and a reverse-engineering logic to systematically link desired outputs with predetermined inputs.

A second approach is problem *resolution*, which he differentiates from problem solution in that "to *resolve* a problem is to select a course of action that yields an outcome that is *good enough*, one that *satisfices*" (emphasis in original).[8] Ackoff calls problem resolution the clinical approach because it relies extensively on past experiences and a clinical construct of experimental trial and error that builds into a long-term, cohesive knowledge base. Thus, clinicians can draw from this base for working resolutions when encountering seemingly similar problem sets. The types of problems that are resolvable are those within complicated or possibly some forms of complex systems (temporarily and rarely repeating). No single or optimal solutions are available to the types of problems that can only be resolved, and these types of problems are often defined in terms such as "messy," "complicated," "complex," "confusing," "difficult," and "wicked."[9] Some of the NATO and joint force analytical methodology appears to apply problem resolution, particularly when coordinating with competing interests, risk mitigation efforts, policy concerns, and multiple stakeholder demands. In practice, land forces that are often closer to populations promote problem resolution constructs in military doctrine, while aviation, naval, and other military entities or forces at a greater distance from direct human population engagement during wartime activities continue to emphasize problem-solution conceptualization.

A third form that humans apply in defining and approaching a "problem" is problem *absolution*. To absolve a problem is to realize one is there and then purposefully ignore it. Essentially, "*the best way to do this is to do nothing*, or as little as one can get away with" (emphasis in original).[10] The act of ignoring the problem is an attempt to permit sufficient time and space to make the problem resolve itself, fade away, or otherwise become unworthy or undesirable to invest energy and attention toward. This strategy is risky and often flawed, according to Ackoff, yet there are countless examples of individuals, organizations, and even nations or societies ignoring problems in the hopes that they "go away" or because addressing them would require an enormous amount of energy and resources.

When intelligence analysts select one target request from potential others as the best linkage to an enemy's assessed critical vulnerability of an adversarial center of gravity, they in turn demonstrate problem absolution *by not acting on the others*. This assessment is not to be considered pejorative. Rather, any military organization that considers a range of possible actions toward multiple challenges and selects action on one over the others is indirectly absolving itself of the other realized problems—even if only temporarily if the intent is to act on them later. Problem absolution does not fit well into most military decision-making methodologies because of cultural and social beliefs about military values, identity, and self-interests. One rarely acknowledges intent to ignore what is understood as a problem, but the military has a clear (often unsightly) history of doing so.

Simply waiting until the news cycle changes or enough people forget or ignore the "problem" is one way some problems indeed are addressed. Examples of problem absolution might include public health issues, negative public image issues that individuals (celebrities, public figures) might be struggling with, or a company getting negative attention for something it is responsible or even largely not responsible for. For instance, despite the clear damage caused by drugs and their trafficking, American and affluent Western societies writ large tend to absolve illegal drug use by noted athletes and celebrities as "part of the lifestyle." In military applications, when an organization gradually lowers security measures or ignores creating "patterns of life" an adversary might exploit, problem absolution occurs. The long-term denial of the health hazards of military decisions to use Agent Orange deforestation chemicals in Vietnam, the tolerance of sexually inappropriate behaviors in the military services (e.g., Tailhook Convention), or the creeping acceptance of Afghan political and security force corruption from 2003 to 2021 illustrate problem absolution. Adding in regular election cycles and a revolving door of political leaders, security organizations often can wait out the clock through problem absolution to delay activities until anticipated leadership changes occur.[11]

Finally, a fourth approach to dealing with problems is problem *dissolution*, which Ackoff terms the "design approach." This last way of approaching "problems" is the most significant for strategic design and often the least understood outside complexity and systems theory. Ackoff explains that "dissolution involves *idealization* rather than satisficing or optimization [or ignoring], because its objective is to so change the system or its environment as to bring the system closer to an ultimately desirable state, one in which the problem cannot or does not arise" (emphasis in original).[12] Problem dissolution is often a superior way to consider and address problems in complex and chaotic system settings. Dissolution means that one designs a way to transform the system so that in the emergent, new system what was previously seen as a problem is dissolved and no longer a major concern. Yet the new system formation itself will generate new problems as well. Ackoff explains this distinction between dissolution and linear solution of a problem: "The designer makes use of the methods, techniques, and tools of both the clinician and the researcher, but he uses them synthetically rather than analytically. He tries to change the way the system as a whole functions within the larger system that contains it rather than the way its parts function within it. Dissolutions are found in the containing whole; solutions are found in the contained parts."[13]

A commercial example of problem dissolution is how social ride-sharing platforms developed with the arrival of the smartphone and sufficient technological distribution across a population. Taxi companies have always dealt with the problem of fleet maintenance, whether in the age of automobiles where engines must be maintained or the era of horse carriages when exhausted horses needed to be rested or replaced. The taxi industry must perpetually manage a fleet, requiring routine and unexpected repairs. It must attempt to solve maintenance problems, resolve others, and in some cases, absolve those that may later cause other problems or simply fade away. When a taxi driver's vehicle breaks down, the company loses that line of profit until the vehicle is operational. However, a driver working for ride-sharing services like Uber must fix their own vehicle when it breaks down. Uber has dissolved the fleet maintenance problem by designing a different system for providing the same sort of transportation service that traditional taxi companies offer.

A military example of problem dissolution can be found in most any transformative war technology, such as the development of aircraft carriers. Once airplanes could safely and reliably land on floating runways, their naval range was extended, introducing a new, lethal way to inflict destruction from the sky with precision and increased scale. Subsequently, the Navy dissolved an earlier systemic problem where surface and subsurface vessels needed to maneuver in water in attempting to damage or destroy an adversary. Battleships had grown increasingly larger with a never-ending arms race between ships and shore batteries on gun range, rate of fire, and projectile lethality. The design of the aircraft carrier dissolved much of those legacy issues while creating entirely novel problems in the new “aircraft-centric naval warfare system” that would mature in the Second World War. Aircraft carriers themselves were vulnerable to other aircraft, and an entire emergent domain of aerial combat would create vastly different (and more complex) warfare challenges for naval decision-makers than their predecessors dealt with.

Lastly, problem dissolution does not “solve problems” in that the earlier “problems” remain for those who extend legacy practices. Taxi companies today still maintain fleets while competing against ride-share platforms, and submarines and surface vessels conduct naval activities originating in the era before aircraft carriers. They do those activities today while immersed in the increasingly complex post-aircraft-carrier world where aviation and other emerging technological developments promote further “problems” to emerge. Emergence thus is a critical element of how one conceptualizes *what problems actually* are and is the next area for modern security forces to consider deeply.

**Notes**

1. Tsoukas, “What Is Organizational Foresight?,” 265.
2. Tsoukas and Hatch, “Complex Thinking, Complex Practice,” 993.
3. Snowden and Boone, “Leader’s Framework for Decision Making”; Snowden, “Cynefin Framework”; Bousquet, “Chaoplexic Warfare”; and Holland, “Complex Adaptive Systems.”
4. Ackoff, “On the Use of Models in Corporate Planning.”
5. Ackoff, 354.
6. Paparone, “How We Fight.”
7. Gioia and Pitre, “Multiparadigm Perspectives,” 585–87.
8. Ackoff, “On the Use of Models in Corporate Planning,” 354.
9. Buchanan, “Wicked Problems in Design Thinking”; Conklin, “Wicked Problems and Social Complexity”; Rittel and Webber, “Dilemmas in a General Theory of Planning”; and Tsoukas and Hatch, “Complex Thinking, Complex Practice.”
10. Ackoff, “Why Few Organizations Adopt Systems Thinking,” 706.

11. Interestingly, while problem absolution is a regular and publicly reported phenomenon of all modern security organizations and their political leadership, it is unstated in any formal strategic or organizational doctrine. This occurrence in itself is a form of problem absolution for military doctrine producers; while the institution readily applies the concept, articulating or even acknowledging it would create massive internal conflicts. At best, NATO-OPP and JPP merely imply problem absolution if considered through historical record and public statements by those deciding and acting on NATO-OPP and JPP applications.

12. Ackoff, "On the Use of Models in Corporate Planning," 355.

13. Ackoff, 355.

Chapter 20

# Emergence and Nonlinearity for Strategic-Level Decision-Making

One significant aspect of complexity theory and systemic thinking is emergence. With the deconstruction of NATO-OPP and JPP already covered in-depth, modern military forces appear to overlook the primary qualities of complex adaptive systems in how and why they approach decision-making and strategic design for military activities. Complexity theory rejects most attempts to use analytically reductionist models such as COG and SWOT analysis and techniques like CARVER, capabilities/capacity considerations, and stakeholder analysis. Nevertheless, modern military decision-making appears to mask the classical mechanics underpinnings by assimilating select terms into established, rigid practices. Militaries should instead consider how *complexity theory concepts* violate most NATO-OPP/JPP concepts for dealing with complex security contexts in reality. Emergence is paramount for realizing how complexity and systemic thinking differ from other modes (e.g., a Newtonian style) of interpreting reality. Contemporary armed forces should consider how to restructure their decision-making methodologies toward how emergence functions well beyond the oversimplifications currently presented in NATO-OPP and JPP reasoning.

Emergence is an important element of complexity and systems theory as well as novel disciplines and fields in opposition to established classical mechanics constructs and, in many ways, appears paradoxical. Tsoukas reinforces this sentiment on promoting a dialogical approach in creating new knowledge that militaries should consider for how NATO-OPP/JPP practices provide perceived value to their institution. He notes, "Novel combinations create new categories to describe or bring about changes in something familiar. . . . The new concept may have *emergent attributes*, that is, attributes that are different from those of either of the constituent parts" (emphasis added).[1] Thus, overreliance on historical precedent as a primary indicator of tomorrow's challenges will lock an organization into expecting novelty to be recognizable using historical frames. It will also expect novelty to be explainable using the very language of yesterday's world that lacked the emergent novel development.

Emergence is a key design consideration because the legacy or original context generating the change *does not itself possess the ability to explain it*. Consequently, outside the context of simplistic and perhaps some complicated systems, the systematic logic of pre-established input-output thinking that provides problem-solution formation within ends-ways-means constructs is flawed. The establishment of a "solution" coupled with a future single "end state" in a complex system implies linear causality, where A plus B will lead to C systematically so that a military might reverse engineer all possible problems with known solutions in their curated knowledge. Emergence denies this predictability (except in closed systems of stable, simplistic settings), as complex systems generate novel developments that cannot be preconfigured, paired with historic solutions, or anticipated and mapped back to direct, linear causations. The modern military emphasis on capturing lessons learned and best practices highlights another example of this tension between complexity and complicated or simple system behavior.

For example, analytic reductionism isolates every water molecule in a glass of water down to individual ones, yet at some unmeasurable point in assembling molecules together, "wetness" emerges from what had previously not been capable of being understood as "wet." In most cases, emergent properties do not reflect the analytic, rationalized tools of prediction, control, and description. NATO and joint forces thus must not just think toward the strategic focus or objective for security activities in terms of current political or institutional expectations. Rather, these forces must look inward at the institution and individual strategist's own logic, belief system, and biases. They must also consider how being part of a dynamic, complex system limits projecting one design methodology or model on all possible emergent contexts. Because "complex systems are non-linear[,] "there is no proportionality between causes and effects. Small causes may give rise to large effects. Non-linearity is the rule, linearity is the exception."[2] Nonlinearity is characteristic of emergent properties where the whole is the product of the *interactions* of many parts that themselves cannot be isolated.[3] Yet today's military forces use methodologies such as NATO-OPP/JPP where all analytical methods express a complex security context in clear, simplistic, and linear cause-effect relationships. Emergence is discounted in NATO-OPP/JPP, as are nonlinear and emergent phenomena and relationships, which, again, are foundational to how complex systems differ from complicated and simple systems.

The process of emergence deals with this fundamental question in complex systems theory: "How does an entity come into existence whereas previously it did not exist, and the system had no understanding or idea of it?"[4] When emergence occurs, one can observe something, such as the appearance of a new or unrecognized order, organizational form, or novel structure/action having no clear causal relationship with the earlier system (when the emergence did not yet exist!). Something comes into reality, and observers struggle to explain how this happened while unable to clearly associate inputs and outputs or frame a linear path for the emergent event. Emergent properties cannot be deduced from properties of the parts; thus, analysis alone is insufficient. They are the product of the interactions and therefore need to be understood on their own terms within how multi-minded systems behave.[5] Yet nearly every model and method in the modern military paradigm relies on analytical reasoning, and emergence is swept under the rug.

Complex systems are also fractal (where irregular forms have strange patterns that appear scale dependent), and no single measurement or equation can ever work beyond specific and temporary contexts; "there is no single measurement that will give a true answer." It will depend on the measuring device and how and where one applies it. Complex systems demonstrate what is termed "recursive symmetries" that occur between scale levels; that is, "they tend to repeat a basic structure at several [different] levels."[6] Consider how the spiral swirl of cream in a cup of coffee is reminiscent of how hurricanes form, a flock of birds spiral in formation, and a galaxy rotates despite these phenomena being unrelated. NATO-OPP and JPP do not have any models or theoretical underpinnings to incorporate this recursiveness, yet military forces evaluate and decide on security activities applied to dynamic, complex systems in most every execution.

Emergence in complexity is the observation of an effect that lacks a sufficiently clear or apparent "cause" as normally understood in how the system behaved previously (the legacy state of that system). The very nature of emergent things and events means that new language and concepts must be created to address the emergence, along with new methods and practices and even entire transformations of what was previously the established system. Emergence is essentially paradoxical—the emergent properties remain changeless but also changing; they are unpredictable yet inevitable in every type of system. Emergence is both independent from the system where it generates or arises but also entirely dependent upon it. Complex systems are sensitive to initial conditions where even exceedingly small activities might propel a system to dramatic transformations that will express in nonlinear, emergent, and dynamic fashion.

Complex systems also are prone to become unpredictable, moving in ways and patterns that are "not reducible to the previous description of the system's behavior. These emergent novelties represent points of bifurcation."[7] This unpredictability means that nearly all analytical models, language, and logic featured in NATO-OPP and JPP do not address complexity. Rather, they relegate a complex reality to a complicated or even simple system framing and thus continue to use the established Newtonian rationale for warfare. Military activities are therefore inappropriately understood in a manner that permits "A plus B leads to C" logic for linear-causal (systematic) analysis. Emergent properties cannot be measured directly; "one can measure only their manifestations. However, measuring the manifestations of a phenomenon has [also] proven very problematic."[8] Regardless, NATO-OPP and JPP as methodologies insist on reductionist, analytical constructs, such as using measures of performance or effectiveness that are entirely analytical and unable to address emergence in complex systems.

Emergence is an effect, event, and new process where the cause is not visible or readily apparent. When we question what emergence is, we really are thinking about causation and causality. In simple systems, the cause links directly to the effect in a clear input-output relationship that is reliable, uniform, predictable, and controlled. These systems encourage *systematic* logic—the sort of systems thinking where standard operating procedures and best practices work well.[9] However, some weak forms of emergence occur in simple or complicated system settings, such as in a closed system frame where a physical target (a hardened bunker) is struck by an explosive projectile or a tactical end state is accomplished with a drone strike on a selected individual tracked to a known physical location. "Simple emergence" is defined as a fixed, machine-like system where emergence occurs only in a set behavior manner.[10]

In a system where each part has a fixed role, and the total of the parts equates to the larger whole, each part becomes a specific, unchanging "cog in the machine." In examples such as clocks, steam engines, a row of dominoes to be set into motion with a single push, or the piling effect of sand in an hourglass, the emergence occurring is deterministic and predictable despite some aspects still possessing emergent qualities. For modern military forces, linking inputs to related outputs in security activities for simple emergence will largely relate to tangible, nonliving objects being maneuvered, destroyed, degraded, or otherwise affected in objective, unintelligent (nonconscious) and nonliving things. Jamming an electronic signal, sensing radioactive elements in a location, striking a runway to crater it, or enabling a mechanical failure of a system remotely are all relevant contexts for this type of emergence.

Emergence must always mean some transformation from the earlier, legacy system into something new and different, even if the difference is incredibly slight. For example, consider how sand falls in an hourglass. The sand will always fall at an exact, predictable rate, and each sand particle must fall from one part of the hourglass into the lower one, every time, always. The sand takes the same amount of time to completely empty from the top to the bottom vessel. These patterns are measurable quantitatively through analytical optimization and are repeatable. Yet as the sand falls and a pile of sand forms in the bottom portion, scientists are never able to accurately predict the formation and precise structure of any sandpile apart from that specific sandpile being created. It is random, and each time a sandpile is created, the formation of that sandpile is uniquely different from every other sandpile. The simple emergence here is that every time the hourglass is turned, an entirely new sandpile unlike any previous one (at the granular level) forms in an emergent way. Similarly, snowflake crystal formation renders all snowflakes unique every time. While all snowflakes are similar at one scale, close examination shows that no two snowflakes are ever identical. Every formation of snow generates myriad and infinite combinations that are in a simple emergence, novel, and unpredictable.[11]

The sand falling at a constant rate is predictable, while the sandpile itself is not. Although the sandpile regulates in a different form of self-stabilizing by collapsing piles of sand too steep to hold together, these, too, occur in unpredictable, unrepeatable ways. Individual grains of sand systemically impact other grains far removed from one another yet are structured in complex, nonlinear relationships that emerge over time.[12] That snowflakes generate uniquely is predictable at one level, while the ability to anticipate how the emergent flake will be different than others is unpredictable. A mechanical watch has similar simple-emergence qualities. Each gear in a watch (with a day/month/year element) makes the same precise, predictable movements to keep time while the watch itself as a composition of those parts tells a new time that the watch has never "told" previously. The parts equally demonstrate a second past nine o'clock p.m. on Tuesday in November, but this Tuesday in 2023 is the first time those watch parts have been in precise formation to "tell" this emergent moment in time. As another example, each person ages into a new version of themselves with changes at the cellular and molecular levels that are beyond their comprehension. Yet on a range of different scales, humans both change and remain the same in a complex, emergent relationship that cannot be reduced to mathematical certainty.

Simple emergence is the minimum and often quite insignificant threshold of emergence and is best framed within simple systems with strong linear causality. Problems with simple emergence can be "solved" using mathematical, engineering, and other scientific analysis or by drawing from established best practices. A row of dominos falls, but each domino itself as a part of the system will fall precisely where it is expected as part of the simple emergent process. Simple emergence is brittle; a single domino removed from the chain collapses the entire system and halts any emergence. The same is said for any disturbance in the hourglass or one gear in a watch breaking; the entire watch stops, and it will cease telling time. "Weak emergence" operates at a slightly higher level of complexity than simple emergence, where there is top-down feedback at the micro and macro levels.

Consider how a swarm of fish moves in the water, an ant colony explores an abandoned picnic site, or a dense flock of birds in flight moves over the observer. Each bird, ant, or fish at its localized level (scale) is aware and responding to others in only its immediate proximity (microlevel). A school of fish, a flock of birds, and an ant colony all respond only to immediate or local actions and effects (as explained by swarm theory). [13] One fish will turn left when other fish turn left as well; this pattern cascades through thousands of fish in a school, which makes the entire group seem to turn together instantly.[14] The ant queen knows nothing about the rest of the colony's actions, nor does she direct them. A drone bee on reconnaissance for a new hive location never visits other sites and does not compare or contrast multiple possible locations; yet every time, a hive collectively selects the optimal site available through only local, microlevel engagements.

This occurrence is of profound significance for modern military forces when considering how to visualize, manage, and assess the wide range of defense activities across the NATO and joint enterprises in complex security contexts. Militaries currently use NATO-OPP or JPP to reinforce centralized hierarchical command and control for decision-making for defense organizations conducting security activities. Each corresponding or subordinate security activity itself is articulated in a linear, cause-effect context where systematic reasoning should justify the risk to commit resources, time, and energy to executing the action. Yet complex systems do not permit such manipulations or respond in kind to linear-causal expectations.

Many behaviors within a complex system are decentralized, have no "center," and express in emergent, nonlinear fashion even when acted upon by a deliberate agent. In self-organized, decentralized systems where simple emergence plays a key role,[15] one fish does not direct the rest (centralized hierarchies); the school movements are emergent in that small effects at the microlevel (one fish sees a threat) cascades through the entire school to change the direction of the entire group (macrolevel). Yet collectively (macrolevel), the school is still moving toward some desired general objective (perhaps to feed, mate, or gain safety), which at the macrolevel influences each individual fish on general direction. A flock of birds migrates south for the winter (macrolevel), yet how immediate or local issues are dealt with by one bird cascades to the whole group (microlevel to macrolevel). One can predict that a flock will fly south but not the changing composition and position of the birds in that flock (weak emergence).

Weak emergence is indeed all around and manifesting in infinite ways. Ant and bee colonies foraging for food exhibit another aspect of this weak emergence worth mentioning. Any colony has a number of ants or bees exploring for new food sources; these "scouts" are usually sent out in random directions, with all scouts featuring a diversity of direction and location to maximize a colony's reach. However, this exploration and randomness is balanced by the colony's macrolevel need for unity, uniformity, order, and the ability to exploit new opportunities. Thus, if a hundred explorer ants move outward randomly and avoid crossing paths (maximum diversity), and just one ant finds some delicious garbage, that ant returns to inform the colony. These activities are decentralized, emergent, and not directed by any authority. The explorer does not radio back to the base to ask the queen ant whether certain exploitation criteria exist; the ant returns independently to the colony to relay the findings along with hundreds or thousands of other decentralized activities occurring across the collective.

The colony then exploits that new source by rapidly channeling other ants with new jobs to harvest and return the food in an orderly, predictably structured way. Anyone who discovers ants in their home knows how this works. Once the food source is gone or the trail for directing that source is lost, the colony returns once more to other more divergent options (exploring, randomness, diversity). A stable balance occurs, yet the colony functions emergently.[16] NATO and joint forces might consider how information collection and pattern analysis could be adapted to considering weak emergence for decision-making on various defense activities. Additionally, security professionals might incorporate emergence in ways currently nonexistent in military strategy, campaign planning, and operational integration across commands and security contexts using systemic logic to establish new models, methods, language, and theoretical underpinnings.

"Multiple emergence" is another expression of this broad, multifaceted concept that presents at a higher level of complexity and is worth mentioning as well. This type of emergence can take on a condition where a combination of different types of weak and simple emergence produce different patterns, unlike lower forms of emergence (weak and simple considered separately or isolated in standard analytical practice). An example is how financial markets or housing bubbles rise and fall, with positive and negative feedback loops therein.[17] Multiple emergent effects seem chaotic and entirely unpredictable, much as how the stock market can never be accurately plotted or a gambler can bet on games with absolute precision and certainty. Weather systems can only be weakly predicted a week or less out even with the most advanced technology available, while social trends—such as fads, gimmicks, and what the next "new sound" will be in any musical genre—are unpredictable and entirely emergent in how they unfold. Military organizations and intelligence agencies struggle not in isolating specific activities and actors in short bursts of time to create direct, causal linkages, but in making sense of and forecasting complex security contexts where this sort of emergence makes long-term, linear "lines of effort" and associated operational or strategic reasoning misleading and counterproductive.

Yet multiple emergence is not the only higher form of emergence worth considering for modern armed forces. "Adaptive emergence" and "tunneling" correspond to far more challenging forms of emergence that reject any linear, analytical, or systematic-oriented methodology applied to them. Complex systems are dynamic, meaning they do not operate or flow in any orderly, linear, or sequential format. Instead, they are nonlinear and almost randomized, with vastly sophisticated interdependence in parts and other subsystems that prevent prediction or control.[18] Yet even with the dynamic nature of complex systems preventing any linear or causal reasoning as they unfold in time and space, they adapt up to a point where some barrier prevents them from developing further. For much of human history, societies understood time only in a local sense (the original purpose of centrally locating bell towers in population centers) until technology such as the steam engine permitted trains and ships to traverse large enough distances quickly so that time became out of synch in the localized sense.

The invention of the "time zone" was a necessity and emergent due to the confusion of people entering locations so rapidly that their sense of time from their departure was "wrong" in their arrival zone. Likewise, the combustion engine, the telegraph, and other inventions were springboards for further innovation but also created new problems that people in earlier eras did not face. The nuclear bomb changed warfare forever, while the rise of computer-stimulated emergent technological and social development led to smartphones, social media, and one person having instantaneous access to more information on their phone than anyone with unlimited resources in any previous time. While modern militaries can access more data than any military predecessor in history, adversaries have the same advantage. Both operate in an ever-increasing fog of metadata, activity, and complex emergence with increasingly dangerous capabilities and capacities previously unimaginable (and unavailable) in past security contexts.

Systems also generate resistance to change, meaning that one type of emergence will be held back from expressing until certain conditions occur, triggering a dynamic and transformative form of emergence called "tunneling." Tunneling occurs when a system builds up enough "pressure" to these barriers so that a sudden (often catastrophic) event can tunnel the system through the barrier and into significantly greater complexity and emergence.[19] Consider the development of the atomic weapon in World War II and the impact on how nations approached warfare before and after its development. For all human history, groups sought advantages in the application of organized violence, whether it was a technological, physical, or conceptual form that provided the ability to defeat an adversary. For example, a technological barrier for the development of atomic weaponry was the necessary resources and scientific experiments to create and apply atomic energy in an offensive, destructive, and controlled manner. A physical barrier in 1942 was the massive amount of silver required to quickly produce enough uranium-235 to have enriched bomb materials and nuclear fission.[20] A conceptual barrier was the understanding of nuclear physics, which only became realized in Einstein's transformative ideas in the first decade of the twentieth century.

Conventional (nonnuclear) war would continue until 1945, and despite World War II demonstrating that nonnuclear war could increase in scale, capacity, and capability for destruction beyond any previous conflict, atomic war would tunnel emergence in a transformative, systemic manner. When the United States dropped two atomic bombs on Japan to terminate that conflict, it ushered in a new era of warfare leading to decades of a Cold War and a nuclear arms race that continues today between adversarial nations able to accomplish nuclear fission. Tunneling emergence radically transforms a system into a new state requiring entirely novel developments that are unexplainable using legacy system language, models, or methods. Nuclear war (and the prevention, containment, and development associated with it) is distinct from earlier types of warfare, requiring new strategies, policies, techniques, doctrine, and organizational forms (such as the Army's Pentomic Division experiment in the late 1950s).

A critical aspect of emergent tunneling is that all legacy forms of warfare remain just as significant and complex in the new, emergent system. Nations can and do engage in conventional warfare in the new atomic age, and all earlier legacy concerns remain today from 1944 before atomics created the emergent system. However, within the new emergent system where nuclear weapons caused radical transformation and disruption, the added complexity of contemplating nuclear war is added on top of the previous legacy conflict concerns of conventional destruction. Tunneling is a radical expression of emergence in complex systems that transforms a system into something more complex and dynamic than the earlier version. The systemic resistance that had prevented the tunneling will switch to another form of resistance to something different that later leads to another systemic transformation and tunneling unlike the atomic transformation.[21]

An example of emergent tunneling that occurred entirely in the social consciousness illustrates how ideas alone might prevent the attainment of shared goals in complex reality. High jumping as a sport emerged in the last decade of the nineteenth century with the revival of the Olympic Games. The first technique to propel a human over a high bar by their own locomotion was the scissor jump and remains the preferred technique for elementary school children. One leaps at the bar and scissor kicks the legs to clear it. Early Olympic records went over six feet, but that technique had an upper limit due to physics, biology, and human limitations. Yet the institution rejected alternatives, and only when Stanford University high jumper George Horine used his alternative technique of the Western roll to break the world record would the sport adapt his technique. Horine accidentally created it because his family's backyard did not allow him to run up to the bar using the scissor method, and he experimented (and failed) with his alternative. His coaches urged him to stop using it, as Horine initially could jump higher with the older technique. Nevertheless, like all innovators, he persisted and eventually transformed the sport.

Innovation in the sport would repeatedly occur through the twentieth century, with the Western roll replaced by a straddle technique where jumpers rotated their torsos belly-down over the bar. That technique was rejected as well until jumpers began breaking the world record. By this point, jumpers cleared seven feet, five inches, significantly higher than jumpers using the original scissor technique. Dick Fosbury at Oregon State University would completely change high jumping by twisting his body over the bar, head and shoulders first, landing on thick padding not required by the other techniques. Again, the institution resisted, and Fosbury endured perpetual insults from athletes and sports media as he honed the strange technique. In 1968, he won the gold medal and broke the world record, causing nearly all jumpers to shift to his Fosbury flop approach.

What is unique about the high-jump evolution is that there is no difference between athletes in the 1890s and late 1960s. There is no technological difference in high jumping, as the same rules and objectives in 1890 remained in 1968. The only difference is how high jumpers conceptualized the best way to approach propelling a human over a bar with their own locomotion. Were time travelers to visit the

1890s and bring the Fosbury flop technique with them, jumpers in the 1890s would likely "tunnel" rapidly to shatter records that instead took decades and gradual institutional shifts in technique acceptance. The high-jump evolution demonstrates how social, institutionalized resistance can slow down even things that do not require any technological, resource, or physical emergence. Today, military organizations have strong institutionalized belief systems that exist entirely in the conceptual realm yet also resist innovative thinking.

The notion that complex systems feature emergence and, in adaptive emergence, the very concepts that a group, organization, or society are enforcing might become the barriers to transformation and change highlights how strategic design is both philosophical at an abstract level and *systemic* in logic. Unlike systematic logic (input-output, linear causality, mechanistic, analytical), systemic logic draws from multiple competing, paradoxical ways of understanding and acting. Systemic thinking requires many ways of thinking about systems, complexity, differences in objectivity and subjectivity, and the prioritization of paradox, nonlinearity, emergence, and innovation.

Modern militaries employ decision-making methodologies that cater exclusively to systematic logic for security activities instead of appreciating systemic logic and complexity in security affairs. Some forms of complexity are accepted in NATO and joint doctrine and practices, but they appear limited by contemporary language, models, methods, and accepted military theories on warfare. Most people readily accept the first order of complexity—a hurricane forming off the coast of Florida is agreed as a complex system. Should that hurricane be somewhere no humans exist (e.g., Jupiter's Great Red Spot is a massive, centuries-old hurricane system where humans have never been), the system will behave uninterrupted and be a "complex system of the first order." There is no such thing as "problem" in "first-order complexity"; there just "is" complexity. Not until humans are introduced into the situation can one add yet another layer to an already complex system.

Complexity theorists Antoine Bousquet and Simon Curtis offer, "The study of social systems is further complicated by the reflexivity [or lack thereof] of actors capable of absorbing and adjusting to the very knowledge produced about them."[22] When an organization is unable to lift itself cognitively by its own bootstraps to gaze upon its own dominant paradigm in action, it is essentially relying on unexamined or unacknowledged assumptions about reality. Gaining awareness of how one's institutional frame for sensemaking and decision-making will enable important realizations such as triple-loop learning, reflective practice, and social paradigm recognition that are featured in security design applications. With this last aspect of emergence, NATO and joint forces should consider a different way of realizing complex reality that differs from the dominant, institutionally sanctioned framework found in contemporary defense thinking.

This approach leads to what is termed "second-order complexity" in recent theoretical work on complexity, systems theory, and social sciences. Humans realizing the hurricane is coming toward Florida (first-order complexity of a hurricane forming) triggers a rush on supermarkets and the panic shopping for toilet paper and other supplies despite little *rational* reason for Americans to overstock these items. The first sixty days of the COVID pandemic in March–April 2020 saw similar worldwide panic shopping for toilet paper, although it had no relation to an infectious disease. Thus, groups of humans often impose on already complex situations—those involving entrenched problems evolving over time—further complication due to their own organizational, cultural, ethical, and legal requirements. People take something complex (first order complete with all types of emergence) and add a new dimension of complexity (second order) that is constructed by humans and through their own cognitive barriers, structures, and belief systems.

Second-order complexity operates on top of the first-order complex system (physical reality), adding another emergent soup of objective, subjective, analytical, irrational, and paradoxical constructs and interdependent relationships. The types of emergence discussed in this chapter operate in first-order complexity and the second-order complexity manifested by human beings. Complex warfare is so confounding and illusive for militaries to make sense of because *their primary conceptualization tools are systematic, linear, mechanistic, and highly analytical*. Strategic design aids security organizations in gaining a deeper, systemic picture of not just what we are doing, but how and why we are in the situations in which we find ourselves.[23] Here, attention is drawn to how one can better understand the systemic changes that occur within the areas of conflict or security emphasis to advance national and institutional opportunities for success.

Emergence in complex systems, to include socially constructed ones as the most dynamic and fluid, is best understood not in an analytical property of "being" but a dynamic process of "becoming."[24]

Emergent properties do not fit in the modern war paradigm because they are the spontaneous outcomes of ongoing processes that cannot be isolated or rendered in any useful fashion through deductive reasoning or analytical examination.[25] Neither do complex systems provide any clear cause and effect. Causes and effects are often separated by time and space, or in the emergence of system change, those causes and effects replace one another. Events often have multiple effects that shift in time and cannot be understood in static terms of ends-ways-means. Emergence means that not only are analytical processes largely ineffective, but the notion of "ends" and "means" are fluid and also in a process of "becoming" rather than "being."[26] These factors create extensive problems for the entirety of how the modern war paradigm rationalizes complex reality.

The very notion of "success" is not simplistic, optimized victory in a closed system. Success in complexity is about leveraging recognizable success and unrealized and novel ways to "succeed" at the desired future states (and unimagined ones that tunneled emergence may usher into reality) security organizations aspire toward.

**Notes**

1. Tsoukas, "Dialogical Approach," 946.
2. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 988.
3. Gharajedaghi, *Systems Thinking*, 112.
4. Fromm, "Types and Forms of Emergence"; Hempel and Oppenheim, "On the Idea of Emergence"; Holland, *Emergence*; and Lewis, "Peter Berger and His Critics."
5. Gharajedaghi, *Systems Thinking*, 45–46.
6. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 988.
7. Tsoukas and Hatch, 989.
8. Gharajedaghi, *Systems Thinking*, 47.
9. Paparone, "How We Fight"; Paparone, *Sociology of Military Science*; and Zweibelson, "One Piece at a Time."
10. For purposes of this basic design education, this definition combines Type 1 and Type 2 "simple emergence" for brevity. The distinction between the two is that Type 1 has no feedback while Type 2 has a scale-preservation and peer-to-peer (parts in composition) feedback. The steam engine and watch are Type 1 while the hourglass sand is Type 2.
11. Snowflake formation is unpredictable in that while scientists know that each new flake will be different from all others; there is no way to determine how it will differ.
12. Boisot and McKelvey, "Integrating Modernist and Postmodernist Perspectives," 423.
13. Zweibelson, "Swarm Theory."
14. Fromm, "Types and Forms of Emergence"; Holland, *Emergence*; and Holland, "Complex Adaptive Systems."
15. Marion and Uhl-Bien, "Complexity Theory and Al-Qaeda," 54–55.
16. Zweibelson, "Swarm Theory."

17. Fromm, "Types and Forms of Emergence."

18. Bousquet and Curtis, "Beyond Models and Metaphors "; Carlisle and McMillian, "Innovation in Organizations"; and Holland, *Hidden Order*.

19. Fromm, "Types and Forms of Emergence."

20. Reed, "From Treasury Vault to the Manhattan Project."

21. Fromm, "Types and Forms of Emergence."

22. Bousquet and Curtis, "Beyond Models and Metaphors," 56.

23. For more on reflective practice and epistemological studies, see Schön, *Displacement of Concepts*; Schön, "Knowing-in-Action"; and Krippendorff, "Principles of Design."

24. Tsoukas, *Complex Knowledge*, 49–52.

25. Gharajedaghi, *Systems Thinking*, 47–48.

26. Gharajedaghi, 41–48.

Chapter 21

# Rhizomes

## In Paradox to "Centers of Gravity" and Centralized Hierarchies in War

Two key biological metaphors used in postmodernism come from the notions of a "tree form" and the "rhizome." Both permeate the natural world, where "root-tree structures grow and multiply in relation to a central guiding and anchoring structure."[1] The tree form is a centralized, hierarchical relationship that metaphorically is the basis of nearly all classification structuring in Western society's knowledge creation. The tree (centralized hierarchy) "for nearly two millennia . . . has been an Aristotelian hierarchical model of concepts divided into mutually exclusive categories."[2] The centralized hierarchical form, mirroring how a rooted tree branches off a central trunk, "is a fundamental intellectual model for much of Western thought, stemming originally from Aristotle's 'classic theory of categories,' which in essence propounds that entities are placed into the same category, by rational division, according to an objective assessment of shared characteristics."[3] During the rise of natural sciences centuries later, Clausewitz would draw from Newtonian physics to adapt a "root tree" metaphor of "gravity" to apply in a new "science of warfare." Thus, the COG analysis central to all modern military decision-making endeavors uses a tree-form mode of organizing reality and warfare.

While the tree-form model has formed the basis for all scientific classification, taxonomy, and bibliographic classification, influencing nearly all aspects of the modern military form and doctrinal function in war, it has multiple advantages and weaknesses when considered in system settings. Tree-form logic is "characterized by vertical and fixed linkages [such as levels of war, lines of effort], binary choices [most dangerous, most likely, strength, weakness], and by the linking of the elements only of the same general nature [the sorting and stacking of things into the 'Political, Military, Economic, Social, Information, Infrastructure, Physical Environment, and Time' or PMESII-PT model]."[4] The logic for the tree form is a form of cognition "in which information, ideas, people, and institutions are ordered hierarchically according to the predecessors and roots. . . . Thus, tree order is an order based on similarity and offers a taxonomy of forms within a category."[5] Just as centers of gravity use a tree-form logic to create the framework for centralized hierarchical relationships upon which to seek military actions (defend, attack), if a part of a tree is damaged, all extensions from that point onward are damaged or destroyed. COGs are then arranged in yet another tree form where they correspond to enemy and friendly COGs positioned at various levels of war. NATO-OPP and JPP employ COG analysis prominently to enable the management of all activities, validating a systematic reasoning for how complex reality and warfare are framed for most Western military forces.

Yet complex, adaptive systems do not support purely systematic logic, nor do complex systems express relationships only in centralized hierarchical forms. Instead, just as nature features root-tree metaphors in many organizational relationships—from vegetation to wolf packs to cloud formations at various altitudes—it also features rhizomic relationships. However, the modern military decision-making methodology has nothing to address rhizomes, and strategists, analysts, and planners can only apply a root-tree construct through COGs, ends-ways-means, line of effort, problem-solution systematic learning, and other mathematical, engineering, and natural science inspired frameworks.

Complex systems feature both root-tree relationships and rhizomes, where one might view how the Encyclopedia Britannica publishing company, a traditional taxi company, the US State Department, and the 75th Ranger Regiment organize and operate as root-tree examples. Meanwhile, Wikipedia, Uber, and the shadowy hacker group "Anonymous" demonstrate rhizomic properties of organization and action. Many more military patterns, groups, and expressions of organized violence seem closer to rhizomic activities than root-tree ones, yet the joint planning process and all related decision-making methodologies, doctrine, strategy, and policy appear to exclusively limit modeling to tree form only. Emergent examples of rhizomic activities where there *is no centralized hierarchical formation i*nclude the Arab Spring movement organized over modified Twitter applications and smartphones,[6] the divergence and decentralization of Salafi-jihadist terror groups from 2006 onward,[7] and similar decentralization and increased organized crime-related violence of Mexican drug cartels since 2011.[8] Another example is Russian state-sponsored bots, trolls, and artificial intelligence algorithms with a decentralized approach to deep fakes and disinformation campaigns.[9]

Originally found in botany, the rhizome is a "root like subterranean stem, commonly horizontal in position that usually produces roots below and sends up shoots progressively from the upper surface . . . with its multiple horizontal roots best [representing] the nature of the relation between . . . strategy and the many scientific disciplines to which it is connected."[10] The rhizome therefore becomes the antithesis of a root-tree construct, as it rejects hierarchical relationships, breaks away from stratifications and categorized totalities (where isolated objects are placed into conceptual bins like how CARVER analyzes targets with independent factors correlating to criticality, accessibility, etc.), and discards any limitation or regulation of emergent connections between system components.

Rhizomes are "non-hierarchical, horizontal multiplicities which cannot be subsumed within a unified structure, whose components form random, unregulated networks in which any element may be connected with any other element."[11] In a study of the rhizomatic characteristics of the London itinerant boat dwellers (Boaters), Benjamin Bowles explains, "Boaters' advocacy organisations spring up, mushroom-like, rhizomes from somewhere underground, to deal with particular threats, before falling apart before hierarchies can be cemented and powers grabbed."[12] Rhizomes encompass ideas paradoxical to centralized hierarchical forms, such as "self-organized," "decentralized," "nonlinear," "lacking order," and "irregular" or "asymmetric"—terms often used in complex security challenges.

The rhizome is a metaphor the military can introduce into strategic design and operational planning where it works to compare "social life to chaotic root structures in which everything is connected to everything else [or has the potential, in an emergent state of *becoming in any and all possible connections]*."[13] Militaries cannot consider the rhizome something that can be plugged into the CARVER targeting model, assailed with SWOT categorical scrutiny, or rendered into COG analysis. Rather, "rhizomes are not composed of units but of multiple dimensions and directions in motion; as such, there is no beginning, no end, only a middle that grows."[14] Their characteristics require a postmodern war frame for strategists to consider instead of the modern, analytically oriented approach of systematic logic. In explaining the rhizomatic London Boaters, Bowles states, "Boaters are proud of how their group is loose, lacking official structure, and often ineffective, just as they are proud of their victories when pressed and threatened. A Boater at the meeting . . .[referred to their collective] as 'a squiggly wiggly not-quite-democratic thing.'"[15] Many of the latest and most confusing adversaries of recent decades might be more "squiggly wiggly" than susceptible to a center of gravity construct; yet defense institutions insist on adhering to doctrinal modes of understanding warfare through one frame only.

The London Boaters provide a useful example of this alternative strategic design concept. They exemplify how "groups tend to arise in response to threats, act in ways which are either contested by skeptical elements of the community or are non-hierarchically designed so as to avoid this contestation, and then change or disappear in the absence of an immediate goal or a diminishing of the threat that framed their original purpose."[16] Rhizomatic action "constantly moves along these connections, changing and connecting to 'other multiplicities,' "[17] which supports the nonlinear and emergent patterns that define complex, adaptive systems where NATO or joint forces seek to exercise security activities. This concept may seem esoteric or even obtuse for military professionals desiring to simplify complex reality so that the mathematical precision of objective isolation can link heroic strategic action in an input-output quantifiably measurable manner as modern military strategic design and planning promote. However, complex reality cannot be tamed into some categorical, hierarchical arrangement where objectivity gains a slight edge on all other aspects of a swirling, transforming, and learning system. David Pick frames this concept effectively:

> In some ways, organization cannot be located solely in the real; it is also a social construction and, as such, is part reality and part real. . . . Two things about organization are real: the people who interact with the organization (who are themselves only part real—an unreachable organism and part subject) and the physical containers and spatial dimensions occupied by the organization (e.g., the physical presence of buildings and computers). Of interest now is how the content, form and expression of organization encounter one another and what happens when they encounter the real.[18]

The rhizome removes the very idea of a natural hierarchy and instead emphasizes the nonlinear and nonhierarchical, self-organizing, decentralized, and "hyperlinked" environment[19] that military strategists may find more valuable in considering complex security contexts versus exclusively using tree-form concepts like COG. In particular, the digital world of today with cyberspace, social media, artificial intelligence, quantum theory, block chains, and other technologically sophisticated manifestations seems far more recognizable through rhizomatic versus COG-oriented models, metaphors, and language. Unlike the rigid root-tree forms that "grow and multiply in relation to a central guiding and anchoring structure[,] the rhizome . . . is the free, expansive movement of grass, constantly connecting random and infinite points."[20] Other examples of rhizomes are found in potato tubulars (growing in all directions, without a center), ant colony movements for food foraging, and the constant reorganization of a bird flock in flight. Tree-form organizational structures are indeed strong and vulnerable, as COG analysis dictates; kill the alpha male of a wolf pack or the leader of a drug cartel, and the organization is disrupted until it replaces leadership. Yet rhizomatic structures continue uninterrupted, no matter where a "kill strike" is attempted across the entire organization. For instance, cutting up certain starfish in the ocean creates many smaller ones.[21]

Lawley provides a valuable warning about potential attempts to submit rhizomes to systematic logic and create a categorical model that formats rhizomatic patterns and permits a comparison and contrast with a COG analysis, stakeholder analysis, or utilization in CARVER targeting. The rhizome must remain fluid, in a perpetually emergent state of *becoming,* where one might illustrate significant qualities and characteristics of rhizomatic behaviors. However, one must avoid "any of these becoming the one use and interpretation of the rhizome in the study of organization—to prevent the rhizome from being arborified [rendered into root-tree centralization/vertical hierarchy] such that its own rhizomatic potential as a concept is closed off."[22] Thus, there will not be a graphic, framework, or templated model provided in this explanation of the rhizome for strategic design. Instead, strategic designers should also respect the incommensurability (competing ontologies equals talking past one another)[23] of rhizomatic heterogeneous and root-tree homogenous organizational forms and why the constructs of one cannot be imposed on the other. Michael Reddy refers to the Sapir-Whorf (a.k.a. Whorfian/Whorf) Hypothesis regarding the influence of language on one's worldview to explain social frame incompatibility:[24]

> There is an old joke about the Whorf Hypothesis to the effect that, if it should be true, then it would be by definition unprov-

> able. For if two human beings not only spoke radically different languages, but also thought and perceived the world differently, well then they would be far too busy throwing rocks and spears at one another to ever sit down and establish this as a fact. The grain of truth in this facetiousness can be found in [Donald] Schon's dictum that frame conflicts are "immune to resolution by appeal to the facts."[25]

This paradox in how we construct frames and then articulate them using language generated within those frames means that "facts" are themselves subject to what frame produces them and how they might be reinterpreted through a dissimilar social frame. A frame that relies exclusively on analytic optimization and objectivity will not persuade with the facts produced within that frame any alternative frame that does not also use analytical optimization and objectivity to make sense of the world. Synthetic thinking relies on systems theory and complexity theory—these theoretical constructs at an ontological and epistemological level break with classical science (Newtonian style) that positions analytical reasoning above all else. Analysis does not produce synthesis, centralized hierarchical reductionism will describe but not explain, and complex emergence cannot be predicted in linear-causal fashion. With rhizomes, "each element mutually alters the other, and they each *become* the other in the process. Fixed entities are replaced by an indeterminate middle, and it is in this middle that uniquely new relations and possibilities are continually created" (emphasis in original).[26] Unfortunately, proponents of COGs will lack the frame awareness, language, and interest in what is beyond analytical rationalization to take much intellectual interest in how a rhizome is not a COG. The same might be said of rhizome enthusiasts if that concept were recognized anywhere in the modern military frame.[27]

The rhizome has already been taken out of postmodern theory and applied in a range of nonmilitary disciplines and fields, including organizational theory, information theory, narrative theory, Eastern strategic theory, social media, and literature sciences as well as artificial intelligence and robotics.[28] Originating in biology (first appearing in 1832 in botany) to explain how many plants—such as poison ivy, potato tubulars, ferns, ginger, turmeric, and other bulbs—organize and grow, postmodern philosophy adapted the concept for other nonbiological usages in the 1970s. Yet the modern military institution never incorporated rhizomatic concepts in strategic or operational planning methodologies. Instead, Western militaries adopted a different organizing metaphor, also coined in 1832, when Marie von Brühl published the posthumous military work of Carl von Clausewitz. Clausewitz introduced Prussian military theorists to “the source of power that provides moral or physical strength, freedom of action, or will to act” as the “center of gravity.”[29]

The COG is a Newtonian physics metaphor lifted from natural science for assimilation into framing a modern “science of military activities.” The difficulty is that the COG enables military strategists and analysts to approach warfare cast in an interpretation of reality where all battles (conducted anywhere, everywhere, forever, and forward and backward in time and space) hold to a fundamental organizing logic that ultimately is in root-tree form. American military forces would not introduce Clausewitzian thinking until after the Vietnam War, yet despite both rhizomes and COGs being available and equally accessible academically, rhizomes are absent in all mainstream military theory.[30]

Cyberspace, computer network development, and the worldwide web’s growth and knowledge creation are currently being explored through rhizomatic constructs. In these technological developments, what was once a centralized hierarchical formation of information understood in classical Aristotelian structuring “has dissolved, replaced by something more amorphous, if more creative.”[31] People several decades ago used the card catalog system (invented by Melvil Dewey in 1876) based on the root-tree construct to organize book locations in a library with vertical, fixed linkages of relative location and relative index, arranged in linear alphabetical ordering. Today, a Google or Wikipedia search is not only faster but occurs rhizomatically instead of through the classical, centralized hierarchical tree form. There is a shift in pattern prioritization from “collecting what is significant through reductionist linkages” to “connecting to as wide a web of information as possible” where any and every path connects the entire network in an infinite, dense, and ever-changing web.[32] Thus, analytical optimization (preferred in simple and complicated systems) is dissolved so that synthesis and divergent thinking generate novelty and holistic appreciation in complex (or chaotic) systems.

Rhizome philosophy, if applied to a security context, would feature the following principles that aid in defining a rhizomatic state of *becoming*, but not a categorization model that strategists might plug data into so that rhizomatic predictive outputs occur formulaically. First, such a model requires any part of a rhizome system to connect to any other part. There is a complete lack of hierarchy. Rather, the system "is anti-hierarchical, but all of its parts are and must be connected,"[33] implying that all manner of COG analytical modeling is also irrelevant. Rhizomes *consist only* of lines and are devoid of points that can be thought of in terms of where a branch meets the trunk of a tree or a linkage node that supports a hierarchical arrangement. Thus, rhizomes are pure expressions of multiplicity, while COGs and root-tree forms express centric (single center) or polycentric (multiple centers) systems with "hierarchical modes of communication and pre-established paths.[34] Gilles Deleuze and Felix Guattari apply a geographic metaphor of "plateau" to differentiate rhizomes from root-tree forms where the rhizome exclusively comprises plateaus. Eli Noy and Aïm Deüelle Leuski add that "a plateau is always in the middle, not at the beginning or end."[35] Figure 36 depicts the root-tree and rhizome concepts and their applications to organizational contexts.

The rhizome experiences damage or "rupture" differently than centralized hierarchical forms. One can target and shatter part of a rhizome in one particular spot, but it will start up again either along an already established line or generate a novel line in an unexpected, different direction. There are two more qualities of rhizomatic philosophy addressed with "cartography" and "decalcomania." They can be explained with the idea of maps and mapping. Decalcomania, shortened to "decal" in modern usage, originated from how printing techniques transfer concepts from the original to other materials. Yet decalcomania offers unusual properties to include fractalization. The postmodern adaptation of this concept for rhizomes is that the rhizomatic organization is the map and not the tracing. The tracing of a map (or what becomes the decal) is a copy of the original, not the actual source or complete capture of the original thing. Further, the decal is fixed, rigidly adhering to the requirement to remain an approximation of that which permitted decalcomania to occur. The map, however, is open and, in postmodern rhizomatic theory, is "connectable in all dimensions; it is detachable, reversible, and subject to constant modification. It can be torn, reversed, adapted to any kind of mounting, and reworked by an individual, group or social formation."[36]

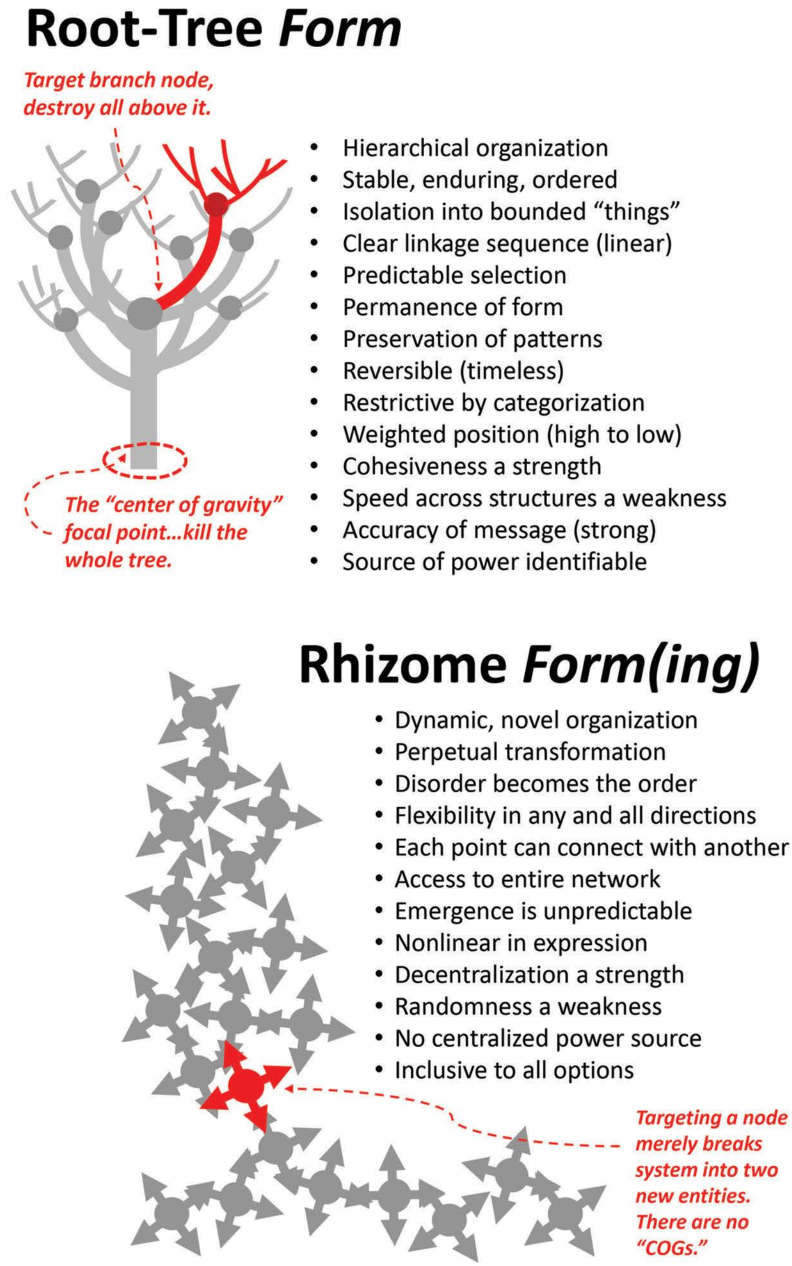



**Figure 36. Root-tree patterns and rhizomatic ones**

In a military consideration, a case where groups have radically transformed ideas or movements to emergent advantage despite a departure from the meaning of the original movement itself applies as rhizomatic. Violent jihadism transformed rhizomatically from particular origins in the 1950s in the Muslim Brotherhood ideological and political stances of Sayyid Qutb and "Milestones"[37] to contemporary Islamist and jihadist movements, with the *9/11 Commission Report* acknowledging Osama bin Laden's worldview as heavily influenced and inspired by Qutb's earlier ideas.[38] The transformation of the Cold War created the Revolutionary Armed Forces of Colombia – People's Army from a Marxist-Leninist peasant guerrilla group fighting antiimperialism to a modern, powerful drug cartel and kidnapping organization in the 1980s, to a disarmed political party with representatives in Colombian Congress since 2018.

Hezbollah's rhizomatic journey took it from post-1979 Iranian Revolution as a state-sponsored terror group using suicide attacks, bombings, terrorism, and militia training to a special operations entity unlike most other groups branded "state proxy appendage." Hezbollah today expresses sophisticated special operations capabilities, operates often autonomously from Iranian formal oversight, nurtures cultlike ideological fanaticism to grow and maintain members, and is an international drug cartel and black-market operator among numerous other forms and abilities.[39] There are clear security entities and patterns of complex violence within NATO's or joint forces' purview that might be understood through strategic design with rhizomes *instead of centralized hierarchical models alone*.

The concept of a rhizome for complex security decision-making consideration is one of disruptive and deconstructive capability toward the current NATO-OPP/JPP decision-making framework. Not all organizations or groups or the relationships within a network are expressed in root-tree or linear, Newtonian-physics-based metaphoric devices. Those parts of complex reality that have "a form of existence that tends toward the unstructured, the free-flowing, and towards flat, egalitarian structures [are the very ones] that state-form organisations find hard to grasp."[40] The rhizome concept expresses through postmodern philosophy, which may be off-putting for those demanding that all strategic thinking be actioned exclusively through a single war paradigm seeking pseudoscientific adaptations of natural science language, models, and metaphors. Yet "strategy is an experiential arena where philosophy matters."[41] The rhizome is "an acentered, non-hierarchical, nonsignifying system without a general and without an organizing memory or central automation, defined solely by a circulation of states."[42] Lyn Robinson and Mike McGuire offer important warnings for adventurous strategists or analysts seeking to fuse rhizomes into another social framework for decision-making, such as grafting a rhizomatic model or stepping into the joint planning process or NATO-OPP:

> The prospect of linking together non-hierarchical and traditional systems—the rhizome and the tree—seems on the face of it to be a promising objective for the practical situation. We should perhaps be concerned, however, that we are "bolting together" concepts from very different philosophical backgrounds—perhaps even inadvertently trying to integrate realist and non-realist positions. . . . Before the rhizome concept can be absorbed as a standard model for understanding information organisation, and other aspects of the information sciences, much more study, both of its philosophical basis and practical applicability, will be needed.[43]

NATO and joint forces ought not to retain the overarching systematic, reductionist frame of the modern military decision-making paradigm and attempt to insert a step where the rhizome is rendered into a formula similar to how COG analysis, SWOT, or CARVER occurs. If the rhizome is applied, it must be done without violating the core principles of what makes the rhizomatic *becoming*, explained earlier in this chapter, unique to rhizomes and not tree forms. Consequently, much of modern doctrine—including language, models, and those theoretical underpinnings the models require—is incompatible and even paradoxical to rhizomatic philosophical constructs. Advocates of this postmodern idea—such as Shimon Naveh, Ofra Graicer, and students of the Israeli original "systemic operational design" community of practice—have used rhizomatic themes and concepts in multiple military endeavors since the 1990s.

*P*ick supports this stance, offering, "We must accept the limitations of our current modes of representation and expression and rethink how we illuminate the multiplicity of complex, contemporary forms of organization in accessible ways. . . . We thus find that we are thinking not about organization itself but the tracks that it leaves behind: footprints, scats, fragments of past meals. By working the seam, . . . we can begin to illuminate the flux and flow between form (configuration), content (constructed realities), expressions (texts) and substance (the real)."[44] In doing so, modern military forces have the opportunity to focus their enterprise in different ways, engaging with complex, dynamic security contexts that legacy modes of decision-making were incapable of. This capability points to not a single future but to the emergence of multiple futures so that complexity is thought of outside and beyond the legacy military framework of systematic logic.

**Notes**

1. Lawley, "Deleuze's Rhizome," 36.
2. Robinson and McGuire, "Rhizome and the Tree " 604.
3. Robinson and McGuire, 606.
4. Robinson and McGuire, 606.
5. Robinson and McGuire, 606.
6. Ritzen, " 'It Exists to Demobilise Opposition.' "
7. Jones, "Decentralized Movement."
8. Selee, "Mexican Drug Cartels Less Cohesive."
9. Meserole and Polyakova, "West Is Ill-Prepared."
10. Noy and Luski, "Multidisciplinary Nature of Business Strategy," 24. Noy cites Henry Mintzberg, *The Rise and Fall of Strategic Planning: Reconceiving Roles for Planning, Plans*, Planners (New York: Free Press, 1994). Mintzberg addresses "business strategy" in particular, but his comments also apply to defense strategy.
11. Robinson and McGuire, "Rhizome and the Tree," 606.
12. Bowles, "Deleuzian Frame for Boaters' Political (Dis)Organisation," 37.
13. Pick, "Rethinking Organization Theory," 804.
14. Deleuze and Guattari, *Thousand Plateaus*, 21; and Pick, "Rethinking Organization Theory," 804.
15. Bowles, "Deleuzian Frame for Boaters' Political (Dis)Organisation," 47.
16. Bowles, 51.
17. Deleuze and Guattari, *Thousand Plateaus*, 9.
18. Pick, "Rethinking Organization Theory," 807.
19. Pick, 807.
20. Lawley, "Deleuze's Rhizome and the Study of Organization," 36.
21. Brafman and Beckstrom, *Starfish and the Spider*.
22. Lawley, "Deleuze's Rhizome and the Study of Organization," 37.
23. Boisot and McKelvey, "Integrating Modernist and Postmodernist Perspectives," 424.
24. Edward Sapir and Benjamin Whorf created their hypothesis in 1954. Whorf stated that "language shapes the way we think, and determines what we can think about." Meehan, "Discovering Benjamin Lee Whorf." This means that language determines one's conception of the world, and Whorf finds paradox in that language is limited and subjective. Therefore, all human perception of reality is not only flawed but, depending on one's social framework, also in tension with many other competing interpretations.
25. Reddy, "Conduit Metaphor," 165. Donald Schön is known for his work in the application of reflective theory and development of single- and double-loop learning.
26. Lawley, "Deleuze's Rhizome and the Study of Organization," 37.

27. Aside from a small population of systemic design practitioners mostly influenced by the work of Israeli general Shimon Naveh, few inside the military have heard of a rhizome. Naveh drew from postmodern philosophy of the 1970–1980s and reapplied it to military design in the late 1990s. Those postmodernists drew from earlier biological sources to reinterpret rhizomes beyond their original biology applications.

28. Robinson and McGuire, "Rhizome and the Tree," 608; Stanley and Lehman, *Why Greatness Cannot Be Planned*; Brafman and Beckstrom, *Starfish and the Spider*; Beer, "Characterizing Autopoiesis"; Noy and Luski, "Multidisciplinary Nature of Business Strategy"; Lai, "Learning from the Stones"; and Jullien, *Silent Transformations*.

29. Clausewitz, *On War*, 331–34.

30. By exception, developers of systemic operational design would use rhizomes starting in the late 1990s in the Israeli Defense Forces. See Naveh, "Between the Striated and the Smooth"; Naveh, "Systemic Operational Design"; and Graicer, *Two Steps Ahead*.

31. Robinson and McGuire, "Rhizome and the Tree," 609.

32. Robinson and McGuire, 609. The author modifies the phrases to fit this security-oriented application.

33. Noy and Luski, "Multidisciplinary Nature of Business Strategy," 25.

34. Noy and Luski, 25.

35. Noy and Luski, 25; and Deleuze and Guattari, *Thousand Plateaus*.

36. Deleuze and Guattari; and Noy and Luski, " Multidisciplinary Nature of Business Strategy," 25.

37. Shaheed, "Milestones."

38. National Commission on Terrorist Attacks Upon the United States, *9-11 Commission Report*.

39. Feltman, "Hezbollah"; and Levitt, "Hezbollah's Criminal Networks."

40. Bowles, "Deleuzian Frame for Boaters' Political (Dis)Organisation," 51.

41. Noy and Luski, "Multidisciplinary Nature of Business Strategy," 24.

42. Noy and Luski, 25.

43. Robinson and McGuire, "Rhizome and the Tree," 611.

44. Pick, "Rethinking Organization Theory," 811.

Chapter 22

# Multiple Futures (Scenario Planning, Strategic Foresight)

## Divergent Goals

Strategists and analysts may question why existing detailed planning approaches (e.g., NATO-OPP, JPP) are insufficient for any security organization to continue applying in complex challenges. The answer requires a quick history lesson about the origins of the modern military strategic framework and decision-making methodology. The modern managerial movement that emerged from the Industrial Revolution and massive national endeavors, such as political and military activities spanning World Wars I and II and the subsequent Cold War, inculcated a precise, end-state oriented, and mechanistic way to organize people and resources to act toward purposeful ends.[1] This mode of organizational decision-making and coordinating actions in time and space is best summarized as "systematic" and is the modern world's most recognized and approved form of linking predetermined goals to institutionally standardized practices, theories, and managed activities.

The modern military as an institution chooses to approach most of life's challenges *systematically*, where "the true goal of the system, the reason it programs itself like a computer, is the optimization of the global relationship between input and output."[2] We demand that a clear, standardized, and linear path be constructed (cognitively) so that we can derive an output from every input; therefore, an already established solution can be readily taken off the shelf and applied to any problem encountered.[3] This strategy forms the conceptual baseline for single-designed end states and the entire course of the action creation, war-gaming, selection, and codification process for operational planning and campaign design. As we have seen, it also exists in all aspects of contemporary NATO-OPP and JPP methodologies, models, theories, and language.

Thus, the systematic logic for sequencing all actions in time and space for most units, groups, organizations, companies, and even nation-states tends to be represented by elaborate arrangements and categorizations of inputs and outputs. These analytic processes attempt to standardize, reduce risk, increase prediction, and otherwise provide the expectation of increased control over time with the accumulation of more information, experience, and repetitions within a stable reality.[4] Paparone explains that this system produces "clear specification toward the industrial-like reproducibility of individual and organizational roles and activities and give[s] a sense of disambiguation and orderliness. . . . The logic of systematicity is written into dozens upon dozens of 'how to' manuals covering a wide spectrum of subjects available in breathtaking detail."[5] In turn, most organizations approach the future in the same systematic outlook that today's input should correspond to tomorrow's output or desired end state.[6] The linear path then becomes an engineering or mathematical problem to be worked out with standard risk, resources, or "ways and means" to proceed linking the input to the output in clear and often standardized concepts[7] that correspond to the institutional best practices for planning.[8] Activities are arranged in a linear, "A plus B leads to C" systematic construct where reality is frozen briefly, isolated and analyzed through universal rules or tenets, and subsequently reassembled so that the reverse-engineered plan might be executed step by step to effect the predicted (and expected) future single-state transformation.[9]

The problem with thinking about the future in starkly systematic terms is that complex, dynamic systems feature high levels of emergence. The emergent, complex nature of how systems transform from present state into some future one rejects such systematic logics outright (as explained in the earlier chapter on emergence and nonlinearity). Systematic logic works best in simple or complicated systems where there is a higher level of stability; indeed, "cause" leads to "effect" in either extremely predictable ways in simple systems or in relatively reliable patterns in complicated systems.[10] This "simple emergence" still largely works in such organizations, and systematic planning logic can be applied to generate useful results.[11]

However, in complex and chaotic systems, the future is going to be remarkably unpredictable. When these organizations attempt to use systematic logic, they are anticipating and preparing for a future that will not occur. Notwithstanding, they are also likely becoming dangerously cavalier or overconfident that their future models and strategic outlooks are sound and valuable. Modern militaries should consider whether systematic processes are the best approach for dealing with how security activities occur in complex security contexts worldwide. Many tactical and technical activities will indeed remain complicated enough to encourage the use of systematic logic, but

NATO and joint forces function above and beyond these within a global and highly complex frame. Possibilities do exist in nature, but any consideration of the future can only be talked about in abstraction and not within any objectivity. In other words, there are no libraries in the world that have books about the future in anything but the fiction section. We simply cannot “know” what will happen tomorrow except in varying degrees of abstraction.[12] Whether an organization employs language that is convergent and systematic or divergent and systemic will determine how and why it looks forward.

Instead of systematic planning for the future where an organization uses a management-by-objectives recipe book structure,[13] taking a *systemic* approach orients on complex dynamic systems as emergent, nonlinear, and entirely unpredictable. In adopting a systemic approach, NATO and joint forces would reform their decision-making methodologies to shift from single-state future strategies toward a divergent process of generating and maintaining multiple futures. Analytical logic would be deemphasized, with systemic logic enabling multiple relational forms of knowledge and different (often competing and paradoxical) ways of making sense of the same reality. Systemic thinking toward the future is divergent (multiple possible but different futures) versus convergent (a single end state); it attempts to generate and accommodate “multiple inequivalent descriptions” within a vastly complex context.[14] This approach would also denote a shift from modern to postmodern strategic design.

Systemic thinking toward multiple futures invests substantial time, energy, and imagination toward multiple frames of reference that are often different paradigms in play among stakeholders, competitors, peers, or rivals within a complex dynamic system. When more than one paradigm competes for making sense of reality, systemic designers will seek highly customized, unique, and tailored explanatory logics for design action. Such strategic designs may function in one possible future but potentially be insufficient or counterproductive in others (e.g., executing a military activity may generate multiple potential emergent outcomes).[15] It is the generation of these multiple divergent futures that creates the cognitive “maneuver space” for the design team. Subsequently, the strategic design sponsor has a wider range of potentials and future actions to consider and simulate because a convergent future end state is not the centralized focus.[16] This scenario creates problems for pure analytical treatments in military strategic design, where a single potential activity might generate a wide range of possible futures. Complex systems have various degrees of emergence, with lower levels expressing somewhat predictable changes, such as how a school of fish changes direction or how the nonlinear collapse of sand crystal piles in an hourglass.[17] Stronger forms of emergence such as those in the complexities of societal conflict (war) unfold in ways that are impossible to predict, rendering any linear-causal planning constructs irrelevant or counterproductive.

Furthermore, systemic design emphasizes that designers consider subjectivity with objectivity—the tangible/rational/analytic with the intangible/irrational/interpretivist side of a complex reality.[18] One must not reduce all strategic concepts to formulaic, isolatable, and measurable variables that eliminate or marginalize that which cannot be rendered into mathematical equations. Systemic designers acknowledge that even if a design future concept proves successful, attempts to reproduce that design or standardize it as an operating principle or general practice for the organization will subsequently fail. Unduplicatable design lessons are not just an example of systemic design but indicate how complex, dynamic systems feature emergence by essentially "learning" from design activities so that the earlier design contexts dissolve in the arrival of the future system. This feature also suggests that while military forces seek a new collective pathway for how to consider, manage, and develop military activities for national security interests, they should also avoid attempts to rigidly methodize, indoctrinate, or standardize a step-by-step procedure. Doing so eliminates the very essence of systemic praxis necessary to break from institutionalisms and the creep of codification.[19]

With virtually all operational and tactical (or local level) planning and most strategic planning centered exclusively on systematic logic,[20] the shift to design thinking and multiple futures presents modern militaries new opportunities. Systemic logic can be introduced into strategic-oriented activities such as NATO-OPP/JPP while other tactical and operational activities remain unaltered. There are multiple ways to think about the future for design in nonlinear fashion; the fastest and most comprehensive tool for doing so in a security context seems to be the inclusion of scenario planning into design methodology.[21] Scenario planning has been used extensively since the 1970s across industry and academia, where it first made a splash during the 1973 oil crisis.[22] Since the 1980s, scenario planning has worked its way into nearly every Fortune 500 company's strategic planning department and academia as a mainstream alternative (and systemic) mode of thinking toward a dynamic, complex future. Yet in governmental, security (military, federal agency), and most law enforcement organizations, only the dominant systematic logic for planning toward singular desired end states is expressed in contemporary strategic thinking, design, and organizational planning efforts. Today, few in the Department of Defense are even aware of multiple futures outside of small groups and sections experimenting with the idea.

In the late 1960s, a small group of economists working for the Hudson Institute developed a novel yet controversial way of planning future strategies for organizations in complex environments. Led by economists Jimmy Davidson, Edward Newland, and Pierre Wack, the Royal Dutch/Shell Oil Group developed this model of complex decision scenarios in the 1960s–1970s for an international oil company confronting complexity. They challenged the many dominant strategy-making methodologies of the time by building on the pioneering economic work of Herman Kahn and Anthony Weiner of the Hudson Institute. Wack and his team of economists saw the existing and dominant process of forecasting as increasingly problematic over time, particularly how the leading managerial methodology (Taylorism School of Management) turned most strategic planning into mechanical, systematic, input-output focused processes where existing organizational solutions are assigned to problems as they are identified.[23] Complexity theorists such as Russell Ackoff would explain how humans understood and approached "problems," with "problem-solution" becoming the dominant mode of framing.[24] Here, one needed to recognize the solution first so that when unexpected "problems" occur, the organization can review its known solutions list and correlate "problem-solution" constructs suitable for formulaic programming of established strategies and operations.

In the Industrial Era leading up to the end of World War II, linear cause-effect relationships (systematic logic) constituted the framework for scientific analysis, strategy, organizational form, and management. Organizations would curate institutional knowledge comprising historically viable "solutions." They used this data to identify future problems and, through linear decision-making, pair recognizable problems to institutionally understood solutions already mastered. This approach became the modern scientific way of warfare for the industrialized West.[25] In the immediate rise of the early Information Age and the arrival of the first computers in this period, the science of cybernetics took hold not just across scientific disciplines but throughout industry, management, and organizational theories. Cybernetics addressed the relationship of problem sets that correspond to "communication, control, and statistical mechanics."[26]

Cybernetic thinking would embrace the computerized assimilation of increasingly more information so that one can focus on specific (micro) segments of a larger system. Decisions then can be fragmented into smaller and smaller segments sequentially arranged in a linear path for the organization to follow into the future like a trail of orderly, reliable breadcrumbs. Thus, "in analysis we assume that which is sought as if it were already done. . . . By so retracing our steps we come upon something already known . . . , and such a method we call analysis as being solution backwards."[27] The desired "end" could be arranged into a single future line (of effort, operation, or physical geography) to which "ways" and "means" must be conceptualized in reverse order, leading back to the present state of the system.

In much of the twentieth century, this systematic way of strategizing about the future by conducting cybernetic inquiries using reductionist analysis of mass data would dominate industry and government policy. The promise of greater prediction and control with the advancement of increasingly more powerful computational assistance by smarter machines continued to propel a shared validation that this was the only way to consider the future. Management and strategy thrived where "forecasts . . . [were] usually constructed on the assumption that tomorrow's world will be much like today's." Strategic planning and forecasting were "predicated on a closed-world ontology: the assumption that the future will be, more or less, an extension of the past, or at least predictable."[28] A preset inventory of "solutions" was available based on past experiences and input-output analytic reasoning.

Solutions await causal linkages with new "problems" encountered. The organization then stacks these many groupings of "proven solutions to potential problems" and then relies on rapid, reliable recognition of any future problem so that the assigned solution can be applied. Inputs link to rationalized outputs, and a causal, almost mechanical "identify problem, connect solution, solve and continue" logic flows.[29] The next illustration demonstrates this legacy mode of strategic design and should appear familiar to most military audiences as the baseline for modern strategic and operational decision-making (as well as most tactical ones) (fig. 37).

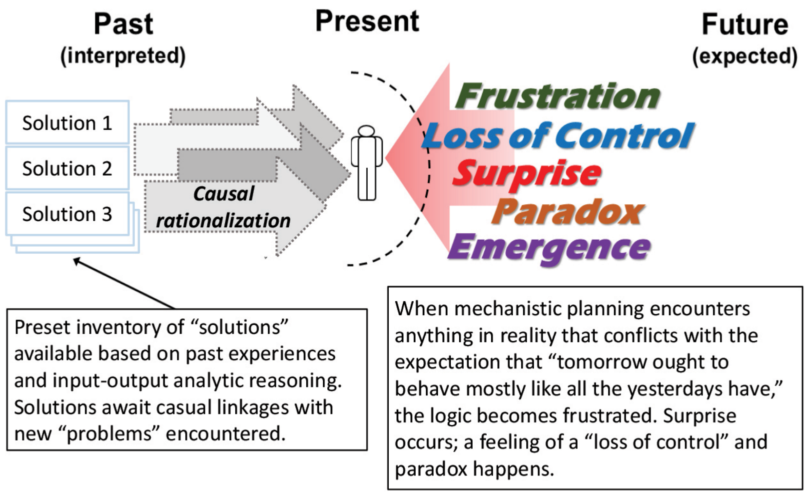



**Figure 37. Systematic logic and linear, mechanistic strategies**

An organization that expects every tomorrow to follow a sequential, obedient, and relatively stable path stemming from a string of "yesterdays" does so for a reason. Employing systematic logic (input leads to output) offers a predictable future encased in the stability of solid analytic reasoning and historical precedent. Any deviation is an anomaly, an outlier—something possible but statistically remote and an area to be less concerned with. In this way of framing reality, when mechanistic, linear planning encounters anything that conflicts with the expectation that "tomorrow ought to behave mostly like all the yesterdays have," that logic becomes *frustrated*. The result is a feeling of surprise, loss of control, and paradox.[30] Yet as globalization and the rapid spread of information and technology caused major transformations in societies, the increasing complexity of this new, interconnected world began to render predictive strategies and linear causality moot in more dynamic contexts.[31]

Emergence cannot be explained or even sufficiently defined within the frame of the legacy system; the arrival of emergence requires entirely new developments to articulate and appreciate the novelty of the emergent system itself.[32] The traditional planning logic where systematic thinking sought to isolate all encountered "problems" in causal rationalization so that inputs could link to outputs would prove insufficient in complex, dynamic systems (fig. 38).

The reverse engineering of existing "solutions" rationalized to future problems could not address emergent, never-before-seen "problems" that violated all interpreted rules and principles of past "solutions" awaiting analytic and causal linking.[33]

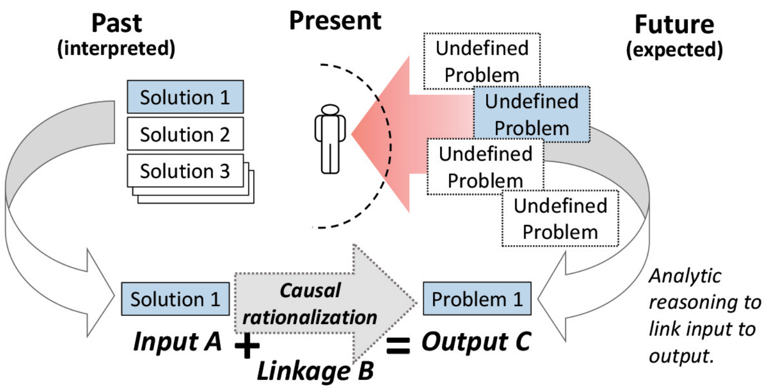



Figure 38. Linking inputs to outputs in linear, mechanistic strategies

Wack observed that "traditional planning was based on forecasts, which worked reasonably well in the relatively stable 1950s and 1960s,"[34] yet the increasing globalization and technological boom of the 1970s and onward made previously stable systems anything but predictable. Oil demands expanded as societies increased their wealth, size, and consumption, yet conflict and interstate tensions also impacted the oil market in profound and often novel ways. Earlier terrorist organizations tended to function in more stable hierarchies, while contemporary ones have morphed into more dynamic, flexible, and elusive organizational forms. The same can be said for enterprises such as illegal drugs, human trafficking, and environmental terrorism (e.g., Earth Liberation Front) in their evolution from the twentieth to the twenty-first century. The older versions of these illicit activities were, in retrospect, more stable and predictable and essentially controllable through older forms of law enforcement and policies. Newer emergent forms of such organizations are radically different, requiring sophisticated, often entirely dissimilar ways of strategizing to compete with them (fig. 39).

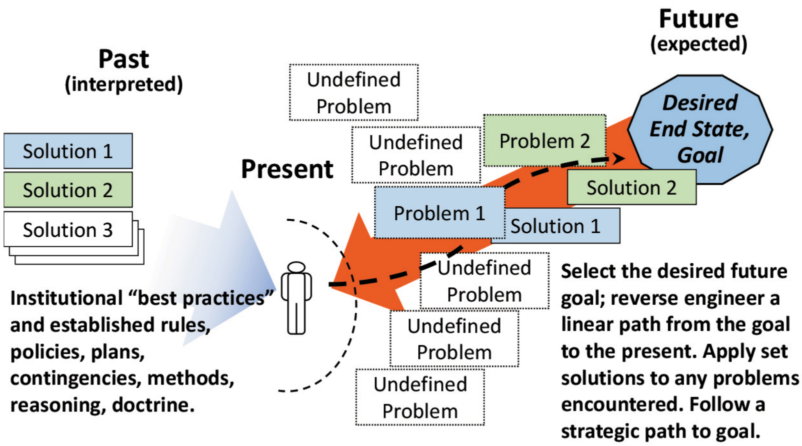



**Figure 39. Reverse-engineered, systematic thinking in warfare**

In the more stable 1950s–1960s (at least economically and in terms of industrial actions), companies like Shell followed a linear, highly mechanistic planning cycle that worked toward quantitative data (tested, validated, reoccurring, predictive), convergence (greater uniformity, reliability, efficiency, control), and an increased expectation that any future should usually be an extension of past patterns and experience.[35] Wack and his team of radical experimenters proposed an alternative mode of strategic design. Wack observed that in developing scenario planning, "too many forces work against the possibility of getting the right forecast. The future is no longer stable; it has become a moving target. No single 'right' projection can be deduced from past behavior."[36] He realized that to prepare an organization for radically different future environments and potential paradigm shifts in how a complex system behaves, he needed a strategy model that did far more than make more accurate forecasts in a systematic logic. Instead, a systemic way of thinking about multiple futures would become more useful in addressing dynamic, emergent systems (fig. 40). Single desired futures were out; multiple simultaneously coexisting futures would be generated instead, with each of these future states demonstrating different combinations of overlap (commonality, convergence, dependence), tensions (divergence, difference, independence), and interplay (novel and emergent qualities that do not exist in any legacy frame or understanding).[37]

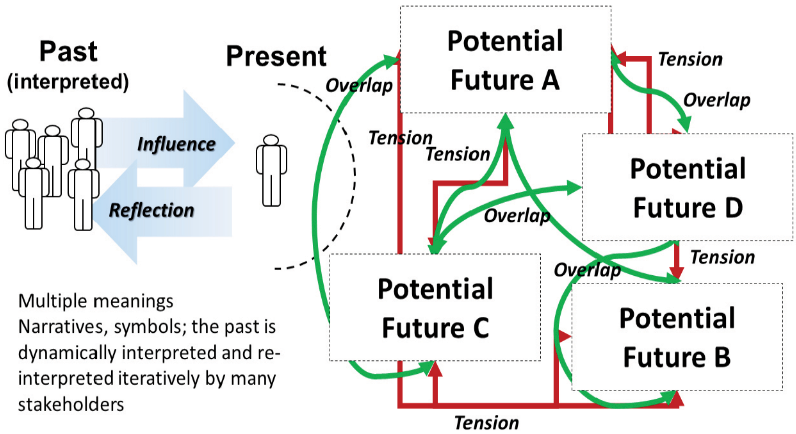



**Figure 40. Multiple futures and a systemic approach to complexity**

Thinking with multiple futures does not permit the systematic logic where recognizable inputs could be linked to understandable outputs in a mechanistic, rationalized manner. Instead, a scenario-based approach would change the decision-makers' assumptions about how the world works and compel them to reorganize their mental model of reality. Scenario planning would use the term "planning" in a new, distinct context, just as security design today presents a vastly different way for law enforcement and security thinking on complex systems than traditional managerial or institutional planning. Some might consider "planning" and "design" as problematic terms in both contexts, offering yet another parallel between the Shell scenario planning movement of the 1970s and the current security design movement of the twenty-first century. Scenario planning does not enhance or "bolt onto" the legacy way of linear planning; it is a distinct mode of thinking about the future.

Systematic logic does not become more systematically capable with an infusion of systemic logic. Rather, it remains a separate way of thinking and acting upon reality. The next chapter introduces the semiotic square, a relatively easy heuristic aid to initiate quick systemic thinking toward multiple futures. Designers should seek to understand that systemic thinking about the future cannot be reduced to a single desired or preferred future end state or strategic goal, nor can such purely analytical or linear-causal logic subsequently be applied toward whatever is generated in systemic thinking toward multiple futures.[38] Scenario planning with multiple futures within a systemic logic is one way to *inform an organization s*o that should it apply sequential, systematic logic toward a short-term goal, it does so while appreciating the emergent, nonlinear, and dynamic qualities of the larger complex system it unavoidably operates within.

**Notes**

1. Paparone, *Sociology of Military Science*, 13–15.
2. Lyotard, *Postmodern Condition*, 11; and Paparone, "How We Fight."
3. Zweibelson, "One Piece at a Time."
4. Gharajedaghi and Ackoff, "Mechanisms, Organisms, and Social Systems," 289–91.
5. Paparone, "How We Fight," 518.
6. Stanley and Lehman, *Why Greatness Cannot Be Planned*; and Weick, "Change Agents as Change Poets."
7. Meiser, "Ends + Ways + Means = (Bad) Strategy," 82; Tsoukas, *Complex Knowledge*, 276; and *Chia and Holt, Strategy without Design*, 25–29.
8. Weick, "Role of Imagination"; and Weick, "Drop Your Tools."
9. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 992–93.
10. Snowden and Boone, "Leader's Framework for Decision Making."
11. Fromm, "Types and Forms of Emergence"; and Hempel and Oppenheim, "On the Idea of Emergence."
12. Krippendorff, "Principles of Design," 417.
13. Paparone, "How We Fight"; Weick, "Change Agents as Change Poets"; Weick, "Role of Imagination"; and Tsoukas and Vladimirou, "What Is Organizational Knowledge?," 978.
14. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 987; Tsoukas, *Complex Knowledge*; and Paparone, "How We Fight."
15. Schultz and Hatch, "Living with Multiple Paradigms"; Lewis and Grimes, "Metatriangulation"; and Ritzer, *Sociology.*
16. The sponsor in any design activity is the individual or group that requested a design activity, is recognized as the senior or ultimate decision maker for the organization employing a design process, and is ultimately responsible for all design opportunities, risks, and consequences of new actions created by an accepted design deliverable. In centralized, hierarchical organizations such as most militaries, a senior commander or recognized leader assumes this role.
17. Fromm, "Types and Forms of Emergence."
18. Naveh, "Systemic Operational Design"; and Naveh, Schneider, and Challans, *Structure of Operational Revolution*.
19. DiMaggio and Powell, "Iron Cage Revisited."
20. Zweibelson, "One Piece at a Time."
21. Design educators at the Joint Special Operations University used design planning in their design educational approach while the author was there leading all design education. For its public-facing "multiple futures" design lesson, see Zweibelson, "Designing with Multiple Futures." This methodology is now also used at the US Army School of Advanced Military Studies (SAMS) in its design education modules, in a range of military war colleges and planning schools, and at places like the National Security Space Institute in its Space Design and Innovation basic course.

22. Cornelius, Van de Putte, and Romani, "Three Decades of Scenario Planning in Shell"; MacLean, "Environmental Leadership"; Sikander, "Scenario-Planning as a Stand-Alone Tool"; and Wack, "Uncharted Waters Ahead."

23. Bousquet, "Cyberneticizing the American War Machine," 90.

24. Ackoff, "On the Use of Models in Corporate Planning," 353–59.

25. Bousquet, "Cyberneticizing the American War Machine"; Bousquet, "Chaoplexic Warfare"; and Bousquet, *Scientific Way of Warfare*.

26. Paparone, "How We Fight, " 520; and Bousquet, "Cyberneticizing the American War Machine."

27. Kitchener, "Bertrand Russell's Naturalistic Epistemology," 122.

28. Tsoukas, "What Is Organizational Foresight?," 275–76.

29. Ackoff, "On the Use of Models in Corporate Planning."

30. Kitchener, "Bertrand Russell's Naturalistic Epistemology," 140.

31. Dent, "Complexity Science."

32. Fromm, "Types and Forms of Emergence"; and Carlisle and McMillian, "Innovation in Organizations."

33. Zweibelson, "One Piece at a Time"; and Kitchener, "Bertrand Russell's Naturalistic Epistemology," 122.

34. Wack, "Uncharted Waters Ahead," 73.

35. Tsoukas and Hatch, "Complex Thinking, Complex Practice," 263–79.

36. Wack, "Uncharted Waters Ahead," 73.

37. Schultz and Hatch, "Living with Multiple Paradigms."

38. Zweibelson, "One Piece at a Time"; and Stanley and Lehman, *Why Greatness Cannot Be Planned*, 1–11.

Chapter 23

# The Semiotic Square and Systemic Logic

## A Technique for Multiple Futures

The semiotic square method introduced here for generating multiple futures within a systemic logic is just one of many possible ways to conduct scenario planning.[1] It was developed in military design education at the Joint Special Operations University to quickly move large groups of basic design teams toward systemic thinking.[2] This technique enabled teams to break away from their traditional, institutionally driven systematic logic of seeking a single future desired end state requiring reverse-engineering lines of effort back toward the present context. Scenario planning instead requires multiple divergent futures ideally in direct paradox with one another. Few, if any, of these futures ought to be clearly linked or predictably charted from the present state (tomorrow equals most yesterdays); most organizations already use this reasoning and likely desire to exclusively continue doing so.[3] While imagining all possible futures is impossible, considering a wider range of potential worlds requires us to design reflectively, away from institutionalized preferences. Rika Preiser et al. further elaborate that "to make other worlds possible, even to simply imagine an alternative means of existence, it is imperative that we engage with the restless resistance that can be found in the cutting and weaving together of complexity and deconstruction, in the possibilities that this dialogic reveals."[4]

There are many techniques involving quadrant charts, developing tensions and paradoxes so that various futures can be imagined and improvised for design team consideration. However, the sophistication and multiple sequences necessary to properly conduct some of these scenario planning techniques require skills and facilitation capabilities likely exceeding the organizational capacities of typical small or medium-sized law enforcement or security organizations. Therefore, this "Z-method" is presented as a streamlined way to achieve many of the intricate outcomes of scenario planning. When the skills, resources, and energy are available, organizations should invest in more extensive scenario planning techniques beyond the method introduced here. As the Z-method relies on the "semiotic square" concept, it is introduced next (fig. 41). This approach has value for rapid implementation into decision-making methodologies such as NATO-OPP/JPP for alternative strategic and operations design where systemic thinking is encouraged over systematic logic alone.

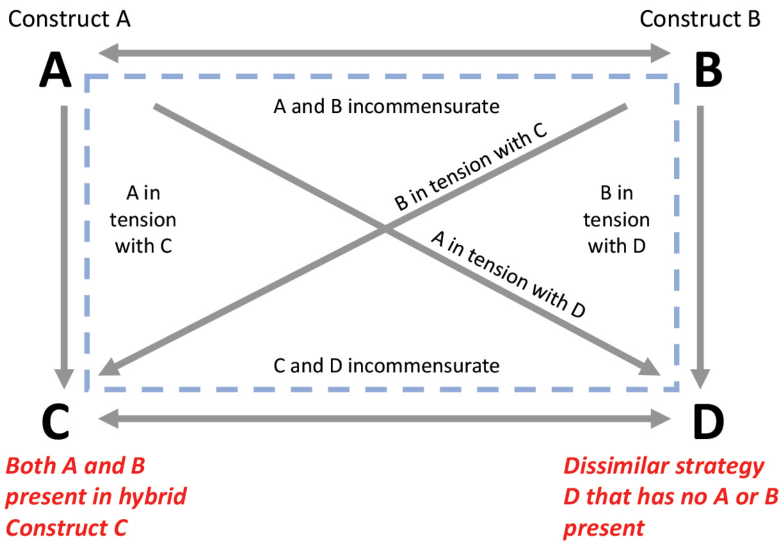



**Figure 41. Explaining the semiotic square for divergent future generation**

Although once used by ancient Greek philosophers as a heuristic device for logical ponderings and highly conceptual discussions, the semiotic square has been resurrected in sociological disciplines and in design for a variety of organizational knowledge and complexity theory applications. Semiotic reasoning is associated with postmodern research, where deconstruction and disruption function through language, signs, symbols, and socially constructed meanings.[5] To apply the square effectively, the design team should have a working understanding of paradigms and be familiar with the sociological /philosophical notions of ontology (what is and is not knowledge), epistemology (how we know how to do something), and methodology (the rules, principles, and procedures nested within the implicit ontological and epistemological choices of the home paradigm).[6] These terms are philosophical, but achieving reflective practice or employing systemic thinking is problematic without considering such constructs.

Replacing the term "paradigm" with the slightly more generic "construct" (where a group implicitly agrees on the theories, methods, instruments, and values), consider the following.[7] Construct A in figure 42 tends to be the idealized or systematically derived end state or strategic goal normally generated through systematic planning activities. Input 1 should produce Output 2, leading to the desired future state (the linear-causal logic frame explained in the previous chapter). Construct A is encouraged here as the "first future" for designers to generate.

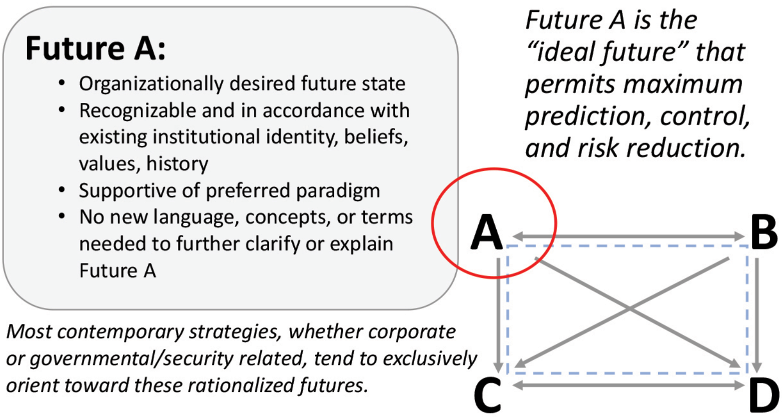



**Figure 42. Future A ideation**

In practice, design facilitators encourage a design team to first create Future A. They know that this envisioned future state will represent the most institutionally acceptable form where existing preferred practices and concepts can easily proceed uninterrupted (or unchallenged) into Future A for continued rationalized relevance. In other words, security organizations need a future garage with sufficient space to store all the institutional "stuff" that must be carried forward and maintained. Anything new can only be integrated if it is rendered (assimilated) into the existing legacy frame for understanding reality as previously, or if incremental, evolutionary change can be added. Thus, new ideas and things can be added to the garage provided they "play nicely" with already existent concepts and beliefs therein. Institutional rituals, traditions, beliefs, and legacy behaviors grow stronger over time, further codifying how "newness" is recognized and treated upon encounter.

Once the design team has sufficiently explored Future A, it then moves to Future B within the semiotic square heuristic structuring. Future B in the semiotic square construct becomes the opposite future of whatever the design team selected as Future A. Initially, design teams will take whatever they produced for Future A and begin considering "what is the exact opposite of this" to begin to construct Future B. It is important that design facilitators realize that the Future B construct a design team creates tends to illuminate the very limits of its original frame (belief system, values, identity, expectation of reality) for what Future A is—and often what the idealized strategic goal or end state is for that organization.

Thus, Future B becomes a divergent orientation for the designers and an organizational mirror of sorts; it provides the tensions, paradoxes, and usually the limits (conceptually, socially, culturally) of the organization when contrasted with the concepts of Future A. Initial iterations of Future B may merely remain superficial, such as taking the doctrinal or institutionally sanctioned opposite stance of something within Future A and marking that part of Future B. For a federal agency seeking to eliminate and prevent illicit drug commerce in Future A, its Future B might include legalizing all illicit drugs so that the nation might regulate and tax them as a legal enterprise. Figure 43 illustrates the dynamics of the Future B construct.

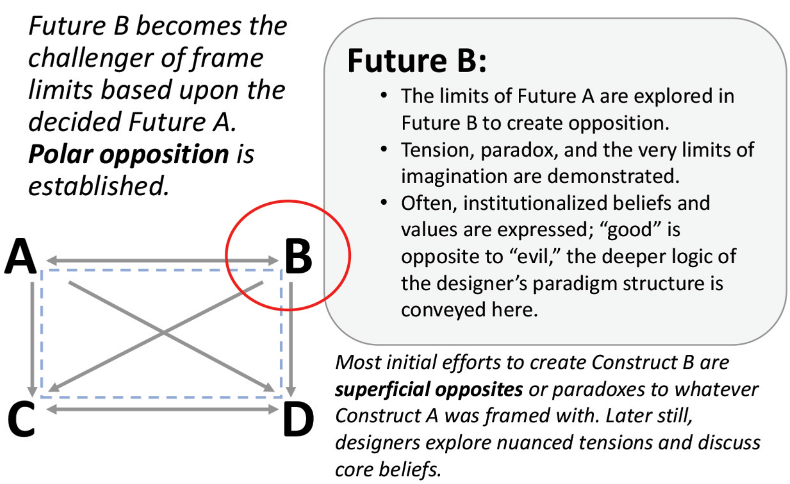


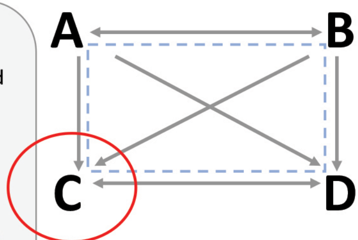

**Figure 43. Future B ideation**

Construct B serves not just as an alternative future scenario that provides additional divergent thinking space for the organization. Its position in the semiotic square heuristic aid generates further institutional insights into the organization conducting this exercise. In traditional strategic forecasting, only a single desired future state is framed, generally devoid of Construct B ideas in that they are in paradox and tension with Construct A. Yet this is only the second part of the four-scenario generation of using the semiotic square in this Z-method of scenario planning and ideation.

The semiotic square now advances, where we establish from Constructs A and B what are emergent Constructs C and D. First, designers will work on Construct C, as depicted in the lower left corner of the semiotic square in figure 44. Here, Construct C is a hybrid fusion of elements of Constructs A and B; designers must fuse key aspects of both scenarios however they like. Future C presents not only the interaction of paradoxes and tensions highlighted by Future B but also the institutional effort to preserve the most critical aspects of Construct A into the hybridization for Construct C. Future C often illuminates the institutional preservation of values, beliefs, identity, and core concepts.

**Future C:**

- Represents a new fusion of the idealized Future (A) while incorporating tensions and paradoxes generated by Future B.
- Unlike traditional hybrids in linear planning, the tensions between A and B will often provoke debate and disagreement as well as emergent ideas.
- Institutional *preservation* occurs in C.




*Future C creates a sharpening of the most essential institutional beliefs introduced in A.*

*Facilitators will take note of how Future B influences Future C, yet the legacy constructs retained and preserved from Future A to Future C will become further identifiable.*

**Figure 44. Future C ideation**

Construct C is an intended combination of Constructs A and B, but as the design team members discuss how and why to create this third future, they will flow through iterations of convergent and divergent thinking. They will also reflect critically on how and why they defined Constructs A and B. In this use of the semiotic square, the four generated futures are deeply intertwined, providing the design team (and facilitators) room for reflective practice as this process unfolds. These first three designed futures (A, B, and C) set up the designers for the fourth and most disruptive, divergent, and introspective scenario modeling of the exercise.

Construct D is defined in the semiotic square as the future that cannot possess anything from Construct A or Construct B (thus eliminating Construct C by default) (fig. 45). Future D presents the first real exploration of design ideation outside all previously established frame limits that were self-imposed by the design team as it constructed futures A, B, and C. Thus, Future D has the best opportunity to encourage a design team to generate entirely divergent thinking that should operate in a systemic versus systematic approach. Often, Construct A is established by relying on institutionally sanctioned and entirely systematic logic (input to output; a desired future reflects an organization's expectation of "solving" the proposed problem). Construct B enables a realization of frame limits set within Construct A, while Construct C forms a hybridization between the two. Only through the development of Construct D will designers need to reflect on all three constructs to generate a novel, dissimilar construct of another future.

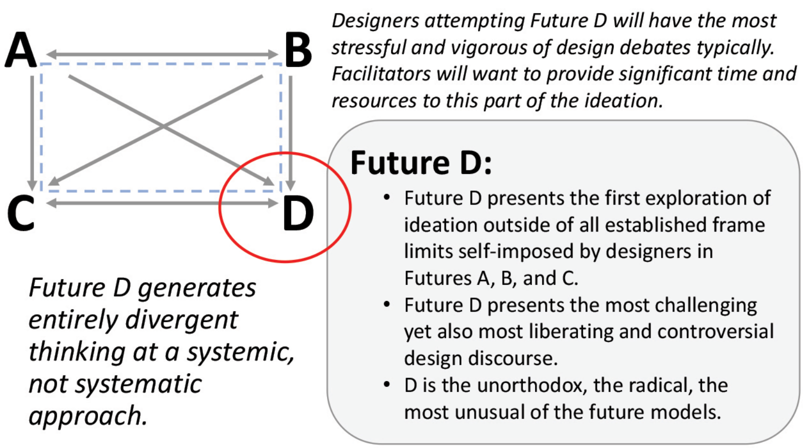



**Figure 45. Future D ideation**

Construct D is often the most conceptually taxing and intellectually challenging to develop, but designers may find the process liberating and playful. The systemic logic applied here requires the team to continue to be mindful of all three other constructs in its semiotic square, in turn helping to generate what can or cannot be part of Construct D. Only Construct D operates in a divergent design endeavor; earlier, seemingly divergent engagements such as in Construct B in turn become somewhat insufficient regarding diverging from institutionally sanctioned expectations about future ideation. If *what happened yesterday* can be expressed in Construct A while still influencing Constructs B and C, their ability to manifest at all in Construct D is greatly diminished. Construct D is that which has never been seen before in any day previously and becomes the design team's framework for truly divergent ideation on futures unimagined or previously off limits to speculation by the organization.

The divergent thinking necessary to foster constructs such as Future D will be challenging for many modern military organizations if only due to the institutional emphasis on convergent thinking in most decision-making activities. Military training and education tilt decidedly toward hard science that uses technological and quantitative logics with a linear-causal rationale. Fostering imagination, improvisation, and experimentation is closely associated not with formulaic, convergent activities but with play. Research indicates that playfulness and imagination in children correlate to creative adults able to blend creativity and imagination into work differently than their less imaginative peers.[8] Yet playfulness is likely to be considered offensive to the modern military institution, with shared values and belief systems oriented toward an almost pious seriousness concerning anything in war. This tension creates hurdles for design teams comprising military participants because they tend to reinforce cognitive homogeneity. The military system has engrained this approach through established patterns of military recruitment, conditioning, and service and multigenerational family aspects of what has been termed the "warrior caste" of a minority population isolated from the broader American society.[9] Design facilitators seeking greater divergence and imaginative futures will need to address these tensions by assembling design teams able to disrupt any potential organizational homogeneity of thought and enable playful ideation within the design praxis.[10]

The andragogic structuring this method provides helps design teams create multiple yet systemically related futures.[11] Given sufficient time and resources, this methodology should be implemented through several iterations where a team discusses and creates multiple different futures. The semiotic square as a heuristic device helps the team consider various forms of knowledge production for imagining the future and beginning to contrast acts of convergent (preservationist) logic with acts of innovation (divergent ideation). Innovation is not always superior to convergent retention or even potentially useful. Yet when military organizations limit security design thinking to a single paradigm or expect innovative design while confusing it with institutionally sanctioned acts of orthodox, systematic thinking toward the future, they may limit their ability to think divergently and creatively or with sufficient reflective practice.[12] The semiotic square helps with what sociologists term "reflective practice" in that the team critically examines the deeper ontological and epistemological choices and institutional values in the organization's socially constructed reality (fig. 46).[13]

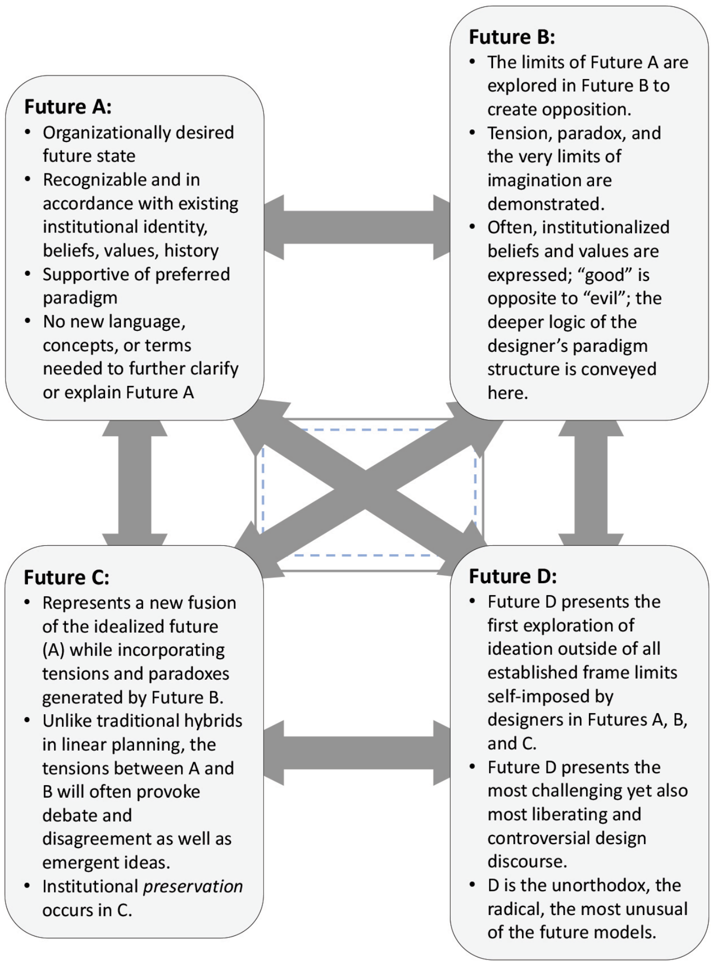



**Fig. 46. Semiotic square and divergent future ideation in total**

The semiotic square technique for generating multiple futures is an alternative strategic design framework to shift modern military decision-making methodologies away from single-future and systematic (input-output, linear-causal) logic of the legacy methodology for security activities. NATO and joint forces could introduce this method for considering a broader range of future system states that might emerge depending on the security activities selected and those considered and not acted upon. Once able to recognize potential security activity requirements or emergent designs, military forces can build multiple future scenarios where the effects of these activities are appraised in nonlinear, emergent frames that better realize complexity and systemic thinking. These future scenarios could incorporate not just the selected targets executed but those not acted upon. Within the strategic framework of indirect strategy, those nonactions are significant to consider within the same dynamic, complex system settings where actions are taken. Scenario planning creates what is termed "memories of the future" where potentiality is valued despite the possibility that many of the imagined future states may never occur.[14]

Strategists and analysts may hesitate to invest time and energy in what might be a futile exercise if ideations of possible futures do not provide any valuable prediction capabilities. Yet the power of multiple futures is not in prediction. Instead, preparing scenarios about possible and dissimilar futures acts as a cognitive disruptor and fertilizing act for conditions of innovative thinking about complex challenges. Tsoukas notes that "although none of those scenarios may come true, the jolt that is delivered to the organization through them is often strong enough to make the organizational challenge its business-as-usual assumptions, its current cognitive models and routines."[15]

**Notes**

1. This chapter draws from the author's article "Thinking outside the Box by Designing with Semiotic Squares" (see bibliography) and prototyping in real-world design facilitation for US Special Operations Command, US Space Command, and multiple agencies and defense organizations.

2. Zweibelson, "Designing with Multiple Futures."

3. Stanley and Lehman, *Why Greatness Cannot Be Planned*:; Monk, "End State"; and Weick, "Role of Imagination."

4. Preiser, Cilliers, and Human, "Deconstruction and Complexity," 271.

5. Kilduff and Mehra, "Postmodernism and Organizational Research," 457.

6. Ritzer, *Sociology*, 7. See also Kuhn, *Structure of Scientific Revolutions*, 5–15. On ontologies, see Hatch and Yanow, "Methodology by Metaphor," 24, 28, 30. See also Reed, "Reflections on the 'Realist Turn,' " 1623; and Stark, *Sociology of Knowledge*, 13.

7. For more on paradigms, see Schultz and Hatch, “Living with Multiple Paradigms,” 530–33. See also Lewis and Kelemen, “Multiparadigm Inquiry,” 252; and Lewis and Grimes, “Metatriangulation,” 673–75.

8. Root-Bernstein and Root-Bernstein, “Imaginary Worldplay.”

9. There is limited research supporting this pattern in other NATO nations. However, there are some indications that in nations with strong Anglo-Saxon identities, this warrior caste identity may have social, ideological, and historical precedent. For the American “warrior caste,” see Schafer, “Warrior Caste.”

10. Hjorth et al., “Organizational Creativity”; and Zweibelson, “Fostering Deep Insight.”

11. “Andragogic” refers to how we approach adult-based learning and education.

12. On breaking out of single-paradigm perspectives, see Gioia and Pitre, “Multiparadigm Perspectives on Theory Building.” See also Schultz and Hatch, “Living with Multiple Paradigms,” 530–33; and Lewis and Grimes, “Metatriangulation,” 673–75.

13. Schön, “New Scholarship Requires a New Epistemology,” 27–29. See also Schön, “Crisis of Professional Knowledge”; and Weick, “Change Agents as Change Poets.”

14. Tsoukas, “What Is Organizational Foresight?,” 270.

15. Tsoukas, 270.

Chapter 24

# Deleuzian Folds

## Alternative Strategic Arrangements in Complex Warfare

In the post-Afghanistan defense context, modern militaries including NATO and joint forces are experiencing pressure for reforms and change. The rapid and unexpected collapse of Kabul to the Taliban followed with criticism and demands for accountability regarding national foreign policy, intelligence agencies, NATO, and the US Department of Defense. Rachel Ellehuus and Pierre Morcos summarize the fallout:

> In the United Kingdom, during an extraordinary session of the House of Commons on Afghanistan, Conservative lawmaker James Sunderland remarked, "The fall of Kabul, like Suez, has shown that the United Kingdom may not be able to operate autonomously without U.S. involvement." Sunderland was not the first to use this historical analogy to convey the sense of disillusion and anger prevailing in London, with British defense secretary Ben Wallace calling it a "failure of the international community." Armin Laschet, leader of the Christian Democratic Union (CDU) and candidate to succeed Angela Merkel, went further, declaring this "the biggest debacle that NATO has suffered since its founding."
>
> While such emotional sentiments reflect the frustration and anger of the present and may soften over time, the withdrawal from Afghanistan is likely to have both immediate and long-term effects on Europe, NATO, and transatlantic relations.[1]

In this strange new world where a Taliban-controlled Afghanistan now is armed with robust NATO-sourced weaponry and infrastructure, European countries have concerns. Will there be a rise in international terrorist groups of Afghan origin or involvement? Will there be increased illegal drug trafficking, migration surges, humanitarian crises, or a reshuffling of major national influence and power in unstable conflict regions including but also beyond Afghanistan? NATO's credibility appears at risk, with the recognition that "for the first time, the transatlantic alliance has lost a war. The trauma of that experience—and the sidelining of its European members—has big implications for NATO's future."[2] That the Afghanistan conflict includes two historic firsts for NATO is significant. It was the first time any NATO member invoked the Article 5 mutual defense obligation as done by the United States in 2001 and, 20 years later, the first time NATO lost a war. Granted, some could argue that NATO itself did not lose anything, as the Article 5 invocation was limited and potentially too specific to legally find NATO as the official "loser" of the Afghanistan collapse. That American political decisions in 2021 forced NATO to withdraw despite objections is also significant.[3] However, these critiques miss the point of the real focus here: NATO-OPP decision-making methodology was used constantly and exhaustively throughout all NATO participation in Operation Enduring Freedom in Afghanistan.

Many of the arguments now unfolding about NATO and partners and alliances of Western industrialized democracies are indeed political, social, and cultural. Yet one clear consistency throughout the Afghanistan conflict has always been the unified military reaction to initial and subsequent national and international policy. NATO-OPP and JPP methodologies for military decision-making have been rigorously implemented and followed for every security activity from individual tactical actions to the comprehensive campaign planning orchestrated by the International Security Assistance Force (ISAF) and associated security entities. The sting of Afghanistan's collapse and a return to Taliban rule after twenty years of NATO and coalition security operations is biting. Former NATO official Jamie Shea remarks, "Afghanistan was a collective NATO responsibility, and that must be collectively shared. . . . The North Atlantic Council should do more than conduct a backward-looking 'lessons learned' exercise."[4] However, without institutional self-reflection on the decision-making methodological frameworks used over the last twenty years, NATO may do just that—missing an opportunity to consider whether NATO-OPP is appropriate for the emergent complex security challenges ahead.

It is entirely possible that any NATO self-examination may merely turn into political maneuvers and avoid any institutional housekeeping on methods, doctrine, or the deeper elements of the military belief system concerning modern warfare. Yet despite a clear history of absolute military devotion to the NATO-OPP or JPP doctrine and processes, modern militaries could not get their methodologies to succeed regardless of how much blame falls on political or nonmilitary reasons. For years, strategists and planners repeatedly followed the recipe step by step. Their efforts fell short but not for lack of trying, as annual ISAF campaign planning products numbered in the thousands of pages, supported by massive PowerPoint slide decks created and briefed by thousands of experienced military professionals reliant on perpetual production and reformatting of military doctrinal manuals and concepts. A 2021 report from the Special Inspector General for Afghanistan Reconstruction (SIGAR) includes these findings:

> Effectively rebuilding Afghanistan required a detailed understanding of the country's social, economic, and political dynamics. However, U.S. officials were consistently operating in the dark, often because of the difficulty of collecting the necessary information. The U.S. government also clumsily forced Western technocratic models onto Afghan economic institutions; trained security forces in advanced weapon systems they could not understand, much less maintain; imposed formal rule of law on a country that addressed 80 to 90 percent of its disputes through informal means; and often struggled to understand or mitigate the cultural and social barriers to supporting women and girls. Without this background knowledge, U.S. officials often empowered powerbrokers who preyed on the population or diverted U.S. assistance away from its intended recipients to enrich and empower themselves and their allies. Lack of knowledge at the local level meant projects intended to mitigate conflict often exacerbated it, and even inadvertently funded insurgents.[5]

NATO forces had for decades followed and repeated military decision-making methodologies from the strategic level of overarching campaign design and diplomatic engagements down through tactical levels of multinational and host-nation security-partnered (Afghan security forces) missions and those undertaken by specialized and elite forces with unique skills and capabilities. Defenders of modern military decision-making can easily fault policymakers and individual commanders and staffs that made poor decisions, but a fair amount of blame remains for the particular warfighter framework of theories, models, methods, and language indoctrinated into the armed forces. The rapid and spectacular collapse of Kabul only accelerated institutional frustration with what went wrong for the most technologically advanced, highly trained, and perpetually overmatched military force fighting a low-technology and poorly resourced and educated third-world insurgency. The strategy, operational design, and everything else outside of localized and temporary tactical excellence had failed in real-world application.

In the initial response to these wide-ranging concerns, policymakers and political groups debate over the need for reassessing how NATO operates, reforming the transatlantic alliance, and NATO shifting from "costly, open-ended missions outside of NATO's area of responsibility . . . [to refocusing] on collective defense."[6] At the security organizational level where decision-making methodologies attempt to translate political guidance and foreign policy goals into tactical actions, "allies are also more likely to be more discerning about when and under what conditions they join operations. . . . They may seek more specifics on the duration, end-states, and exit plan of a mission; seek assurances in terms of support; or demand a greater say in shaping or leading the mission."[7] These introspections of how political and strategic dialogues ought to foster military activities in alternative ways are significant. They appear to be the first time in NATO's history of such proposals and disillusionment with how the legacy system produced this outcome. Similar discussions are ongoing in the military forces themselves regarding what sort of military reforms are needed, with various factions seeking to return to simpler, more stable times when warfare and security affairs seemed to function as intended.

In military discussions today across the international community, many military forces want to reset the focus toward missions, processes, and roles that avoid the messiness of the Afghan insurgency. A 2021 SIGAR report on Afghanistan cites Gen Jack Keane (USA, retired), former Army vice chief of staff, on the post-Vietnam military reaction: "After the Vietnam War, we purged ourselves of everything that had to do with irregular warfare or insurgency, because it had to do with how we lost that war. In hindsight, that was a bad decision."[8] Similar to the post-Vietnam military reaction, in this current post-Afghanistan response, militaries are avoiding the same necessary introspection and instead seeking to capitalize on military activities that accelerate rapid, visual, and reliable success.

For security activities being planned at strategic and operational levels, various military forums propose "we need to be focused on quick wins" or "we need to ensure our return on investment is prioritized." Another reoccurring sentiment is "we have a desire to standardize" for what sorts of military reform ought to occur in doctrine, training, education, and military organizational change. In a recent military strategic session the author attended, one briefer stated, "The end state [of these military activities] is to execute operations and spend less time *understanding* the task" [emphasis added].[9] Such statements can be appreciated as voicing the desired outputs advocated by the modern military warfighting paradigm where linear causality systematically generates clear, deliberate, and decisive "wins" that can be achieved rapidly and, with standardization, be repeated rapidly. To generate many "quick wins" that can be uniformly repeated and standardized to increase speed would, in this mindset for warfare, incrementally and progressively move the organization to a predetermined strategic goal through more operations and less time invested in making sense of complexity, where tasks may or may not help move things along.

Shifting the modern military decision-making mindset (one oriented on systematic logic and linear-causal campaigning through Newtonian-styled sequences of reverse engineering) requires the application of different philosophical concepts. These would be immediately antagonistic and even incommensurate (lacking any commonality to begin to realize differences) in how each frame understands warfare. Thus, these concepts that draw from postmodern sources are quite dissimilar to the modern military frame for understanding everything it maintains on what war is (and is not). This concept is termed a "Deleuzian fold" for the postmodern theorist who created it.

Deleuzian folds are still experimental in their limited application in organization theory, literature, information sciences, and other disciplines, with no known examples of the concept ever being applied in a military setting. The military has not adopted the concept in part because it provides ways of escaping the foundations of Western, industrialized, and systematic thinking. In turn, this idea becomes a "shock" to an organization comfortable with understanding reality as unfolding in a linear, sequential, stable, and orderly manner. Deleuzian folds shift from thinking about how to optimize organizational processes (e.g., NATO-OPP/JPP) to how the organization should think about the processes. For example, are institutional frames omitting essential alternatives outside of artificial, conceptual limits of this select worldview?

Deleuzian folds employ nonlinearity, movement over established ordering, a concept of "drift" where despite efforts to organize or orchestrate, reality hosts a rich and emergent transformation where construction occurs over and over in the folding and unfolding of many relationships, patterns, and activities. The fold has been described as "enigma and intricacy; it complexifies, introducing detours, inflections, and instabilities into systems."[10] Deleuze suggested that the fold refers to form in that folding involves enveloping or developing and involution/evolution.[11] He compares the concept of folds to that of the Russian doll (dolls within dolls) because there are interiors and exteriors folding within one another. The exterior of one doll is interior to another, and the interior of a smaller doll contains yet another exterior of an even smaller doll. Deleuze also uses the metaphoric device of origami "because it has processual characteristics that refer to the transformation of the form."[12]

Postmodernists again return to biology to adopt its concepts but employ them differently, with Deleuzian folds applied through the transformation of organic and inorganic folds when the caterpillar develops (unfolds) into the butterfly. The butterfly starts as folded within the caterpillar (the caterpillar form initially envelops that of the butterfly). Later, the butterfly dies "and involutes (refolds) back into its constituent parts. These constituent parts become inorganic folds that wait to evolve once again into an organic fold—through a different form."[13] There are organic folds that are the interior envelopments of other organisms, such as a mother and her unborn baby, or the potential metamorphosis of an organism from one form into another. There are inorganic folds in this construct too.

The inorganic aspects of the Deleuzian fold feature simple and direct folds that are "exterior sites, including water, air, fire and rocks, that flow in, through, on and around organisms (organic folds). . . . [Deleuze] also argues that no separation exists between the organic (interior) and the inorganic (exterior) because the inorganic folds into the organic and the organic folds into the inorganic."[14] An example of a mountain range with a series of tunnels used by a terrorist cell can be used here. The mountain itself is an exterior (inorganic) site, but it is infused with the terrorists as well as local civilians, herds of mountain goats, and other wildlife and vegetation. The snow falling onto the mountain is inorganic and a crystalized form of water molecules, with flowing mountain streams also expressing inorganic water in movement. Yet water also circulates within the terrorists, with the inorganic (exterior) folding within the interior (organic) at fractal scales, such as the earlier Russian dolls metaphor. Within a mountain goat standing on a hillside, inorganic water molecules flow through its blood and tissues, while folded still further within is the organic potential of all future goat offspring that extends infinitely forward for every successful generation of goat descedents that at this moment in time could emerge.

The folding provides a different way to frame organizations and socially constructed reality (shared beliefs, values, symbols, meanings, culture) with the physical (objective) world of things and tangible actions. As the folding and unfolding process provides a nonlinear, emergent, and ultimately rhizomatic mode of making sense of a complex reality (and complex security affairs within), this way of modeling strategic design blurs the once solid boundaries between key concepts ordering how militaries approach warfare. Further, "the fold not only refers to organized processes of unfolding and refolding but also calls attention to the fuzzy and indeterminant nature of the difference between the internal and the external. In this respect, the fold can be seen as disorganized. The rhizome can be seen to refer to the organization as not disorganized *and* not organized" (emphasis in original).[15]

If arranged in a manner that breaks with the centralized hierarchical mode of linear linkages between things and bounded objectivity, folds offer a way of thinking about complex reality (and warfare) so that everything becomes connected to everything else. Yet "these connections are not disorganized in that various planes of multiplicity exist, but they are also not organized in that there is a constant flow and flux of new connections being made between multiplicities. Combining the fold and the rhizome metaphors can seemingly help us think about organization in new ways."[16] Before the discussion here turns to ways to apply Deleuzian folds and rhizomes, it first examines familiar forms of military analysis already popular in mainstream NATO and joint planning activities. Moving from examples of centralized hierarchical linkages and analytical optimization of *systematic logic t*o those that depart from those frameworks through Deleuzian folds and rhizomes (systemic logics) will form a striking contrast.

The "iceberg model" demonstrates a centralized hierarchical linkage of bounded, rationalized events, things, or snapshots in time arranged within the metaphoric device of an iceberg in water (fig. 47). The "events" are placed at the surface, illustrating that the things most obvious in reality are akin to the visual spectrum of humans (or other animals) recognizing the tip of the iceberg above the surface of water. This model is not a centralized hierarchy for an organization where the top leadership would occupy and direct commands downward while pulling information upward from the organization. Instead, the iceberg model organizes an analytical framework for considering a complex reality where the events are identified first (what is happening), and the linear linkages are established from these starting nodes. Next, immediately beneath the waterline and obscured from the observer's view (implied awareness of conceptualization), the "patterns of behavior" link to the events as depicted in the figure below.

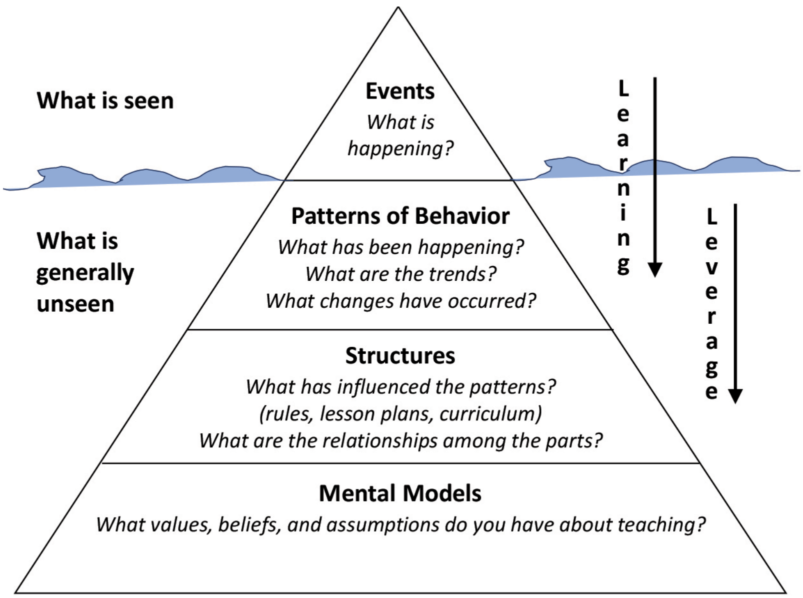



**Figure 47. Iceberg models and hierarchical, systematically organized frameworks.** (Source: The above version of the iceberg model was developed by Michael Goodman and adapted by Innovation Associates Organizational Learning, 2002, https://files.ascd.org/. Ernest Hemingway established the earliest attribution of the iceberg model concept, and Edward Hall adapted it in a social model [as an iceberg metaphor] of culture and behavior decades later [1976].)

The linkages of "patterns of behavior" promote a "trend, pattern, change" relationship between events that draw the analyst's attention to what the analyst believes are expected causal relationships where "what happens now" ties with "what has happened before." The pitfalls of following processes without regard to why we are using them have been addressed (e.g., chap. 12, "The Limits of Technical Rationalism"). Similarly, the iceberg model seeks a systematic conclusion where input-output or cause-effect is recognized by directing the analyst to correlate "what is happening" to "what one has seen previously that seems familiar or related to this new stimulus." This linear-causal, systematic reasoning is arranged in a hierarchical mode of system behaviors using a root-tree model inspired by the shape and characteristics of an iceberg. The iceberg is understood in a Newtonian style wherein ice floats, and a physics dynamic governs how this model functions. The analyst is subsequently encouraged to build upon this linear correlation of observed activities (events) and preconceived patterns of behavior curated in their institutional knowledge (how one is instructed to analyze reality to deconstruct patterns according to the institutional paradigm). The "structures" portion occurs next in the hierarchical, linear sequence of linking meaning to events.

Structures are explained in the iceberg model where rules, plans, or organizationally sanctioned models, methods, and theories define the relationship *among the parts*. This construct is notable because the iceberg model ultimately applies a modern strategic worldview where ontologically, the world is in a state of being where reality can be frozen in time and space—isolated into distinct, definable things or bounded entities—and one thing can be linked in some relationship form to other things. The rules, maxims, or principles governing how these linkages occur are explained by various conceptual models utilized by the social paradigm analysts are taught so that they can function within the institution. Again, NATO and joint forces use their decision-making methodologies—such as SWOT, COG, and stakeholder analysis and CARVER-like targeting models—to direct the analytical framing of how tangible things might be understood in relation to other things. At the core level of the iceberg is the idea of "mental models," conceptually the most abstract and remote portion of reality from those observable events at the surface.

In the iceberg construct, mental models form the foundation of complex reality and a direct, linear linkage between these belief systems and the events occurring at the surface that are most easily observed by the analysts. Yet the vertical, hierarchical model structure forms a linear-causal linkage that is an inverse of the centralized hierarchy or root-tree construct. It is from the bottom base of the iceberg that all power exists and where all ultimate sources are for driving system behavior. The question of "What values, beliefs, and assumptions do you have about teaching?" is positioned in a nonreflective mode that prevents reflective practice or triple-loop thinking where one considers the limits of one's social paradigm. While reflective practice can occur within the iceberg model if an analyst is already capable of such thinking, the model itself does not promote such consideration. Rather, it reinforces a vertical sequencing and channeling of events, institutionally sanctioned models and recognized patterns, and isolation of parts of a system in a reductionist, systematic mode of analytic inquiry. The model organizes these parts from the "top" of the relationship in the abstract down in clear, linked relationships to the "bottom" where physically observable, tangible reality occurs above the waterline.

The iceberg construct is itself a categorization model[17] in which the operator often adopts institutionalized thinking that is nonreflective and self-referential to the dominant social paradigm (the overarching military belief system on how war is supposed to occur). Yet the "iceberg" construct becomes inverted in application. From a vast, dynamic sea of many events in a complex reality, certain ones are isolated and categorized into preselected and institutionally sanctioned mental models. Such models function within a controlled social paradigm so that operators will correlate events with particular "patterns of behavior." Military strategists and planners invest considerable energy and resources into analyzing data and sorting it through descriptive modes of systematic logic, so one "thing" observed as a significant event is clearly linked to other relevant "things" in recognizable patterns. These patterns (models of military decision-making) are structured in a sequence of formal decision-making—whether the joint planning process, NATO-OPP, or other related assembly line of manufacturing ideas—to deliberate, coordinated actions in time and space. At the deepest level, the iceberg model converges even further into a select grouping of core values and the underpinning military belief system—the modern military paradigm for warfare. Reality is simplified down in a convergent, linear process of linking tangible, quantifiable things and isolated events to ontological and epistemological stances held by Western industrialized defense organizations (fig. 48).

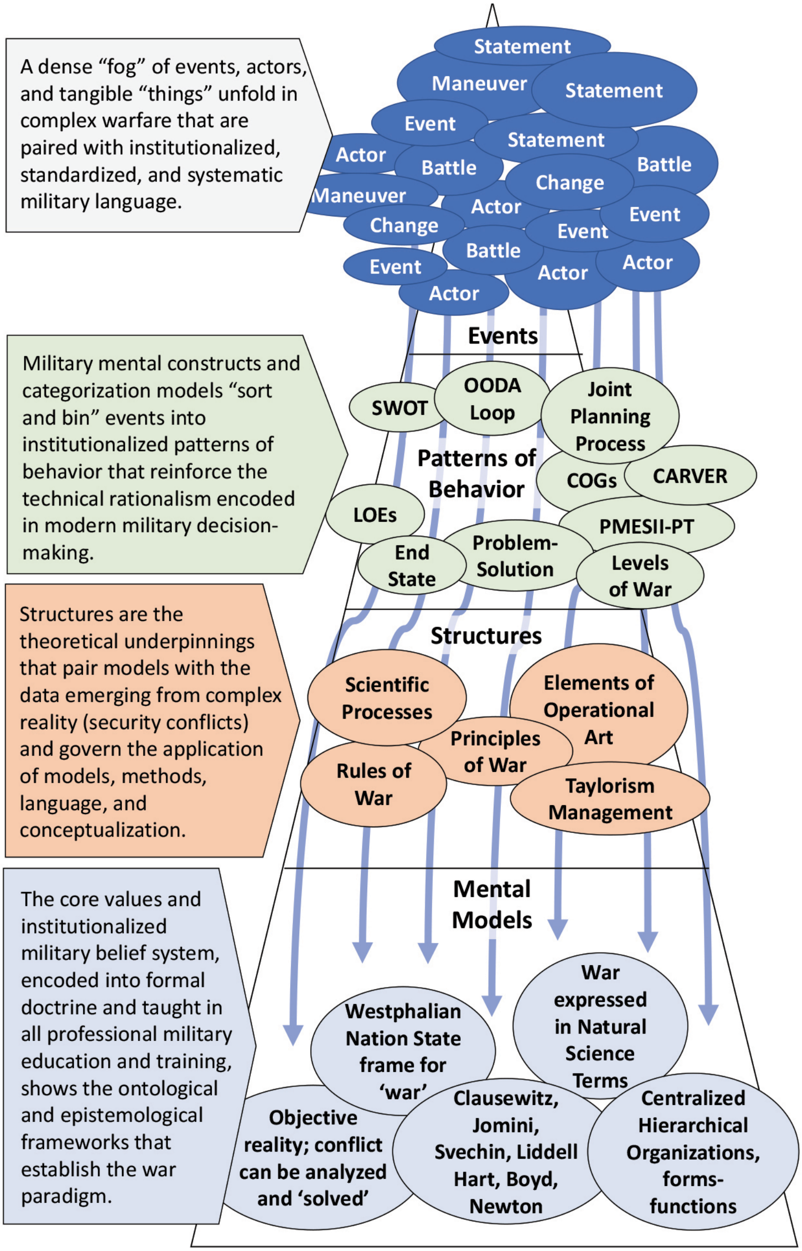



**Figure 48. Nonreflective, institutionally reinforcing example of ice-berg model application**

Thus, while the iceberg model is depicted graphically as a divergent, ever-expanding metaphoric iceberg below the surface where observable events link to abstract complexity, the above illustration portrays what most practitioners instead accomplish in applying the iceberg model in security contexts.[18] Events are interpreted using institutionalized beliefs through the indoctrinated methods, models, language, and theories practiced by the military profession in imitation of natural science disciplines.[19] Vastly complex events woven into an ever-changing fog of dynamic reality are eventually reduced to patterns and structures approved by overarching mental models that reflect the deep ontological and epistemological belief systems of modern militaries. This approach occurs not just in examples of the iceberg model but in multiple expressions of military analysis where complex, dynamic security challenges are rendered into some institutionalized meaning that simplifies and isolates. The infamous "Afghan Complexity Map" made the front page of the *New York Times* as direct criticism of how the coalition of military forces led by the US Department of Defense was trying to make sense of that frustrating conflict.[20] The detailed interrelationships depicted in the map represent a "causal loop diagram" and demonstrate aspects of systems theory fundamentals.[21] The article notes that the map "looked more like a bowl of spaghetti," with Army general Stanley McChrystal commenting, "When we understand that slide, we'll have won the war."[22]

The article, published in 2010 during the sudden surge of violent insurgency in Afghanistan and political debate on how and why strategic change was required, would ignite criticism on the inappropriate use of PowerPoint slides for coordinating military activities. Yet the deeper debate on military strategic design was not the use of PowerPoint but how the graphic grossly oversimplified a complex insurgency into "rigid lists of bullet points . . . that take no account of interconnected political, economic, and ethnic forces."[23] The *New York Times* article cites US Army (retired) Lt Gen H. R. McMaster's critique that "if you divorce war from all of that, it becomes a targeting exercise," echoing the comments of Gen James Mattis, USMC, retired, on "effects-based operations" and the oversimplification of turning everything in warfare into the kinetic targeting of things to break up linear linkages to other things.[24] This strategy was utilized to collapse a system assumed to be hierarchical and vulnerable to precise strikes to critical links in a chain.

The derogatorily nicknamed "spaghetti chart" is another example of systematic logic and root-tree organizational categorization. While the iceberg model is not shown, it is entirely feasible that analysts used some version of "iceberg categorization reasoning" to guide their creation of the chart. This mechanistic form of military analytical thinking "views the relationship between actors and phenomena in instrumental terms."[25] Reality is categorized into tangible things so that they can be connected in linear, sequential patterns to a host of other things similarly defined. Doing so enables an illusion of control, risk-reduction, efficiency, and prediction of a complex system that rejects such attempts.

Strategic designers might move away from root-tree models and systematic, analytic reasoning on warfare (repeating iceberg models upon complex reality in various incarnations) to consider Deleuzian folds instead. The models discussed next suggest possible ways of using these systemic, postmodern options to transform existing modern military decision-making, so that earlier Newtonian-framed and single-paradigm concepts are not just unwittingly extended over and over into future planning and strategic efforts.

These applications insert alternative philosophical language, metaphors, and constructs into what has previously been an exclusively systematic, reductionist, and Newtonian-styled mode of modern military decision-making. Critics of postmodernism aside, Robert Chia encapsulates the observation of Michel Serres (one of France's most gifted and original thinkers) that "whether knowledge is written in philosophical, literary, or scientific language, it nevertheless articulates a common set of problems that transcend academic disciplines and intellectual boundaries."[26] As military organizations must address some of the most complex, even chaotic sort of human challenges in existence, the legacy barriers against philosophical, literary, and scientific concepts that do not reinforce institutionally recognized beliefs or values must be softened.

Figure 49 presents Deleuzian folds in the Russian doll metaphoric device of various folds creating interior and exterior interactions in three areas of security interest. "Organization," "beliefs," and "actions" are granted folding treatments. It is important to highlight the complex fusion of tangible (objective) and intangible (subjective, social) aspects of these three suggested folds. Folding objects, stakeholders, nation-states, or other clearly bounded, isolatable, and quantifiable constructs would potentially encourage strategists and planners to reinforce systematic thinking, similar to the iceberg model.

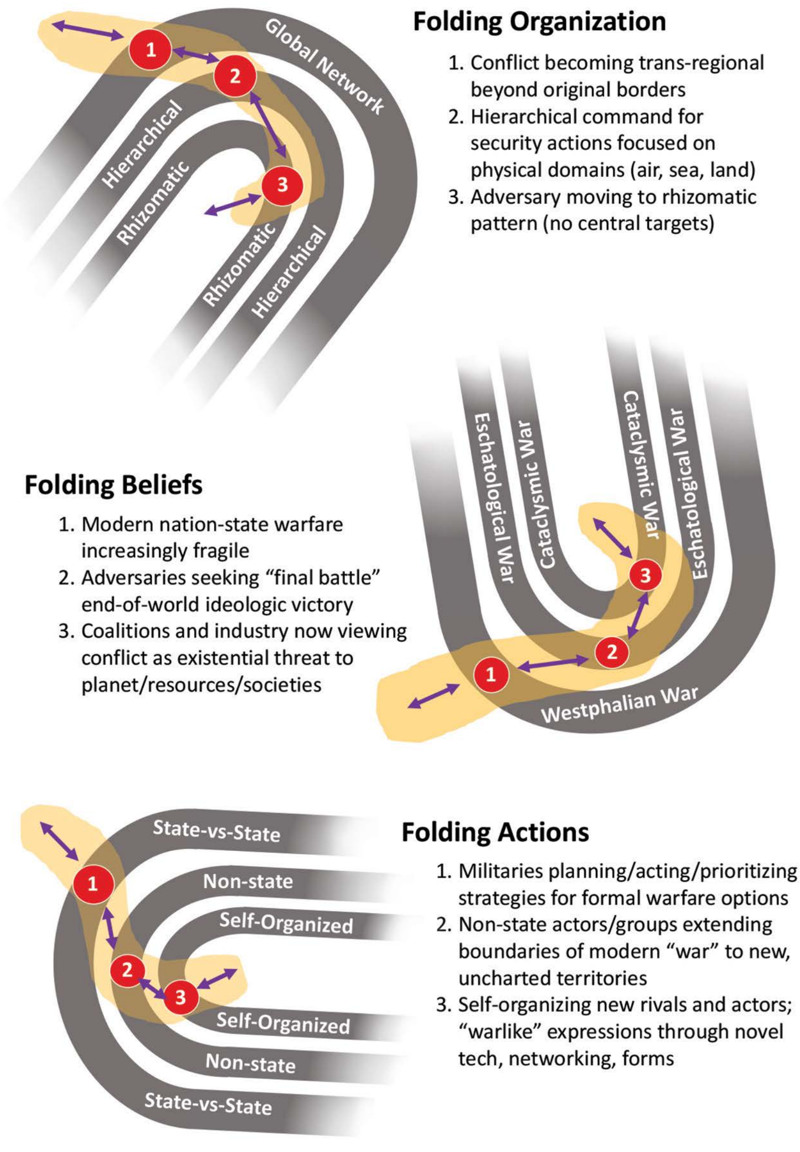



**Figure 49. Potential forms for expressing Deleuzian folds in security applications**

However, "under the fold's regime the self ceases to be individual, offering in its place a plenum of infinitely permutating bodies"[27] where the interaction of interiors and exteriors dismantles the traditional boundaries of things, people, bounded concepts, and rigid organizational frames. Also illustrated below is how a pattern of folding, unfolding, and refolding interactions expresses through each treatment, where the numbered sequence "1, 2, and 3" presents one way of exploring complex relationships, nonlinear networking, and emergent patterns relevant to the security challenge under inquiry. Each folding treatment has bullet statements corresponding with examples of systemic appreciation of how those strategic designers might explore through Deleuzian folds.

Deleuzian folds present philosophical (epistemological and ontological differences on what war is, how and why it forms and functions) constructs that are not a substitution for the familiar legacy modes of decision-making. Thus, inserting a Deleuzian fold approach into some step in NATO-OPP or the joint planning process while leaving the rest of the framework largely unchanged will not accomplish much and likely create confusion and hostility toward this alien interlocutor. Such application of a postmodern construct requires using different language, unfamiliar metaphoric devices, and new methodologies and forming alternate conceptual models that draw from different theories on war. In a reference to Deleuzian folds, "the mind folds a body that floods another body's mind until . . . 'your own discourse is the other's unconscious.' "[28] For example, the postmodern conceptualization of how humans create reality is not bounded in a way that is objective and stable but dynamic and fluid. Ideas, language, and symbols morph across populations and groups in nonlinear, emergent fashion so that where a concept might end up is entirely out of any individual's clear or direct (centralized, hierarchical, systematic) control or guidance. Chaos theory posited that a hurricane near Japan could be triggered by the flapping of a butterfly's wings in New York. The postmodern deconstruction of that metaphoric device might offer that tomorrow's political revolution or violent insurgency might be started with one individual's social media post arguing about the price of milk.

The swirling of ideas, objects, minds, and living beings becomes tangled in relationships that shatter traditional (Western, modern military) orderings of things. In another suggested example of how strategic designers might apply Deleuzian folds, the unfamiliar mathematical and scientific concept of a Möbius strip is incorporated as a metaphoric device and modelling framework. Figure 50 introduces a Möbius strip operating in the similar "Russian doll" series of complex folds.

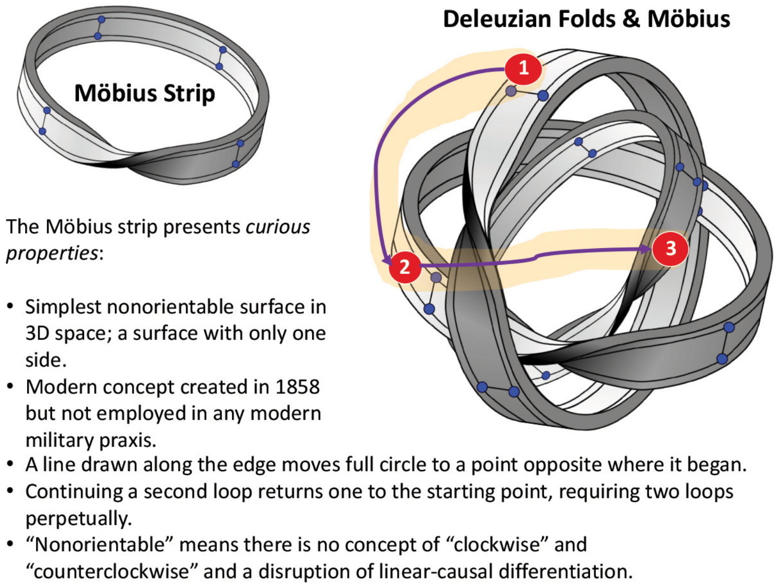



**Figure 50. Another potential model of Deleuzian folds using Möbius strips**

A Möbius strip is a peculiar construct discovered in Germany in 1858, several decades after the Prussian military theorist Carl von Clausewitz's theory of modern nation-state warfare was published. Yet despite the close chronological ordering of the ideas, the Möbius strip has never (in any searches conducted by the author) been applied to warfare or military strategy. The concept has likely not been adopted in a military context because it is challenging, disruptive, and in many ways paradoxical to Newtonian-styled thinking. The Möbius strip presents several curious properties that differentiate it from straight lines of effort, systematic causal (input leads to expected output) structures, and other spatial frameworks that underpin classical military thinking. The traditional domains of land, sea, and air that fostered much of modern military theory and practice do not have many practical examples of what the Möbius strip introduces. It is the simplest nonorientable surface in three-dimensional space, meaning it is a surface with only one side and does not feature the concepts of "clockwise," "counterclockwise," or other orientable phenomenon of everyday life.

For instance, were one to start at a point on a Möbius strip and begin a path around the entire surface, one is at an opposite point to where one began at the completion of the strip. Only by completing a second full loop will one return to the original starting point, making the strip a peculiar nonorientable surface. Were an object to rotate around a Möbius strip and attempt to look at itself as if in a mirror, there would be no "mirror effect" because anything within a Möbius strip cannot orient to itself. In orientable contexts and spaces, a person can look into a mirror and see everything reversed. The peculiar property of a Möbius strip denies this phenomenon for those existing within a reality shaped in a Möbius strip form. Other unique mathematical properties of the Möbius strip exceed this chapter's intent. For a Deleuzian fold application for strategic designers, figure 50 (above) builds from the previous graphic in the Russian doll "nesting" for folds (fig. 49). However, this nesting arrangement now has Möbius strips within other Möbius strips, creating folds within folds where each strip creates itself with a twist in its one-sided surface, and the nesting of multiple strips generates interiorities and exteriorities of Deleuzian folds as well.

If readers reapply the same "1, 2, 3" sequence of organizational, belief-based, and action-oriented security topics from the earlier Deleuzian fold illustration (fig. 49) here once again, the peculiar twists of the Möbius strips arranged in a nesting relationship of folds, unfolding, and refolding provides a sophisticated arrangement of ideas on a complex security challenge *differently than possible in traditional military campaign designs or strategies*. This construct does not correlate to "better" or any potential evaluation. Rather, the change in rendering complex security challenges using postmodern ideas enables a greater opportunity to think divergently toward potential advantages when considering complex, dynamic systems and an ever-emerging reality. While there is an infinite expansion of other ways to envision Deleuzian folds for complex security challenges, these two examples are provided to stimulate further research and experimentation by strategic designers.

Deleuzian folds were introduced here along with the overlapping postmodern concept of "rhizomes" as part of the idea of indirect strategic design and how complexity requires vastly different conceptual tools than offered by the legacy warfare frame. Defenders of the modern military institution may object to these positions as well as the notion of bringing postmodern concepts, complexity theory, systems theory, and social paradigm theory into a Newtonian-styled, technologically rationalist approach to modern warfare. Yet modern military decision-making methodologies and strategies have never successfully accounted for how objectivity (science of war) and subjectivity (art of war) interact *systemically*. French philosopher Maurice Merleu-Ponty contributed an important idea on consciousness from an individual's viewpoint, noting, "No matter how strict the connection between external facts, it is not the external world which is the ultimate justification of the internal; they participate together in an 'interior' which their connection manifests."[29] This perspective illustrates how Deleuzian folds work logically, where the interiority of ideas within an individual mind fold and unfold with external reality.

Objective facts that are quantifiable interact with subjective perspectives enabled by a second-order complexity of human socialized construction where qualitative inquiry is perhaps the only option. This gap between qualitative and quantitative is itself an artificial imposition created by academics of rival disciplines and belief systems. However, both sides ultimately admit that complex reality encompasses both aspects, and neither can ever sufficiently address that complex reality in total.[30] Modern militaries are institutionalized to obsess over scientific objectivity and analytic optimization to the detriment of subjectivity, interpretivism, and those significant phenomena and patterns in warfare that cannot be measured, isolated, or rendered predictable in formulas and rules. NATO and joint forces use their military decision-making today to attempt an objective representation of a complex reality. Tomorrow's military decision-making design could shift to consider alternatives that might produce a deeper appreciation of those same complex security challenges.

**Notes**

1. Ellehuus and Morcos, "Fall of Kabul."
2. Keating, "Can NATO Survive the Afghanistan Debacle?"
3. Shea, "NATO Withdraws from Afghanistan."
4. Shea.
5. Special Inspector General for Afghanistan Reconstruction (SIGAR), *What We Need to Learn*, x–xi.
6. Ellehuus and Morcos, "Fall of Kabul."
7. Ellehuus and Morcos.

8. SIGAR, *What We Need to Learn*, xii.

9. In working over the last decade-plus with US Special Operations Command, US Space Command, and many other organizations, the author has frequently encountered statements such as this one in design workshops.

10. McCaffery, "Blaser's Deleuzian Folds," 101.

11. Pick, "Rethinking Organization Theory," 803.

12. Pick, 803.

13. Pick, 803.

14. Pick, 803; and Deleuze, *The Fold*, 9.

15. Pick, 805.

16. Pick, 805.

17. Snowden and Boone, "Leader's Framework for Decision Making"; and Snowden, "Cynefin Framework."

18. The author's assertion is based on strategy, planning, and design sessions involving thousands of students over a decade in military educational, training, and practical applications using the iceberg model.

19. For example, see Maxwell, "Do We Really Understand Unconventional Warfare?" In fig. 1-1, Maxwell depicts covert and overt functions of unconventional warfare employing the iceberg model, with the bottommost mental model a "dissatisfaction with [PEMSII framed] political, economic, social administrative, and/or other conditions" and associated categorical examples.

20. Bumiller, "We Have Met the Enemy and He Is PowerPoint." While Army general Stanley McChrystal viewed this graphic in a PowerPoint briefing deck, the analysts created it in another software mapping tool; PowerPoint was merely the presentation device used. For the *New York Times* article with the diagram "meant to portray the complexity of American strategy in Afghanistan [and] certainly succeeded in that aim," see Bumiller.

21. Gharajedaghi, *Systems Thinking*, 109–25.

22. Bumiller, "We Have Met the Enemy and He Is PowerPoint."

23. Bumiller.

24. Bumiller; Mattis to Zweibelson, letter, subject: RE: Design for Defense Book PDF Manuscript; and Mattis, "USJFCOM Commander's Guidance for Effects-Based Operations."

25. Tsoukas, "Refining Common Sense," 766.

26. Chia, "Teaching Paradigm Shifting," 414.

27. McCaffery, "Blaser's Deleuzian Folds," 103.

28. McCaffery, 106.

29. McCaffery, 110. McCaffery cites Maurice Merleau-Ponty, *Signs*, trans. R. C. McCleary (Evanston, IL: Northwestern University Press, 1964), 148.

30. Tolbert and Zucker, "Institutionalization of Institutional Theory."

# PART 4

# Formalizing Reflective Practice into Military Decision-Making

Chapter 25

# How Can the Military Move from Theory to Action?

Thus far, we have established the modern military war paradigm for decision-making, how it functions, and why it is often nonreflective, systematic, and oriented toward a Newtonian-styled worldview. We have also discussed systemic design concepts and how to enable reflective practice to "triple-loop think" beyond the limitations of the institutional frame. Now, we address *how* an organization can transform existing organizational form/function and the modern military decision-making frame to integrate systemic design through reflective practice. Most military organizations already move in single- or double-looped cycles of process adherence to the dominant single war paradigm, often associated with John Boyd's "Observe, Orient, Decide, Act" or OODA Loop as an iterative cycle of thought and purposeful action. This paradigm is also underpinned with an ends-ways-means, reverse-engineered process from a single desired future state back toward the present through a static, isolated interpretation of reality.

Yet military organizations exercise the OODA Loop in the many graphics pulled from NATO and joint doctrine already presented in this book. Their curation of a particular inventory of knowledge becomes "universal solutions" paired systematically with military problems the organization has historical precedent with encountering. Military forces maintain and update these systematic models through doctrine, training, and education and orient their staffs toward process and procedural efficiencies. They seek analytic optimization through the single- or double-looped cycle of "identify problem, pair with institutionally sanctioned solution, prepare planning treatment to execute said solution toward isolated problem, and then assess the system response." Forces conduct assessments through analytical thinking, often single-loop-fixated "measures of performance" and the more ambiguous yet still double-loop-oriented "measures of effectiveness." Granted, many advocates of Boydian theory will insist upon its reflective capacities. However, the long-term, multidecade influence of Boyd's concepts on various incarnations of joint and NATO planning methodologies is discussed next and draws from the book's earlier illustrations and points.

Purists of Boydian processes often confuse what a model is (OODA) with how theories, models, and methods operate to form an overarching social paradigm. Boyd drew from general systems theory and what was in the 1980s a dominant position on complexity theory advocated by groups such as the Santa Fe Institute.[1] Tsoukas frames most Santa Fe scientists of that period as complexity theorists who sought a classical reductionist approach; they searched for common principles underlying a variety of systems so that ultimately, even a complex system might be controlled or predicted with some degree of objectivity.[2] This approach would be in tension with a minority of complexity, systems, and organizational and management theorists and some sociologists who would establish the interpretivist school for considering complex, dynamic systems that simply cannot be treated objectively.[3] That movement has grown over the last few decades to now challenge the discipline's majority on how to comprehend and engage with complexity.

The early group of theorists (1980s, Santa Fe Institute centered) believed that complex systems could be understood and predicted with sufficient mathematical sophistication and informational analysis. Militaries, particularly the US Air Force and US Marine Corps, would incorporate Boyd's OODA Loop into their planning doctrine and methods as a model to frame how operators and organizations should conceptualize as they implement their decision-making methodology. Boyd's work would reference this group of complexity theorists, and in the 1980s their positions were highly influential. Proponents of Boyd's model argue that each iteration of the OODA sequence is a new conceptual loop, implying a uni-minded system setting where analytical optimization is possible with sufficient speed, superior logic, and the ability to act decisively upon adversaries before they can act. This process fails to appreciate that emergence and complex systems are nonlinear, and iterative cycles or loops will not build upon one another in a multisystem context.

Gharajedaghi clarifies this distinction with an analogy of how nonlinear systems cannot work as Boydian advocates posit except in systems that are not complex or are merely simple or complicated subsystems within a larger complex system. He asserts, "Analyzing the behavior of a nonlinear system is like walking through a maze whose walls rearrange themselves with each step you take (in other words, playing the game changes the game)."[4] By marginalizing complex emergence, the Boydians promote a linear-causal epistemological stance on iteration. In single- and double-loop thinking, operators anticipate that with each trip through their logical loop (with OODA being one such model to conduct single- or double-loop thinking for warfare), the cunning operator ought to gain advantage if doing things as Boyd advocates. Iterative action becomes linear-causal despite being separated in time and space. This result suggests that each time one cycles through OODA, the subsequent "observation" is a "reobservation" that builds on the first loop, with future OODAs becoming a "re-reobservation" still building, each contributing to an operator's superior *analytical rationalization*. Such recycling reinforces the belief that more knowledge equals superior understanding and control—a perspective that gained prominence in the Age of Enlightenment and has shaped knowledge curation and scientific analysis ever since.[5]

In figure 51, military organizations stuck in nonreflective practice repetitively move in the blue cycle, starting at the "observe" phase where single-loop thinking fixates on "WHAT is our desired END?" and "WHERE is the organization NOW?" Doing so leads to fixating on reverse engineering ends, ways, and means to link historically established input-output formulas systematically and pair recognized solutions with new problems observed. In turn, this formulaic process leads to decisions where the commander directs the organization to act, and in most Boydian applications, OODA then repeats itself cumulatively. The figure also expands on this process in complexity by showing a system's reaction to any actor's action. This scenario leads to operator or organizational reflection (thinking back on decisions, performance, results, and consequences) that opens up the potential for second-loop limited reflection or another cycle around the single loop. The dotted red line below shows this journey through a single-loop, nonreflective practice that brings the organization through reflection (oriented on process adherence, efficiencies) to a reorientation and reobservation. Nonreflective organizations, still reverse engineering toward a preconceived goal, will only reorient so that the same process and ends-ways-means logic are sustained and solicit options based on this single-loop orientation. Double-loop thinking may generate more options yet still remain stuck (as depicted in fig. 51).

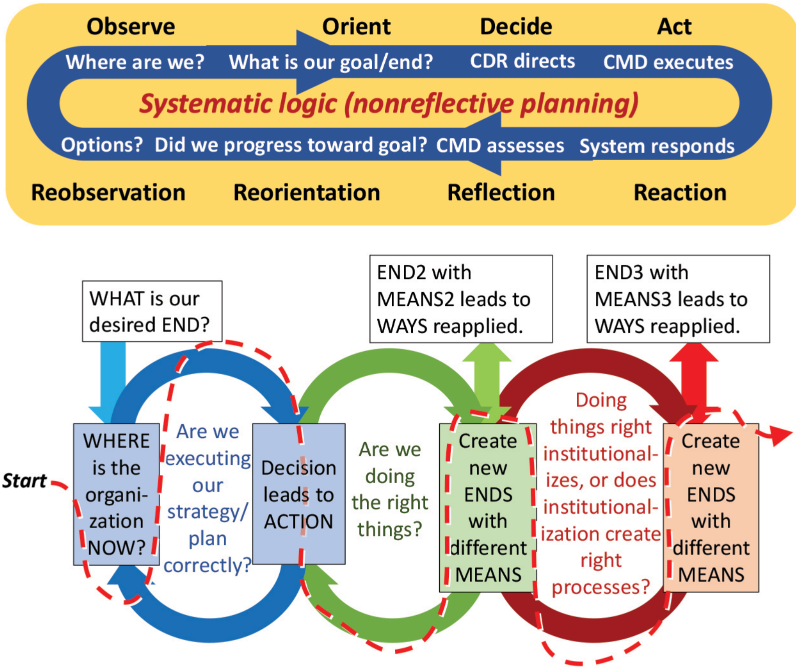



**Figure 51. Visualizing modern military decision-making as an iterative, nonreflective OODA Loop**

The deliberate, formalized insertion of reflective practice into the above organizational decision-making frame needs to be accomplished in NATO and joint forces today. They have unique challenges that cannot be properly addressed through nonreflective thinking or single-loop planning outcomes. Implementing reflective practice through systemic design will require the organization to set radical, unorthodox developments into motion. These developments will frequently challenge and disrupt the historic and institutionalized norms of a military force oriented to a single war paradigm and adherent to systematic logic and terminology underpinned by Newtonian metaphoric devices. The iterative epistemology depicted above remains linear-causal so that analytical rationalization through single- or double-loop, nonreflective thinking might continue. Yet *iteration* in nonlinear, emergent systems requires us to deviate from how *iteration* is considered. In this proposed redesign, core epistemological concepts such as how linear and nonlinear systems require different understandings of iteration is just one of the disruptive and unorthodox proposals that will take operators beyond the pale.

These changes will be controversial because many will become increasingly clear only in future security contexts after the organization achieves disruptive innovation in complex warfare that ideally will shatter existing frames, surprise and confuse adversaries, and likely require new language, models, and theories to explain to others. The greatest challenges for innovation and transformation toward a superior future warfighting form will not be technological or dependent on external requirements. They will be conceptual flexibility and inventiveness of the enterprise itself and how it makes sense of emergence in the next war as well as the form/function of a novel war paradigm of systemic design.

Institutional resistance comes in many forms, and the modern military enterprise will need to critically and creatively self-examine existing tactical/technical methods, models, theories, and language through strategic constructs. It must question and explore beyond deeply held (or seldom questioned) organizational and philosophical stances on war and warfighting and institutional resistance to real change. Shifting the organization from protecting institutionalized concepts (and identity) that might no longer be relevant is essential, yet organizations tend to reinforce how they prepare for tomorrow's challenges by extending known successes and beliefs validated yesterday. Thus, when militaries draw only from the past (legacy frame) to inform their present understanding of what war is and how it is waged, they fall short. Doing so *cannot adequately* inform a future war yet to be fought within peculiar contexts and exercised through unique abilities that the modern defense profession has *never before* seen. Change is difficult, particularly when the shift must first occur at an abstract, philosophical level before impacting tangible events.

**Notes**

1. Bertalanffy, "General System Theory"; and Holland, *Hidden Order*.
2. Tsoukas, *Complex Knowledge*, 232.
3. Burrell and Morgan, *Sociological Paradigms and Organisational Analysis;* Conklin, "Wicked Problems and Social Complexity"; Morgan, *Images as Organizations*; Rittel and Webber, "Dilemmas in a General Theory of Planning"; and Paparone, *Sociology of Military Science*.
4. Gharajedaghi, *Systems Thinking*, 51.
5. Tsoukas, *Complex Knowledge*, 32–33.

Chapter 26

# Reflective Practice to Think in Complex Warfare beyond Classical Science Analysis

The modern military war frame exists today for many reasons, including technological, cultural, social, and organizational influences. Without suggesting that any decisions leading to this frame were incorrect or ill-advised, today's modern military forces face unique challenges in how, where, and why to develop their organizations. They must consider strategic design, organizational form and function, and technological procurement and assimilation into their military capability/capacity. Military forces must also assess their expected role, responsibilities, authorities, and overarching purpose in what will be previously unrealized and likely unimagined future conflicts that are going to be surprising, confusing, and decidedly different than preceding ones.

There is a profound demand to think, act, and prepare differently and an implied need to challenge previously unquestioned beliefs, theories, methods, and conceptual models entrenched across the Department of Defense, NATO, and related security organizations. Challenging core concepts incurs substantial risk, where divergent thinking and experimentation carry with them known and unknown problems and consequences. However, retaining institutionalized beliefs and concepts that enforce convergence and localized/immediate periods of expected stability and order bring the risk of a military failing to transform from the institutional wants of the legacy system toward the emergent needs of the nation understood only through illumination in future, unimagined, or unrealized and unfolding conflicts.[1] *How can NATO and US armed forces navigate this difficult and confusing journey to strengthen some forms/functions/concepts while disrupting others to foster necessary innovation and change*?

This book has discussed complexity theory, emergence, types of problems, and systemic thinking. In suggesting how to formally integrate reflective practice and systemic design into a military's decision-making cycle, one more complexity theory model requires introduction. Organizations without a complexity framework may inadvertently continue to cling to the Newtonian-styled war frame and assimilate these design concepts into a nonreflective cycle of institutionalized thinking. Arguably, this application has already occurred across many Western militaries in early efforts to introduce design theory into a service.[2]

Integrating a new paradigm for decision-making is no easy task, as organizations that fixate on using mechanistic, linear-causal, and oversimplified frameworks are ill-prepared to receive concepts that are disruptive and paradoxical to the original frame. Further, as noted by Rittel and Webber, "the professional cognitive and occupational styles that were refined in the first half of . . . [the twentieth] century, based in Newtonian mechanistic physics, are not readily adapted to contemporary conceptions of interacting open systems."[3] Subsequently, many foundational concepts offered by complexity and systems theory are either nonexistent or poorly translated in current military doctrine, training, and education. Militaries paradoxically exhibit strong scientific qualities that are in tension with bureaucratic and ritualistic practices that collectively form the modern military institution. The military institution prefers particular theories over others, and its core belief system will exclude those that threaten to disrupt or even dismantle concepts including identity, meaning, value, or other socialized military norm.

The author offers a model as a potential shortcut around this barrier or perhaps as a way to more readily "bring what is beyond the pale and past the walls." Figure 52 is the author's adaptation of the popular Cynefin model used in many complexity science applications. Complexity theorist and physicist David Snowden first created this model in the late 1990s when he worked for IBM and developed it to assist managers in their decision-making. While there are thousands of competing models for systems thinking, complexity theory, network theory, and organizational decision-making, the Cynefin model is surprisingly easy for military professionals to quickly learn and integrate into strategic and operational planning contexts. More importantly, Snowden's framing of simple, complicated, complex, and chaotic systems illuminates how military forces tend to emphasize good and best practices at the expense of emergent and novel practices (see fig. 52). Snowden's original Cynefin model is modified here to feature these preferences—such as military "standard operating procedures" (SOP), "tactics, techniques, and procedures" (TTP), rules, regulations, and checklists—that function entirely in simple system settings. Readers may notice that most of the content shown in complex and chaotic systems is far less featured in modern military doctrine, training, education, and decision-making methodologies for strategies and planning.

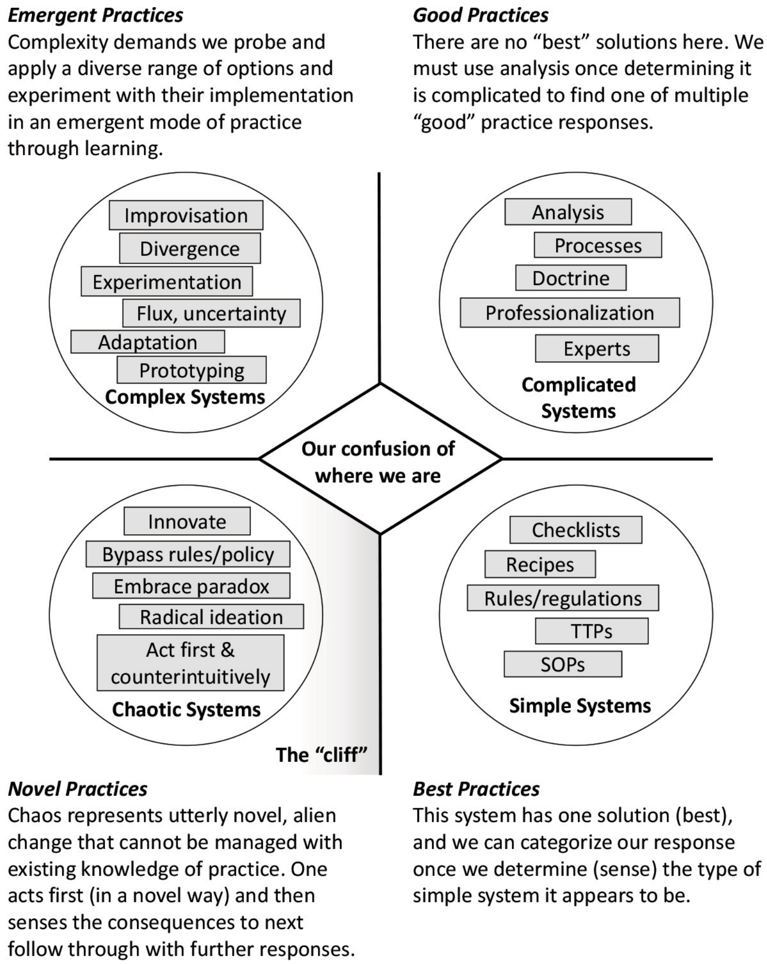



**Figure 52. Using the Cynefin framework as a point of departure**

Snowden's Cynefin framework provides a useful model for quickly conceptualizing the types of systems that modern militaries must identify, distinguish, and contemplate in all decision-making activities.[4] His model arranges systems thinking into simple, complicated, complex, and chaotic systems. Snowden relates each system according to how cause and effect appear to correlate and the most valuable behaviors, decision-making, and activities in each type of system setting.[5] Unique to Snowden's original model is the "cliff" positioned between simple and chaotic systems, where organizations fall from if they overinvest in best practices while misunderstanding the changes they are facing that pull them toward chaos. One additional important feature of the Cynefin model is that most of the time, we remain in the center of the graphic—representing confusion or disorder in knowing the sort of system we actually are drifting within. Snowden's model echoes earlier military theory such as Carl von Clausewitz's "fog and friction" that persists throughout all of warfare and makes the simplest things difficult.

Snowden's model also addresses the dangers of becoming too dependent on a lower form of system constructs when the organization in fact is unknowingly heading toward a much more dangerous and volatile construct. Often, organizations that become overfixated on simple system activities will spiral into chaos with catastrophic consequences. Military forces that heavily invest in best practices and prescriptive behaviors illustrate this systemic, institutional challenge. Examples include how the Iraqi forces responded in the First Gulf War (and again in 2003), the French overemphasis on fixed defenses (Maginot Line) and static armor firepower in the interwar period, and the US Army's overreliance on body count metrics in the Vietnam War. Oversimplification in war can drive a military to become increasingly better at the wrong things at the expense of realizing the right ones.[6]

Using the Cynefin framework, each system will be briefly addressed, beginning with simple or "obvious" systems. According to Snowden and Mary E. Boone, "simple contexts are characterized by stability and clear cause and effect relationships easily discernible by everyone."[7] There is always a "best" solution, and once an organization understands the context, it can develop best practices and checklists to master the management of simple security challenges therein. Programmatic management excels in simple systems. An organization can determine a problem from a well-established catalog and categorize the current problem to an already known (and validated) solution that the organization is trained or specializes in; best practices are reinforced so that organizational behavior is rapid, regulated, and uniform. A centralized hierarchy becomes the best organizational form, leading to deliberate command and control using indoctrinated sequences and standardized checklists. Militaries employ checklists, "standard operating procedures," "best practices," and other programmatic (requiring minimal thinking) sequences enforced through rote memorization, drill, repetition, and uniform application across the enterprise. The obvious systems found in warfare become seductive, as organizations are drawn to them above all others. These become preferred due to the high degree of control, prediction, and mastery of curated knowledge for optimized performances.

Complicated systems have no single "best solution" and exhibit some pattern of causal relationship between cause and effect that is rarely obvious, often requiring considerable expertise and experience to recognize. In such systems, "good practice" often produces an expected outcome but only through robust analysis and the reliance upon expertise. Unlike simple contexts where there is a "closed system" repetition, complicated systems rarely are predictable beyond trends and broader patterns. Thus, organizations must conduct analysis and explore multiple viable yet different options to accomplish goals. As complicated systems are open instead of closed, one cannot "rewind the tape and insert a new option" to determine the "best solution"; there are only "good enough" options that change over time.

When engaging in complicated contexts, an organization can establish theories, models, and methods that draw from historical and empirical evidence, increasing the awareness of opportunities to employ previously successful actions toward new challenges; however, there is a risk of analytical blindness and "analysis paralysis."[8] Experts can become trapped in their own biases or become overconfident and ignore serious indicators or ideas from outside mainstream practice/beliefs. They can also spiral into perpetual descriptive analysis that is inconclusive and unable to suggest creative solutions in time to act decisively. Militaries develop extensive decision-making methodologies (e.g., joint planning process, Military Decision-Making Process) using conceptual models (centers of gravity, levels of war, spectrum of war, lines of effort) and drawing from specific war theories (Clausewitz, Jomini, Svechin) to think and act within complicated contexts. Operational and tactical doctrine standardizes these processes, and militaries reinforce the professionalization of skilled planning experts through training, education, and practice adhering to these indoctrinated processes.[9]

Complicated systems are static and in that way differ from complex systems. An example of such a static system is the F-35A fighter jet. It is the most sophisticated aircraft ever produced and comprises over 50,000 technologically advanced parts, yet it can be taken completely apart and reassembled without issue. A simple system challenge could be to repeatedly navigate a fixed maze; the maze never changes, and the operator could eventually memorize the one correct path. A complicated system challenge would have operators running through different mazes at each iteration, meaning they could never memorize a single "best solution" but could develop "maze-running practices" to help give them advantages. In a complex system challenge, the maze would reconfigure each time the operator took a step, learning and responding to the operator and creating novel styles to outwit the maze runner.[10] Such a challenge requires the operator to think systemically "above the maze itself" and seek broader system patterns that could offer insight and strategy for negotiating a complex, dynamic maze. Airplanes can be disassembled and reassembled as complicated machines, yet how to effectively use airpower concepts for a culturally dissimilar, developing nation's security forces embroiled in an insurgency makes for a complex challenge.

A complex system possesses systemic qualities beyond the total sum of its parts; it is impossible to deconstruct, and reduction does not aid in explaining system behaviors.[11] For instance, despite exceptional targeting efforts on terrorist groups and drug cartels to kill/capture key individuals, today's versions of these organizations not only adapt and exist but find new ways to thrive and develop. Complex systems have intricately woven, dynamic relationships between cause and effect so that they cannot be teased apart. While some cause-effect relationships might become clear in hindsight, they rarely can be located exactly as they appear in future system developments. This factor reflects "emergence" as a core phenomenon of complex systems and why "emergent practice" is necessary for organizations operating in these ever-changing, dynamic, and learning contexts.

Complexity is nonlinear and emergent, meaning a military organization spends far more time sensing, experimenting, and ideating on complex challenges than constructing doctrines, fixed methods, practices, and models found in complicated system settings. Indeed, organizations that seek to extend the sequential, analytic decision-making used in complicated systems (such as the joint planning process) into complex systems will become frustrated, confused, and disrupted by the perpetual ability of the complex context to elude efforts to control, contain, or stabilize conditions. Complex systems reject most efforts to reverse engineer "ends" or predetermined and historically recognized outcomes. Organizations must instead shift to a high-experiment, high-failure, highly adaptive learning construct that deviates sharply from "good enough" processes used for complicated system contexts.[12]

Military organizations addressing complex contexts require a divergent mode of considering system emergence where multiple possible futures flow in nonlinear paths, often obscured and paradoxical when viewed from the swirling present perspective. This present stance itself is limited, counterintuitive, and often full of paradox as well for organizations working in dynamic, complex systems. When an organization attempts to force constructs from simple and complicated systems management into a complex context, it will succumb to illusions of control and order that quickly crumble and fail. It will miss opportunities for unique and unimagined opportunities to act and potentially transform the system to its future emergent advantage because it remains rigidly wedded to processes incompatible with and often counterproductive to the complexity it is engaged in (and part of). Militaries seek innovation and emergent practices for dealing with complex systems, where often a minority position or concept will gain traction through a visionary leader or minority group that challenges the mainstream institution. In the last generation, multiple militaries have formalized "military design" activities to encourage these unorthodox, experimental, and outlier approaches. Often, these ideas and groups are resisted as heretical, radical, and dangerous by defenders of the legacy institution and those insisting that complicated system processes must be applied to all military challenges.

Complex systems present emergent, ever-changing, and dynamic contexts. Rittel and Webber's concept of "wicked problems" is expressed in how complex systems function. They assert that "the planner terminates work on a wicked problem, not for reasons inherent in the 'logic' of the problem. He stops for considerations that are external to the problem: he runs out of time, or money, or patience. He finally says, 'That's good enough.'"[13] Yet even complex systems express a certain general pattern of cohesiveness and regularity despite change being the only constant. Chaotic systems are different in that they present unprecedented, unimagined, and entirely novel dynamics that pose extremely dangerous and costly contexts for organizations that find themselves in chaos. There is no relationship between cause and effect in chaotic systems where novelty is the only constant pattern, and an organization's first and only priority is to act immediately until the system shifts or the organization navigates successfully to a complex or complicated context. Chaos cannot demonstrate any pattern (except perhaps a pattern of no patterns),[14] and the apparent randomness of chaos creates unique challenges for leaders seeking to restore some sort of order and coherence.

In chaotic system contexts, courageous champions of society and tyrannical dictators alike have equal opportunity to gain power and credibility. Any acts of innovation and decisiveness stand the same chance of failing or succeeding . . . even ones entirely counterintuitive or antithetical to how an organization or society normally understands reality.[15] Indeed, a dialectic of paradoxical strategies is often valuable in chaos since either might provide advantage despite their extreme difference. Conservative strategies that generate similar or complementary options may have a higher risk of failure in chaotic contexts. Thus, a unique condition for radical change is set because leaders able to successfully steer an organization out of chaos will be viewed and appreciated in a new light.[16] Organizations will seriously consider ideas or practices that succeed in one chaotic episode as a potential mode for acting in future chaotic encounters. The unique qualities of human imagination, improvisation, charm, charisma, and desire and passion reach their most volatile and unpredictable capacities in chaos, meaning that saviors, authoritarians, and champions can arrive in the widest possible range of forms and motives. Militaries tend to undergo revolutionary, radical, and often unprecedented changes when in chaotic contexts, particularly when these become existential to the military or the nation/society it exists to serve. While heroes and legends emerge in these conditions, they also share the risk of being overextended or given too much credit and power for what might happen within chaos.

Figure 53 provides one way to depict these different types of systems and how militaries think and act within them. Drawing from Snowden's Cynefin framework, organizations experience the most damage and pain when they fall into chaotic system contexts, and the most disastrous path leading to this state is often when they become complacent by relying on increasingly simplistic "best practices" while not observing systemic shifts.[17] Organizations that overrely on simple system practices are least able to recognize and respond to chaotic systems. Thus, by falling off the edge into chaos, they suffer the most cost and damage versus an organization operating in complexity that momentarily dips into chaos.[18] In the graphic, the swirls might be thought of as a wormhole that rapidly transports the organization from a simple to a chaotic context. They are the disruption, damage, confusion, and pain an organization encounters if it is unwittingly moving toward overdependence on simple system thinking and/or faces chaos.[19]

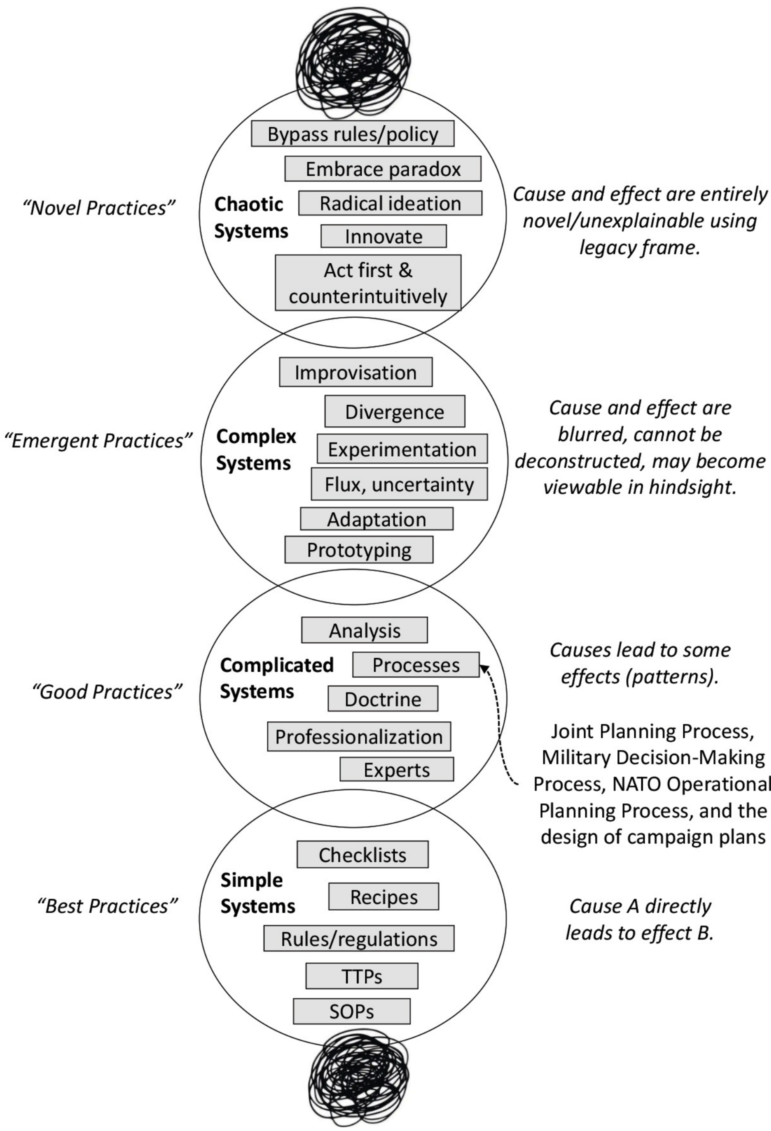



**Figure 53. Integrating complexity theory into the modern military war frame**

This framework of systems theory presents one way to understand complex security contexts and how militaries engage with myriad systems (from simple to chaotic) throughout any security challenge. It identifies how an organization can shift the ways it employs logic and makes decisions depending on the type of system it is experiencing. Figure 53 lists a series of associated decision-making methods, models, and organizing logics as examples associated with each type of system. Again, using one decision-making framework that is well situated for one system type does not usually correlate to another system type. Thinking in complexity using simplistic "best practices" programmatic logic is usually a recipe for disaster, as is attempting to introduce novel practice (chaos) into simple system contexts where a best practice is often already identified and optimized for organizational utilization.

Considering figure 53, military organizations invest considerable effort into the codification, education, and training of formal (and informal) doctrine exclusively applying to simple and complicated systems. Military formal decision-making and structured campaign planning that involve an operational design approach are associated with "good practices" found to pair well with complicated system contexts. However, activities found in complex and chaotic system contexts are less familiar within established military education, training, or doctrine. Indeed, many military theorists posit that military doctrine is antithetical to complexity and chaotic contexts, representing a significant organizational vulnerability to modern military forces.[20] Military design proponents offer that design praxis (the hybrid of novel theory and informed, reflective practice) is the only current form of knowledge curation and decision-making available to military forces for complex and chaotic security contexts. Consequently, many military design theorists (including the founder of military design, Shimon Naveh) insist that the military's attempts to incorporate design methodologies into doctrine, make them a formal step in a decision-making process (e.g., before "mission analysis" as the US Army suggests), or simplify design into checklists or best practices are futile and counterproductive.[21]

Such endeavors highlight a tension in how modern militaries seek to approach various systems that exercise within the security contexts they are directed to address based on their nation's political or societal desires. In addressing security affairs, militaries generally adopt two primary distinguishable patterns of logic: systematic and systemic.

Systematic logic breaks things down for analysis and subsequent reassembly into the whole for formulaic, linear-causal activities that denote a stable and uniform context. Systemic logic requires consideration of larger systems "up and out" through increasing abstraction, where framing the future is divergent (multiple possible but different futures) versus convergent (a single end state). Thus, it avoids the systematic approach to reverse engineer from an established goal. Systemic design thinking attempts to generate and accommodate "multiple inequivalent descriptions" within a vastly complex context.[22] Figure 54 shows the boundaries of systematic and systemic logic paired with military activities within each type of system setting.

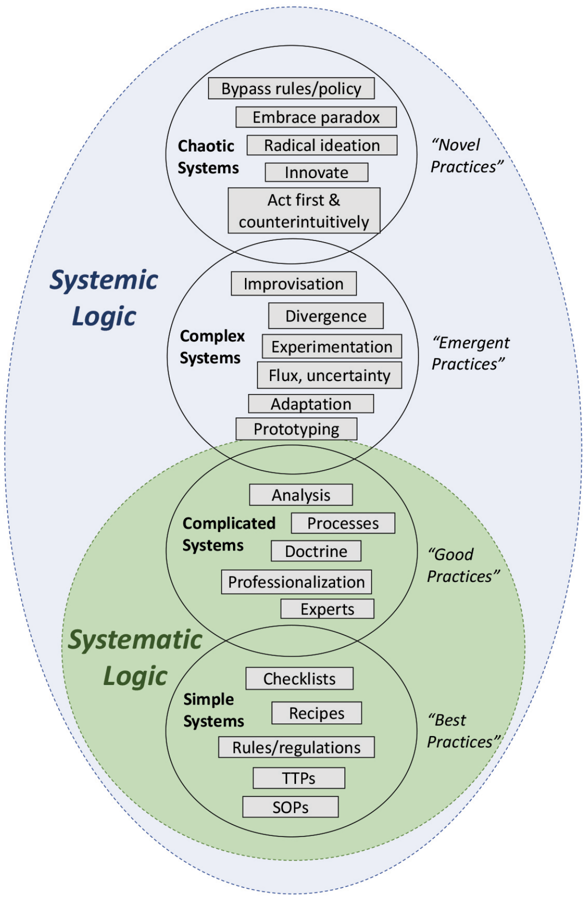



**Figure 54. Systemic and systematic logics clarified**

To revisit earlier definitions, systemic logic differs from systematic logic in how a military force thinks and acts in complex warfare. Again, systematic logic functions with *inputs linked to clear outputs* and where linear-causal relationships work mathematically (A plus B leads to C), even mechanically, to sequence discrete and reducible activities across time and space to lead toward overarching objectives and goals. Thus, systematic thinking implies a direct, causal, and input-output correlated relationship that is quantifiable and suitable for analytic optimization within the system one is attempting to act within. Systematic logic is valuable for analytical optimization and yields clear, repeatable results in simplistic and complicated systems. Programmatic management functions best in this context and is found in disciplines such as engineering, where mathematical formulas are used to express natural science concepts (physics, chemistry). Systematic logic is highly successful in predicting the behaviors and dynamics of simple and complicated systems but becomes increasingly fragile within complex and chaotic systems.

Military organizations that overinvest in systematic logic are dependent on doctrine and standardization of best practices. They employ elaborate campaign plans in an effort to stabilize and instill a sense of order and predictability in what are often complex (or chaotic) adaptive systems. Modern military forces tend to underinvest in systemic logic, where the disciplines of complexity theory, systems theory, military design, postmodern philosophy, and military sociology are considered outliers or, in the case of postmodernism, decidedly off limits for most institutions. When concepts or terminology from any of these fields are adopted into modern military practice, they are rendered into systematic logic so that the systemic qualities are broken or discarded. For example, concepts such as "synthesis," "emergence," "dynamic," "nonlinear," "holistic," or "problematize" are frequently misapplied in military doctrine and theory through their assimilation into what is still an overarching systematic logic.

How might we break free of these institutionally imposed and *single paradigm* inhibiting frames? Designers able to use reflective practice to illuminate the belief systems, theories, methodologies, models, and terminology that form our entire military preferred frames for thought and action in complex warfare can then move "beyond the pale" and bring back essential yet disruptive, challenging, and paradoxical ideas from outside our own groupthink and biases that restrict imagination, innovation, and change. The next several chapters attempt to offer some of the ways designers can seek this sort of essential disorder and destruction so that cognitive barriers are overcome.

**Notes**

1. Weick, "Collapse of Sensemaking in Organizations"; and Weick, *Sensemaking in Organizations*.

2. Martin, "Deniers of 'The Truth' "; Jackson, "What Is Design Thinking?"; Paparone and Squier, "Reframing Leadership at the Eisenhower School"; Graicer, "Between Teaching and Learning?"; and Beaulieu-Brossard, "Encountering Nomads in Israel Defense Forces."

3. Rittel and Webber, "Dilemmas in a General Theory of Planning," 156.

4. There are many models for explaining systems theory fundamentals. The Cynefin framework has utility here in that it quickly presents multiple different systems in a cohesive organizing model. It is widely used internationally and in many defense organizations. See Snowden and Boone, "Leader's Framework for Decision Making"; and Snowden, "Application of the Cynefin Framework."

5. Snowden and Boone, 68–72.

6. In the interwar period, armor development went in many competing directions. The French sought a heavy frontal armor and large-caliber ranged system with only radios with command vehicles. These tanks moved slower and were less maneuverable but were ideal for fighting in keeping with the Maginot Line strategy. Germany invested in smaller, lighter tanks with less firepower but maximum communication and maneuverability that could work in a combined arms fashion with close air support and offensive drives. Many historians agree that the French military focused on winning the last war with new technology, while Germany sought to win the next war differently by exploiting new technological capabilities outside of the last war.

7. Snowden and Boone, "Leader's Framework for Decision Making," 70.

8. Snowden and Boone, 72.

9. Paparone and Jackson write extensively on how militaries create doctrine to standardize knowledge in a particular way divorced from most other professions. See Paparone, "How We Fight"; Jackson, "Doctrine, Strategy and Military Culture"; Mäder, *In Pursuit of Conceptual Excellence*; and Kier, *Imagining War*. Mäder and Kier provide historical studies of certain militaries (within NATO today) that enhance some of Paparone and Jackson's arguments.

10. The maze metaphor is adapted from an example in Gharajedaghi's chapter on complexity. See Gharajedaghi, *Systems Thinking*.

11. Holland, "Complex Adaptive Systems," 17–30; Conklin, "Wicked Problems and Social Complexity"; and Dent, "Complexity Science."

12. Snowden and Boone, "Leader's Framework for Decision Making"; Rittel and Webber, "Dilemmas in a General Theory of Planning"; and Protzen and Harris, *Universe of Design*. *Universe of Design*, a collection of Horst Rittel's university lectures and class instruction notes from his work at Berkeley over several decades, provides an extensive resource on emergence, complexity, and why humans tend to create artificial end states when engaging with complex systems that have no such phenomenon in reality.

13. Rittel and Webber, 162.

14. Fromm, "Types and Forms of Emergence"; and Holland, *Emergence*.

15. Snowden and Boone, "Leader's Framework for Decision Making"; Snowden, "Cynefin Framework"; and Snowden, "Application of the Cynefin Framework."

16. Snowden and Boone.

17. Snowden, "Application of the Cynefin Framework."

18. Snowden and Boone, "Leader's Framework for Decision Making."

19. In Snowden's Cynefin framework, he depicts this concept of damage as a cliff or wave that exists between simple/obvious systems and chaotic ones. An organization overcommitted to simple systems will fall off the cliff into chaos and suffer pain and expense.

20. Graicer, "Beware of the Power of the Dark Side"; Naveh, Schneider, and Challans, *Structure of Operational Revolution*; and Zweibelson, "Awkward Tango."

21. Ryan, "Introducing Design to the U.S. Army"; Weizman, "Walking through Walls," 215; and Graicer.

22. Tsoukas and Hatch, "Complex Thinking, Complex Practice."

Chapter 27

# Reframing the Modern War Paradigm with Systemic Design

Modern military organizations operate in a centralized hierarchical structure that pulls information requirements from subordinate levels while pushing direction and decisions from higher levels downward. Today, militaries associate the centralized hierarchical form with how they categorize complex reality into a Newtonian-styled, hierarchical, and causal relationship of strategic, operational, and tactical levels for war. Tactical units form the base of the organizational pyramid, where the large population of subordinate participants in a military organization conduct localized, tactical, technical, and immediate actions (directed action in specific time and space proximate to that unit's role/responsibility/specialization). This operations construct is introduced at the onset of military education and training so that military professionals view it as a natural order of things.[1] Except at higher levels of leadership development and education, participants do not consider the scaling of role, responsibility, and organizational purpose in the broader military institutional form/function for warfighting. The next graphic illustrates one way to overlay the military view of war (strategic, operational, and tactical/technical) with organizational form/function (fig. 55).

As illustrated, modern military organizations broadly position the form and function of their decision-making based on two overlapping conceptual frames that consider the organization's exteriority (what "war" is within reality; the character and nature therein) and interiority (how the institution organizes to make decisions and direct activities). They categorize war into a scaling/scoping hierarchical framework of "levels of war" within which the organization (a centralized hierarchy) can draw from select methods, models, and theories to function as a warfighting enterprise. The institution's war philosophy informs how the military should construct campaign planning and operational concepts and orchestrate myriad activities in time and space, which subsequently inform tactical (localized, immediate) and technical military activities. The military's war paradigm enables these activities (as fig. 55 depicts) that are shaped and rationalized within how that frame relates theory, models, methods, and language to the shared belief system.

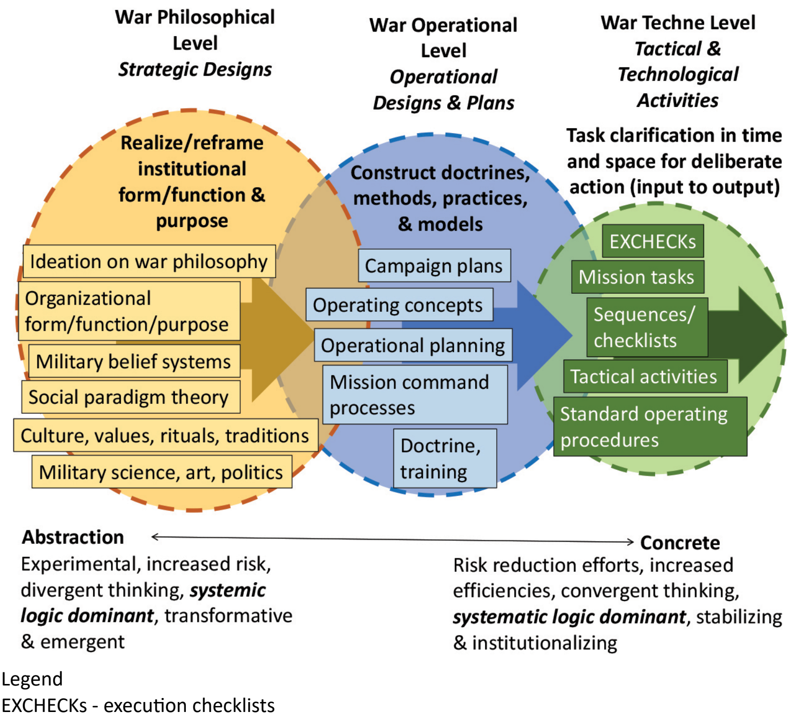



**Figure 55. Reframing the modern military war paradigm with systemic design**

Yet organizationally, military forces tend to overemphasize some managerial, leadership, and systems methodologies over others or unwittingly (or unwillingly) prioritize convergent processes at the expense of divergent ones in security contexts that require different thinking and organizing. Further, when considering most military professional military education platforms, junior military professionals almost exclusively focus education and training at the "war techne level." Only mid-level and senior military education move the focus toward the middle sphere and "war operational level," with little education or training ever directed at the "war philosophical level" except through outside expertise, select senior leader development, and certain advanced military schooling and research. The organization lives mainly in the tactical, immediate, and local context of warfighting and projects planning as an extension of the immediate upward for framing all operational and strategic contexts.[2] Naveh et al. reinforce the indoctrination of this mindset, noting that "in the military sphere, we train almost exclusively to the tactical level of abstraction; it is easiest to teach and easiest to learn; it is also easiest to engineer."[3]

Figure 56 is presented once more (see chap. 8) with components from figure 55 to show the ontological and epistemological choices of the modern war paradigm that renders constructs such as the above coherent to the institution. We all implicitly agree that such things are as they are because we conceptualize warfare as illustrated in figure 56.

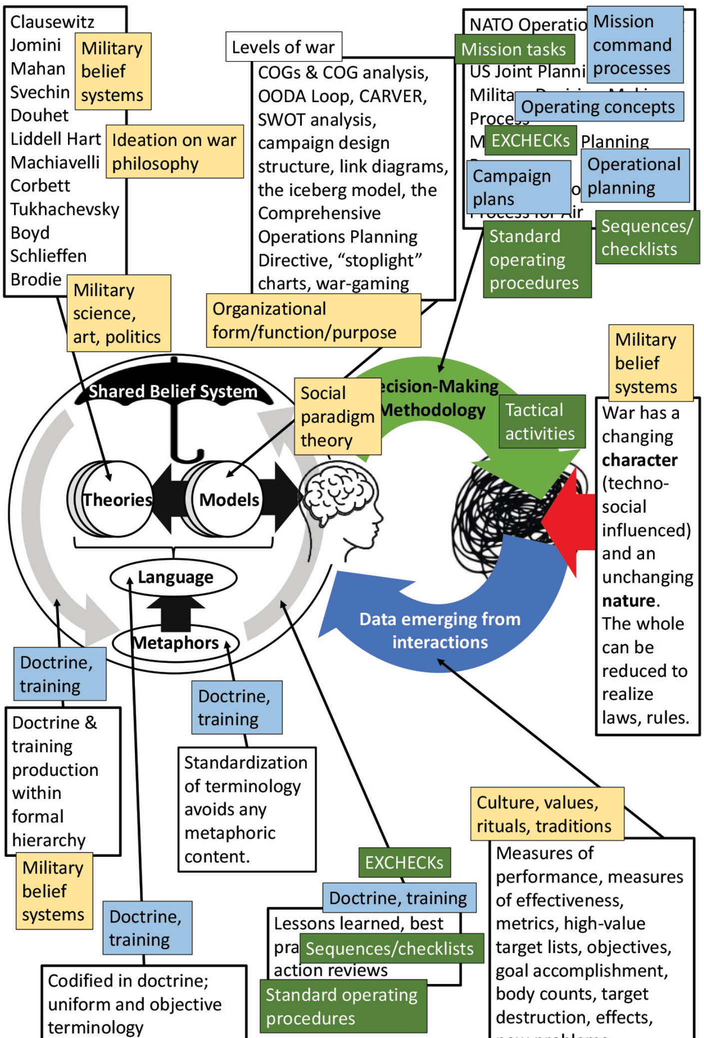



**Figure 56. The modern military paradigm for war**

Orientation to the tactical and immediate creates the risk of institutional imbalance because the organization does not reflect critically and creatively on how and why it operates as it does. Often termed "thinking about one's thinking" or reflective practice, sociologist Donald Schön coined this concept. He indicates that "the problems of real world practice require a process that engages the practitioner's theoretical, procedural, and reflective knowledge . . . . [It] is a process of reacting to the inconsistencies in a situation by rethinking one's tacit [deep, advanced, masterful] knowledge and reframing the situation within one's intuitive understanding in an action experiment that tests possible solutions."[4] Schön pioneered decision-making theory development, advocating that "all decision makers in science and the professions must move beyond a purely rational model of understanding to one that is transactional, open-ended, and inherently social."[5] Next, we discuss a systemic approach for incorporating reflective practice into decision-making cycles. While some might argue that existing decision-making cycles are already reflective, readers can refer to the chapters on single-, double-, and triple-loop learning. Only in a triple-loop mindset do military professionals gain reflective practice. Most existing military doctrine and decision-making methodologies employed today represent either a single- or double-loop capacity for thought and action in war.

**Notes**

1. "Levels of war" and the centralized hierarchy for organizational form and function are representative of models used to convey military theoretical concepts so that the modern decision-making methodologies (e.g., NATO-OPP, JPP) can work as desired.
2. Sorrells et al., "Systemic Operational Design," 15.
3. Naveh, Schneider, and Challans, *Structure of Operational Revolution*, 8.
4. Ferry and Ross-Gordon, "Inquiry into Schön's Epistemology of Practice," 98–99.
5. Lichtenstein, "Generative Knowledge and Self-Organized Learning," 48.

Chapter 28

# A Systemic Treatment of Reflective Practice in Decision-Making Cycles

Modern military forces have the opportunity to systemically design a new organizational approach to military form, function, and purpose. When a military realizes how and why it thinks and does things (reflective practice), it gains a unique ability to conceptually pull itself up by its own bootstraps. By becoming self-aware of its preferred social paradigm for decision-making, a military opens up the distinct possibility of deconstructing and radically transforming that framework when found to be inadequate or incomplete. The difficulty of overcoming this organizational barrier is compounded by how the social paradigm seeks to protect itself from inquiry and critical deconstruction. Militaries and commercial enterprises are equally challenged to break out of institutional self-protection measures that redirect focus away from the paradigm and toward methods or practitioners.

Militaries can get caught in the self-protecting characteristics of the dominant war paradigm; the institution defends itself against change and uncertainty by warding off critical and creative inquiry. To paraphrase Karl Weick, we tend to believe we are remembering the past (how things were for defense previously) so that today (the present) we can operationalize future actions and imagine ways to accomplish tomorrow's goals.[1] Yet this causal loop falls under institutionalized groupthink where, instead, we often imagine the past (ritualize and indoctrinate preferred beliefs, theories, and narratives) so that we can today employ doctrine and operational planning to remember how the future ought to go. This mindset generates institutional gaps and increases the risk of failure because we omit necessary strategic design and institutional reflection/revision. In a rush to operationalize planning and doctrine toward procuring the things and permitting the favored behaviors that our organization *wants to continue*, we neglect to institute necessary change toward what our organization *needs to move toward*.

Figure 57 presents a new model for systemic organizational design to synchronize modern military activities and decision-making across the enterprise and to incorporate various organizational/management constructs in complex, adaptive system contexts. This figure introduces the systemic loop for organizational management and decision-making that is also integrated into figure 58. First, the figure below positions an iterative loop of leadership and organizational activities that broadly pairs with systemic or systematic logic considerations. While this graphic appears linear in the same iterative structures provided earlier in this book, multi-minded systems and complexity require a different framing of iteration. Systemic concepts will be visualized in ways that appear linear, yet only systematic ones are functional solely in a sequential, formulaic manner. Systemic framing will be explained without resorting to legacy modes of conceptualizing conflict such as reductionism and linear-causal formulation to reinterpret war.

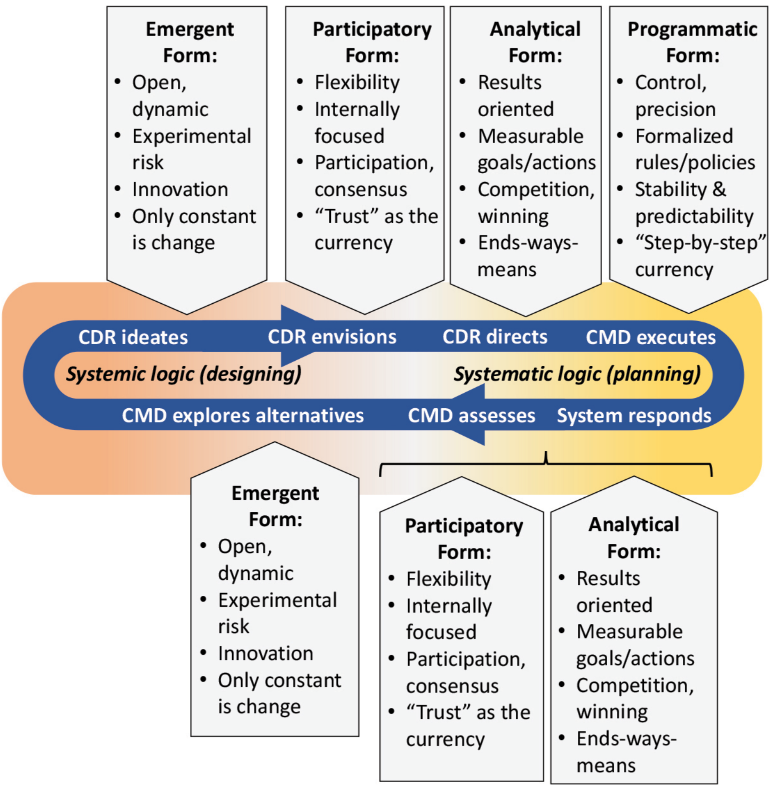



**Figure 57. Merging reflective practice into the entire military decision-making framework**

The emphasis on graphically depicting these concepts deserves further mention with regard to systemic design and innovation. Simple and some complicated systems can be mapped out in formulaic style, whether with numbers or terminology. This methodology works with recipes or drill and ceremony in military contexts. When militaries move out of simple or complicated systems into complex and even chaotic systems, the value of formulaic and analytical representation diminishes considerably. Thus, when designers explore and reflect on dynamic processes of multi-minded systems, they rely more heavily on pictorial presentation than written language.[2] This tendency highlights the difference between operational planning teams that generate vast piles of written operations orders with precise, doctrinally approved language and military design teams that work with whiteboards and far more graphical abstractions. Indeed, many military design facilitation techniques intentionally dismantle and disrupt the proclivity of modern militaries to render all decision-making into text. For example, war-gaming graphics end up becoming largely symbolic textual representations in spreadsheets, tables, or maps to support analysis and a factorylike, ordered production sequence.[3] Design moves paradoxically toward iterative ideation and experimentation outside the established lexicon and institutionalized frame.

Operators must appreciate that with systemic design and reflective practice in complex, dynamic systems, there will be no linear, causal relationships in iterations through any cycle of thinking and acting and that systemic versus systematic (analytical) thinking is necessary. Complexity requires us to reform how we view time itself, where "nature forms patterns, some orderly in space but disorderly in time, others orderly in time but disorderly in space. . . A new understanding of time brings the realization that time is not really defined by a clock but by rhythms and iterations."[4] With systemic design and reflective practice, iterative cycles through the design activity represent entirely new and often emergent, different ways to *sensemake* within a multi-minded system. Analysis and linear-causal iteration, such as OODA or other modern military models that support analytical rationalization, will not suffice. This understanding is key to the proposal presented next.

Figure 57 represents the concept of merging reflective practice into military decision-making through a loop and describes each phase within the stages of the loop. Although the loop has no starting or end point, for conceptualization it is useful to start in the upper left of the loop with "commander ideates." This phase is associated with the organizational style of "emergent form" for leadership, management, and modern military organizational form/function. In the "commander envisions" phase, the organizational style shifts to a "participatory form." Although any and all organizational styles may be present and operational, the participatory form is paramount.

Next, the military organization moves in this iterative loop to "commander directs," paired best with "analytic form" for the organizational style of decision-making and form/function. Here, the organization moves toward systematic logic underpinning most activities, where analytical and, later, programmatic forms of organizing style become increasingly prominent. Again, the "emergent" and "participatory" forms are present and functional in all phases of this loop. However, programmatic organizational form and function should become prominent for executing missions and realizing how the broader system responds to military decision-making activities. Programmatically and analytically, the organization would seek to appreciate what efforts accomplished what effects and whether the system moved in a nonlinear, emergent manner requiring significant systemic reframing. Subsequently, the loop moves to "command assesses," where participatory and analytical forms of organizing eventually give way to the emergent form of an experimental, dynamic, and innovative organizational style. The systemic logic of design regains dominance as the loop moves to "command explores alternatives" and loops back to a commander-led "ideation" phase.

Figure 58 (next page) inserts this systemic organizational loop across system forms (Cynefin framework) coupled to earlier organizational frameworks of how military forces establish their form/function and purpose. It shows the systemic framing of simple to chaotic systems layered on the modern military organizational structure, paired with the proposed systemic design for the decision-making loop.

This illustration also presents a proposed strategic design loop that is iterative and would form the foundational scaffolding for subsequent developments in any joint operating concepts and a process for enabling the commander's vision, direction, and evaluation of any operational concept from design to execution. The blue loop demonstrates this proposal by commencing at the "war philosophical level" in the orange semipermeable sphere. Here, a commander (and associated staff) ideates at the abstract level, beginning with a reflective framing of the modern military war paradigm. Doing so would illuminate that paradigm, the organization's institutional form and function, and whether the legacy belief system (what warfare was previously) requires a reframe or transformation. This insight would generate a clarification of that organization's form, function, and purpose systemically rather than nonreflectively or within a single- or double-loop cycle. In the below graphic, organizational activities using reflective practice overlap with how complex and chaotic system settings are arrayed. This depiction frames how, at the highest levels of human societal interactions that include politics, war, and rival belief systems, these systems exercise the most prominent representation of reality systemically versus systematically (reduced, compartmentalized, analyzed).

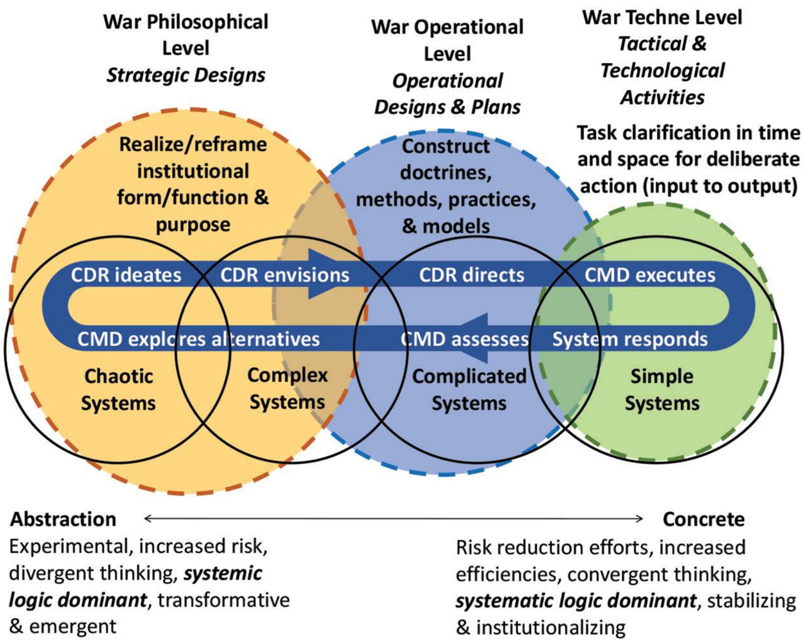



**Figure 58. Establishing systemic design for decision-making and reflective practice**

During this *ideation phase*, the commander would progress through strategic design toward a vision statement that again represents the strategic and philosophical purpose, form, and function of that modern military force engaged in reflective practice. *This phase would be largely devoid of any doctrine or operationalized concepts, planning, or methods*, as they cannot provide innovation or necessary self-reflection per se. Their logical origins are as subordinate manifestations within institutionalized war frames; doctrine is convergent and oriented toward protecting established ideas from outside disruption.[5] In the graphic, the war frame itself is generated in the orange sphere. Because of the nature of how a war paradigm maintains relevancy, organizational members operating at the operational or tactical levels will find realizing or reflecting on the war frame difficult. Thus, those individuals seek to plan and produce actions immediately and rely on doctrinal obedience and convergence above all. The strategic/philosophical phase of this design loop mitigates this tendency. This reflective practice orients to the *why* so that subsequent activities can generate novel ways for how and *what* ought to be done militarily.

Once the commander envisions the strategic design, the organization has the necessary articulation of new or refined commander's guidance to commence planning activities (through the analytical organization style) nested to programmatic and technological endeavors (tactical/techne in simple/complicated contexts). Here at the "war operational level" where operational design and planning are paramount processes, the commander moves from "ideates/envision" to "directs." Accordingly, the organization constructs the necessary and informed decision-making methodologies to craft new doctrine, practices, and needed mental models. Referring to figure 58, these actions largely occur where complex systems interact with complicated ones in that overlapping area where tactics blur into operations, which again blur in the subsequent overlap between strategic and operational.[6] Next, the organization (through the commander's direction) executes, where tactical and technological activities are implemented at the "war techne level." At this level, complicated and simple system contexts overlap, and an organization seeks to clarify tasks in time and space for deliberate cause-effect relationships.

As complex reality represents an ongoing, dynamic engagement between many human beings and their created artifacts and ideas with the realities of the world, the design loop circles back from an execution of a localized, immediate (tactical, techne) activity to a system response. This interaction moves into the complicated system frame (the blue sphere), where the organization must assess for the commander what has happened and why. Complex reality rarely rewards organizations with things happening exactly as planned. It is emergent, meaning that change occurring now cannot be articulated with legacy concepts or even realized fully without reflecting and creating new ideas. The emergent aspect of complex reality is the bedrock of human innovation, and the challenge of addressing this emergence is why institutions tend to be conservative and resist change until absolutely necessary.

As the loop circles back into the strategic design sphere, the command must explore alternatives and consider reframing and experimenting so that the commander gains cognitive maneuver space. This loop leads to a return to the commander ideating and modifying or generating yet another strategic design vision through triple-loop thinking and systemic design practices. This design loop is iterative, nonlinear (it need not follow the same path or occur in an orderly sequence), and perpetual. An organization that nourishes and maintains the entire design loop will be more agile and creative than an organization that shortcuts the strategic design in favor of operationalizing tactical and techne concepts through rigid institutionalization of doctrine and static belief systems (trapped in single- or double-loop thinking).

Figure 59 builds on the last few figures by highlighting where dominant patterns occur for security-oriented "designing" versus "planning." The designing patterns encompass the abstract side of the conceptualization spectrum for an organization, with design best paired for appreciating and developing activities for chaotic, complex, and high-functioning complicated systems. Design is iterative, emergent, nonlinear, and perpetually transformative as well as self-disruptive. Designing occurs as designers design. The planning side of the conceptualization spectrum corresponds with complicated and simple systems where such activities thrive. Design informs planning, while planning results subsequently inform further design. The relationship between designing and planning is symbiotic, iterative, and dynamic. "Dynamic" is used in this context in the sense that while the organization realizes and distinguishes between types of system contexts and matches appropriate organizational styles toward decision-making, it will tailor all activities toward the form and function that suit the security challenge at hand.

As illustrated earlier in this chapter, the systematic logic of reductionism and linear causality encompasses most planning activities and reasoning within simple and complicated system contexts. In figure 59, systemic logic realizes the entire frame but is directly applied as the primary decision-making mode for complex and chaotic system contexts.

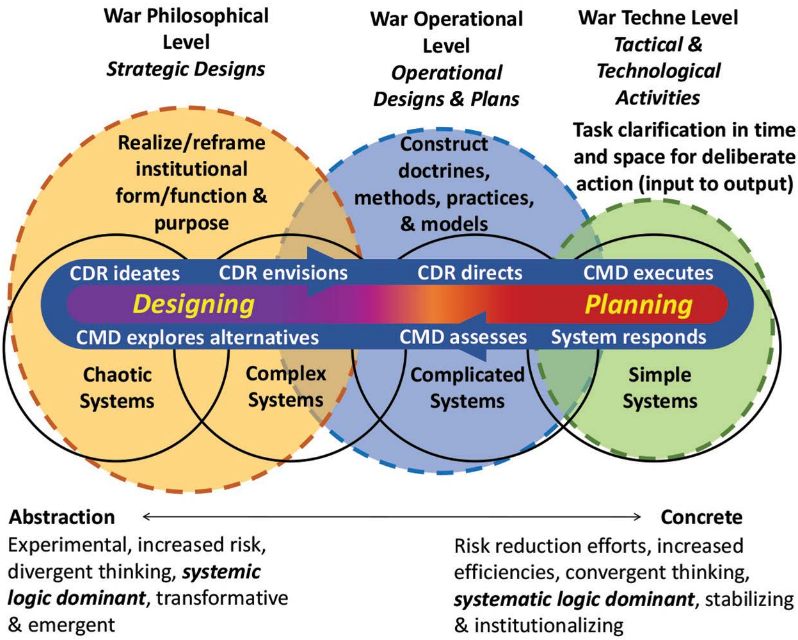



**Figure 59. Designing and planning patterns in organizational form, function, and purpose**

Designing for military considerations recognizes the entire frame (a systemic view) but focuses activities on contexts where design provides the greatest opportunity; planning and programmatic processes thrive in simple and complicated system contexts accordingly. As one informs and influences the other, these actions and reactions will blur into complexity and complicated contexts dynamically. The implication is that modern militaries require operators, subordinates, and staff components comfortable with exercising design and planning actions interchangeably with a high degree of skill and sophistication.

In figure 60, the established military conceptual and behavioral processes are bounded with relation to systems theory and complexity. Note that the swirling zone of damage, destruction, and confusion is depicted on both ends of the graphic, illustrating a core aspect of complexity theory where activities within a simple system context can suddenly spiral into catastrophic failure (chaos).[7] The strategic light grey arrow is multidirectional and covers the span of the strategic design sphere. Design is where military conceptualization and associated behaviors must follow an emergent, unorthodox, and multidisciplinary process that is transformative. Operating in novelty requires high experimentation with a large "failure population" that necessitates scaled prototypes in a divergent range of creative options. One might consider this endeavor "treasure hunting" and nonlinear exploration within multiple conceptual failures so that an emergent and novel value is "discovered."[8]

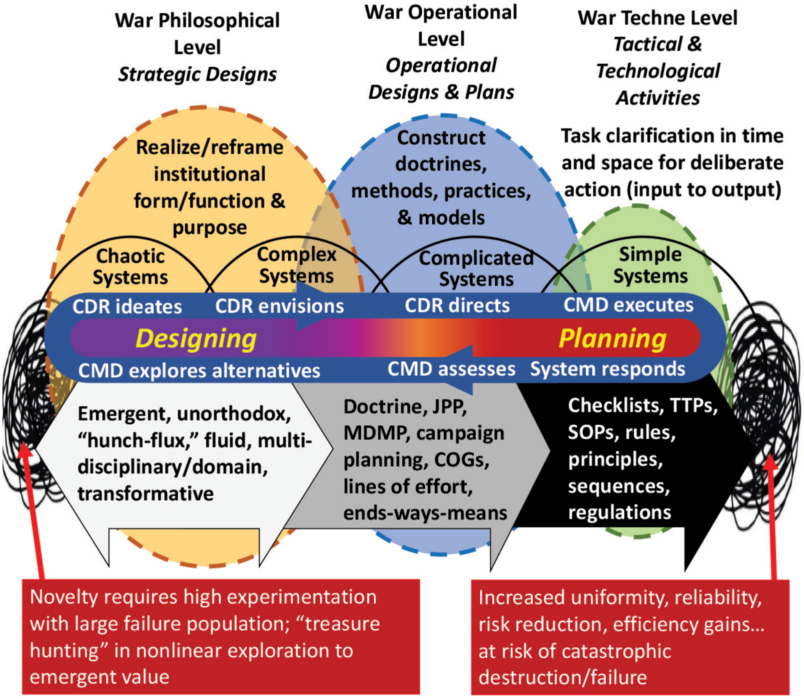



**Figure 60. Synthesis of design, planning, and reflective practice within complex security contexts**

In the blue sphere for operational design and planning above, a dark grey arrow illustrates the manifestation of operational-level doctrine; decision-making methodologies, such as the joint planning process and other service-related variations; and natural science modeling used in military science, including "centers of gravity," "lines of effort," and organizing metaphors like ends-ways-means processing. The black arrow extending from the grey one is under the war techne level, where simple systems respond well to checklists, standard operating procedures, rules, and principles extracted from operational doctrine, models, and methodologies.

On this far right end, the increased uniformity and reliability and the risk reduction practice of using a set "best solution" do increase efficiency and conformity. Indeed, organizations often attempt to find problems that match with existing solutions they already have available. Rittel and Webber first described this tendency, stating that "the information needed to *understand the problem depends upon one's idea for solving it*" (emphasis in original).[9] However, overemphasis on simple system practice also increases the danger of catastrophic failure for the organization unable or unwilling to realize when the security context is able to transform to a future state where the current simple system thinking will produce disruption, destruction, and loss.

The prior figure pairs "novelty" with abstraction, where a military organization cannot avoid engaging in philosophical inquiries about war or organizational theory to consider how and why it conducts decision-making in its current form and function. Novelty requires a different organizational framing for risk, divergent thinking, and critical reflection as well as deep consideration of potential design risks, opportunities, and consequences. Design risk differs from traditional risk considerations for militaries in that they hail from different system settings. Reducing risk for simple and complicated systems (a rocket component malfunctioning, a fighter aircraft failing to have scheduled maintenance completed) includes gains in efficiency, prediction, uniformity, and control. Design risk for novel experimentation or prototyping occurring in complex or chaotic systems involves a different consideration of failure, where ideating, prototyping, and experimenting (whether conceptual or tangible) must produce a high degree of failed outputs in a highly divergent mode of production. Design thinking involves conceptual abstraction and active experimentation—"designers must stay at higher levels of abstraction" so that they can challenge institutional assumptions.[10] Innovation is never linear-causal, where experiment A leads to solution B. Instead, it is nonlinear and emergent, where a host of design failures act as stepping-stones toward unrealized or unimagined opportunities that require design risk to explore.[11]

Design consequences differ from risk in that complex and chaotic systems are dynamic and emergent. Systemic change cannot be explained (or predicted) sufficiently using the legacy system's theories, models, or language. For this reason, societies change their language and invent new terminology to explain developments. For example, the term "horsepower" was created when a largely agrarian and animal-power-oriented population needed new language and metaphors to adapt the emergent concepts of combustion engines, automobiles, and mechanical powered devices. Part of the design risk involves how a system changes through the application of design experimentation. An existing "problem" in the current system might become dissolved through the designed transformation into a new system where the organization gains a new advantage over adversaries. In turn, adversaries are surprised and disoriented and must adapt to the changed system. However, a design risk must include the disorientation of the organization implementing the design because complex emergence is dynamic; any illusion of increased control through deliberate design misunderstands how innovation occurs in reality.[12]

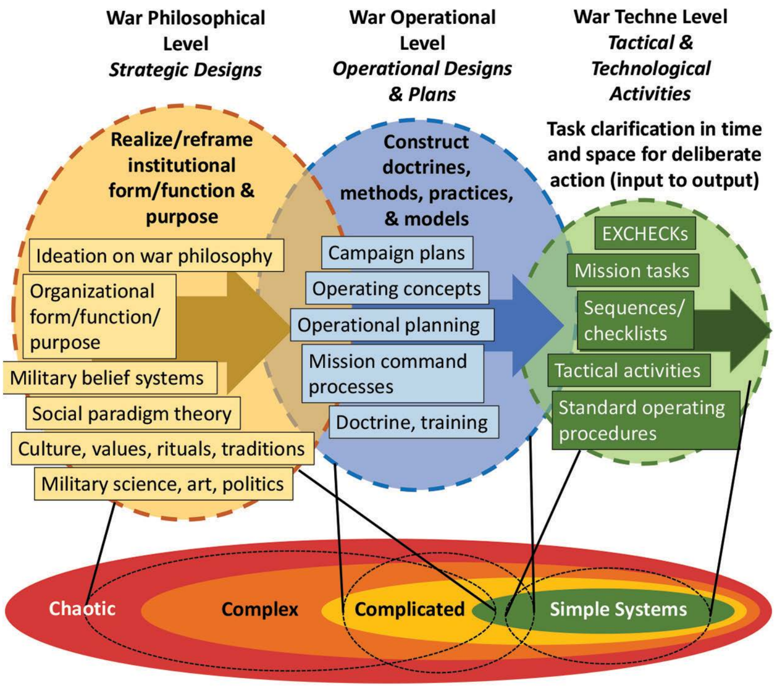
Since complex systems are dynamic, many of the new developments that will emerge from systemic design will not be forecasted or anticipated, leading to emergent problems that did not previously exist yet now are part of this newly designed system that the organization and adversaries are engaging within. Risk becomes different in that the increased efficiencies of a perceived risk do not impact an emergent system if the transformative design shifts the emerging system so that legacy "problems" associated with efficiency gains are irrelevant. For example, naval battleship developments and increases in efficiencies mattered in legacy systems through the First World War. However, through the interwar period, the emergence of airpower and aircraft carrier design gradually moved battleship relevance out of its former primacy of naval strategy and organizational form/function.

Figure 60 also highlights that increased uniformity, reliability, regulation, and efficiency are most beneficial when the organization engages with simple and complicated systems (which remain critical, dangerous, and prolific in all military enterprises). Indeed, with systemic design, an organization will propel a complex system into new and uncharted areas. These novel and emergent contexts will feature change and design consequences not previously imagined or realized. Yet they also will retain many of the existing legacy features that still mandate precise adherence to programmatic and analytical styles of organization. The future requires improved programmatic doctrine; new military best practices for simple, obvious system applications; and improved education, training, and theory experimentation. However, systemic design will disrupt this construct in that some legacy requirements for order and uniformity will carry into the emergent and transforming system, while others will need to be discarded. Further, some new requirements not previously considered will spawn new demands for different programmatic and analytical processes due to the changes initiated in the systemic design.

All models are abstractions and simplifications of a complex reality that cannot be contained by any one or set of models, theories, or methods. While the last set of figures positioned different types of systems (simple to chaotic) across a spectrum of military activities, this overlap of tactical to strategic and the nesting of simple to chaotic systems is potentially misleading. There clearly are many aspects of simple system behavior present across tactical to strategic contexts, and many tactical activities feature complex and chaotic phenomena for military operators. Although the last set of figures made several assumptions that tactical-level military affairs tend to present more complicated and simple system phenomena as well as opportunities for the military organization to render best practices and techniques toward those simple warfare phenomena, the next figure presents another way to frame complexity and war.

In figure 61, the same familiar spheres of strategic, operational, and tactical/techne level war activities are repositioned above a different framework for systems thinking. Suppose we consider different types of systems as nested together, but the shadow of each sphere tends to encounter some system phenomena more than others. This figure shows that the war tactical/techne level engages far more with simple and complicated systems than the other spheres of war enterprise, while the strategic sphere gets only a sliver of truly simple system occurrences. Indeed, sometimes a strategic planner might reliably execute a pattern of designed action using simple system constructs. However, this scenario is far more likely at a lower level of the military organization at a scale and scope that pairs best with tactical and technical specialization. Nonetheless, the below graphic attempts to accommodate how complex systems nest, particularly in how warfare is both tangible and intangible through the ways humans socially construct most of how we experience complex reality.

There are many other ways to conceptualize how a military organization might formally introduce reflective practice into the operational battle rhythm, campaign design, or development of war strategies. Although this book introduced alien planning concepts earlier—including multiple futures, rhizomes, Möbius strips as models, and Deleuzian folds—these were not applied here.




Legend
EXCHECKs execution checklists

**Figure 61. Another variation considering complexity and war**

Instead, there has been an attempt to form a hybrid where the familiar, systematic planning framework could be extended so that any military organization could incorporate systemic design and reflective practice in a meaningful, sustainable manner. Just that incorporation would cause third-order effects requiring a disruption and reinterpretation of most military doctrine, education, training, and practice. In proposing such change, a designer must also be realistic about how much change the organization is willing to undergo. While some organizations will readily storm the castle—ready to tear down walls and replace indoctrination with experimentation and improvisation—others will resist all but the most benign modifications to the current legacy frame. How systemic design might be applied is part of the challenge to disrupt nonproductive institutional conventions. But the other part requires us to consider which organizations might be ready to change and which will likely insist on the status quo, even in complex and chaotic contexts where it cannot produce the desired effects.

**Notes**

1. Weick, "Role of Imagination," 448.
2. Gharajedaghi, *Systems Thinking*, 110.
3. Zweibelson, Wetzel, and Landis, "Designing in Complex Security Contexts."
4. Gharajedaghi, *Systems Thinking*, 51.
5. Graicer, "Beware of the Power of the Dark Side; Jackson, *Roots of Military Doctrine*; Jackson, "Nature of Military Doctrine"; Paparone, *Sociology of Military Science*; and Zweibelson, "One Piece at a Time."
6. The author acknowledges that this argument contains the traditional "levels of war" model. Conveying transformative proposals systemically requires using some familiar models, theories, and language—whether to reinforce select concepts or, at times, to highlight the need for their retirement.
7. Snowden and Boone, "Leader's Framework for Decision Making"; and Snowden, "Application of the Cynefin Framework."
8. Stanley and Lehman, *Why Greatness Cannot Be Planned*.
9. Rittel and Webber, "Dilemmas in a General Theory of Planning," 161.
10. Gharajedaghi, *Systems Thinking*, 135.
11. Stanley and Lehman, *Why Greatness Cannot Be Planned*; and Pugh, Soros, and Stanley, "Quality Diversity."
12. Weick writes extensively on how organizations tend to fail to recognize innovation and prevent operators from recognizing or using it until after significant failure. See Weick, "Drop Your Tools"; Weick, "Collapse of Sensemaking in Organizations"; Weick, "Change Agents as Change Poets"; and Maitlis and Sonenshein, "Sensemaking in Crisis and Change."

Chapter 29

# Framing Decision-Makers Who Stay "Within the Pale" and Those Venturing Beyond

The modern military force has the potential to institute systemic organizational design that moves the current legacy system of organizational form, function, and purpose toward a normative (what ought to be) future design. To accomplish this shift, organizational leadership needs to shape the entire enterprise and frame at the abstract, philosophical level initially. Leadership must be able to clearly define and explain the NATO and joint force legacy form and function and how those organizational frames currently operate through an institutionalized paradigm, management, purpose, and a shared belief system concerning warfare. Characterizing these processes requires a substantial investment into what many military forces normally disregard: the war philosophy, ethos, character, culture, and organization of the enterprise *beyond* the limitations of institutional doctrine, methodologies, conceptual models, and theories.

To realize where the organization ought to transform toward, there must be a shared and appreciated grounding in what the legacy frame is for NATO and joint forces—particularly their shared war paradigm for decision-making activities. The legacy frame can be illuminated (which otherwise the institution obscures in the background for practitioners using it) through an appreciation of systems and complexity theory applied toward the modern military enterprise, mission, and external environment where adversaries, competitors, and other enterprises interact. Militaries should formally incorporate systemic design into the entire organizational battle rhythm so that the organization can carefully and comprehensively shift through different modes of organizational form and function that pair best with the types of systems and challenges the enterprise is responding toward. No Department of Defense entity currently integrates systemic design, as these organizations remain tightly wedded to existing institutional norms and behaviors as established in military doctrine, education, and training. As provocative as this argument may be, the collective groupthink across the DOD along with NATO and allied partners in terms of a shared single, dominant war paradigm cannot be ignored. Nor can the frustrations, setbacks, and failures be discounted, as they are inspiring increased introspection and disruptive thinking across the military profession.

The various constituents within NATO and partnered and national military services (like any modern, highly developed profession) have mixed degrees of interest, compliance, and capacity for enabling or inhibiting any systemic redesign. Figure 62 depicts the dual tensions of "witting-unwitting" and "willing-unwilling" and portrays target populations in organizational transformation through quadrants. This categorization is one way to illustrate some of the institutional positions of a dynamic and diverse population comprising talented, experienced professionals with various levels of institutional frame awareness (social paradigms). Each of these categories has advantages and disadvantages, and none of the concepts used imply any hierarchical positioning of one demographic over another.

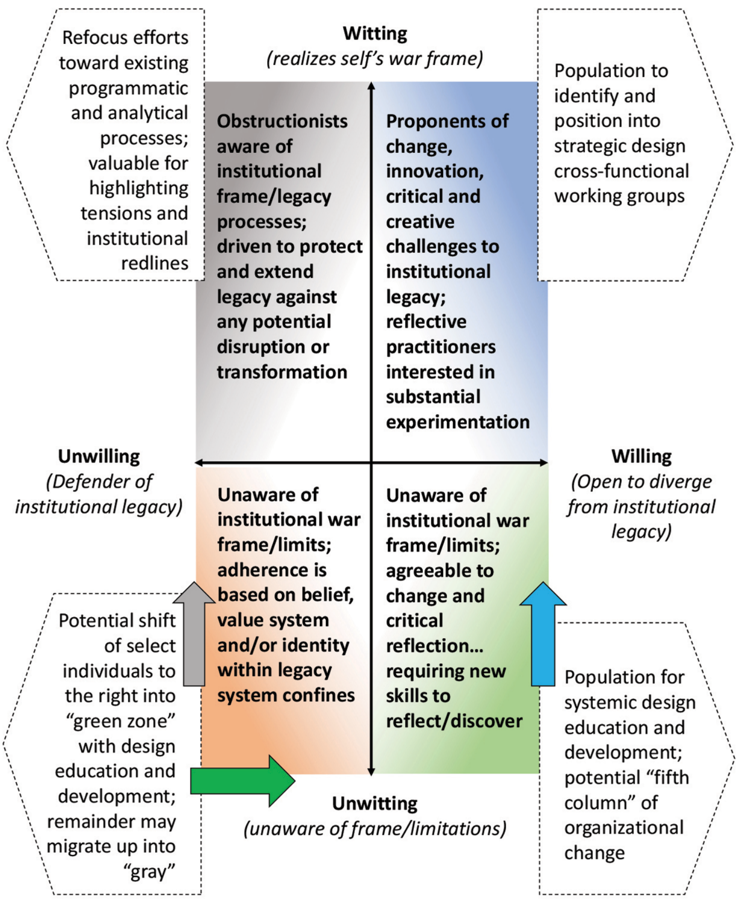



**Figure 62. General target population in organizational transformation**

In the vertical axis above, "witting" is used in a philosophical context where a person is directly aware of their preferred individual (and/or organizational, cultural, group) frame for understanding reality. This frame is often termed one's "social paradigm" and is not interchangeable with the original concept of a scientific paradigm first introduced by Thomas Kuhn.[1] Social paradigms or frames represent the entire mode for making sense of reality and include the select theories, conceptual models, methodologies, language, and underlying metaphoric devices that constitute the frame.[2]

The belief system composed of values, symbols, and assumptions provides the "bedrock" for how a social frame develops and self-regulates across a large group of individuals who organize using the social frame.[3] An "unwitting" individual is simply unaware of some aspects of the frame, ranging from minor and isolated components to major and systemic portions of the social paradigm. For example, most military professionals understand the conceptual model of "levels of war" based on extensive education, doctrine, and training throughout their entire military careers. Yet few may consider why war is conceptualized using a model of layers or hierarchical levels or what other ways to understand war might exist beyond the "levels of war" construct. In this case, many military members are "unwitting" concerning how and why the institution uses the "level of war" construct in making military decisions.

"Unwitting" is not pejorative and is a fluid concept indicating that individuals or organizations may just lack awareness on the deeper governing logics of their paradigm, which can be disrupted through education or experience. "Witting" refers to those who have gained deep insight into the "why" and explanation of their war frame beyond a methodological mastery (deep understanding of "how" and "what"). When considering military innovators and visionaries such as Billy Mitchell, Carl von Clausewitz, John Paul Jones, Henry "Hap" Arnold, Edward Lansdale, or Shimon Naveh, there often is a pattern of the institution resisting or fighting back against disruptive innovative proposals. Those innovators see the legacy system and have unique insights into where the institution ought to move next. They are often willing to risk personal advancement and power to accomplish the transformation necessary to shift the institution progressively. Thus, witting individuals can be seen as heretical, disruptive, and outside the box but also as radical and dangerous to the established norms and patterns that an organization views favorably.

Mitchell and his airpower predecessor Giulio Douhet, an Italian army general, were both court-martialed for criticizing their militaries on air innovation. Shimon Naveh was purged from his Israeli military position of influence prior to the 2006 Lebanon War and informally excommunicated from the US Army by 2009.[4]

The vertical axis in figure 62 presents a tension between "willing" and "unwilling." Again, framed in a philosophical construct, individuals that show a willingness to diverge from the institutional frame (and overarching social paradigm/war frame) are flexible, open to increased risk, and receptive to conceptualizing beyond the typical barriers imposed by the organization for what is relevant and irrelevant. The term "unwilling" is also not to be interpreted as a slight or insult; those who are strong institutional defenders maintain a conservative, protective stance and are the guardians of cherished values, beliefs, rituals, and established behaviors that proved valuable in past challenges. There is an important and healthy balance in any organization between these two populations, and any systemic design initiative should draw from both. However, an unwilling participant features some disadvantageous characteristics just as an overly witting one can for different reasons, as illustrated in the figure's four quadrants.

The blue zone (top right quadrant) represents the target population of an organization's innovative, creative, and outside-the-box thinkers. These members are ideally the dominant group to draw from for any systemic organizational redesign activity, as they can think divergently and ideate in ways that are outside the institutional gaze. This group will also generate many ideas that fail; from these failures, an irregular, nonlinear path emerges that results in profound innovation. Thus, those in the blue group may be unable to realize when some divergent concepts are failures and promote flawed concepts or underdeveloped ideas too early or inappropriately to the command. Seasoned design facilitators are necessary to bring out the best performance, and the organization must identify which members might fall into this category for any design team inclusion.

The green zone (bottom right quadrant) group is open-minded and flexible but unaware of its war frames, thus requiring design education and experience to shift upward into the blue group. This zone represents a much larger population in any organization, and it is up to the organization's leadership to set necessary conditions and foster a safe, encouraging environment for some of these members to self-identify and move toward the "willing/witting" quadrant. Organizational members in the red zone (bottom left quadrant) are in the "unwilling/unwitting" population. They are most comfortable with convergent thinking, programmatic processes, and extensive analytical approaches where rule-following is normalized and encouraged. Through design education, some of these members may migrate into the green or blue quadrants. However, others may remain or even migrate into the gray zone.

The gray zone (top left quadrant) represents the antagonistic group to the blue zone "witting/willing" population. In the gray quadrant, members are "unwilling/witting" in that they, too, like blue zone members, are aware of their war frame at a deep level. However, they prioritize the supremacy of their frame (beliefs, methods, theories, language) above all others. Social paradigm theorists term this mindset "incommensurability." An example is how Boston Red Sox and New York Yankee fans both love baseball—but could never root for the other team or appreciate any perspective that falls outside their team loyalty. This incommensurability is found in any deep institutional division over beliefs, culture, values, politics, scientific theories, and more. Gray quadrant members are valuable for framing the characteristics of an institution that become redlines where innovation might prove too disruptive or where transition will require a gradual, sophisticated path of implementation requiring leadership's negotiation and patience.

This book proposes a path to shift the modern military force from a legacy framework for thinking nonreflectively in warfare to a reflective, multi-paradigmatic warfighting force of tomorrow where future conflicts will continue to become increasingly resistant to favored, historic processes and behaviors. This transformation is still emergent and unrealized. However, the book has identified the target populations that can best assist in force transformation. It has also described methods to conduct systemic framing, organizational framing, and deliberate systemic organizational design. Applying these concepts and practical methodologies would systemically encompass all strategic, organizational, operational, tactical, and technical considerations writ large. It would create the overarching vision and novel war philosophy toward which the organization designs differently. As a result, adversaries will be unable or perhaps unwilling to realize that they are unprepared until they are already at an emergent disadvantage.

**Notes**

1. Kuhn, *Structure of Scientific Revolutions*; and Chia, "Teaching Paradigm Shifting." Chia uses Kuhnian natural science paradigm shifts to explain how social paradigm shifts differ.

2. The primary source for the origins of social paradigm theory is Burrell and Morgan, *Sociological Paradigms and Organisational Analysis*.

3. Hatch is a primary source on how groups will establish symbols and conceptual frameworks for creating a second "socially constructed layer" of reality. See Hatch and Cunliffe, *Organization Theory*; Schultz and Hatch, "Living with Multiple Paradigms"; Hatch and Yanow, "Methodology by Metaphor"; and Tsoukas and Hatch, "Complex Thinking, Complex Practice."

4. The history of how Naveh developed systemic operational design and implemented it in Israel and later the American military is scattered across many sources. However, the author's recently published book, *Understanding the Military Design Movement: War, Change and Innovation (*Routledge, 2023), includes a chapter on Naveh's role in systemic design with extensive interviews and new research.

Chapter 30

# Conclusions

## Moving toward Strategic Synthesis and Alternative Sensemaking

Innovation is challenging for organizations due to the high risk and ideation requirements to disrupt the status quo and venture into unrealized and unexplored avenues for change. The first hurdle is developing concepts and processes outside of the engrained norms of an organization but that better prepare it for success in an emerging, complex environment. The second is implementing that innovation and convincing the organization to experiment and employ what is by definition an unimagined, unrecognized, and unestablished thing or idea. It is "unproven" in that innovators are first and not last in order of discovering and adapting what is new. Repeating nonreflective actions will not produce anything novel for warfighters; repetition hones efficiencies regardless of whether that process improvement helps or hurts the organization. With the paramount demand of innovation, game-changing ideas, and creativity on the lips of senior military leaders and policymakers today, only reflective practice has the potential to illuminate irrelevant methods and break through institutional boundaries to journey beyond the pale. As Hardimos Tsoukas observes, "Potentially endless reflexivity creates the conditions for potentially endless novelty."[1]

Today, NATO and joint forces demand innovation in warfare, and the term is certainly recognizable in leadership statements on vision, transformation, change, and so on. Innovation is always in the top five of any "buzzword bingo" game played by staffs as leaders present their desires to change the organization. ("Buzzword bingo" is a sarcastic reference by cynical military professionals when a new term is introduced to replace yet another concept, while no actual change occurs beyond linguistic gymnastics for the organization.) Yet all too often, we pay lip service and return to barricading the organization within "the pale" so that it cannot venture beyond. Unless military organizations can realize what their frame is (what bounds their interiority) and how they consider many other things "beyond the pale" in warfare, they will continue to struggle with innovation. Innovators will have difficulty gaining permission to experiment outside of institutionally sanctioned ways and means. If they do realize novelty and potential emergent value for their military organization, their own institution will automatically enact barriers to prohibit any real innovation from coming back in from the "wild" exteriority. The response of "we cannot accept the risk of adapting this new thing unless you prove it works better than what we already have" is the very sort of static reasoning that protects the institution while also calcifying it against any new ideas.

However, this reasoning may be what is most dangerous for the modern military. Organizations that agree to a paradigm shift at too late a point will, by all historic examples currently available, wither and die. Jamshid Gharajedaghi discusses competition and the need for multi-minded systems to innovate and adapt in increasingly complex systems. He suggests that "the inability to change an outdated mode of organization is as tragic for the viability of a corporation as the consequence of missing a technological break is for the viability of a product line."[2] Militaries are not businesses, yet they share many attributes. Granted, even in national defeat such as the overthrow of the Iraqi government in 2003, the thwarted Iraqi army emerged in a new and different form afterward. However, militaries exist for the purpose of preventing such events. In any future security context, contemporary militaries should heed this warning that those unable to change early enough will be dragged through that transformation after their defeat.

The contemporary military-decision making methodology for NATO and the joint forces provided utility and value extending back across many decades of security challenges and modern warfare. Designing in security contexts is not necessarily about tossing out entire processes just to make room for random acts of experimentation. However, modern militaries would gain potential advantage against clever, learning, and innovative adversaries and competitors if NATO-OPP/JPP were deconstructed and reformed. This reformation would occur within a greater range of underpinning theoretical, modular, and methodological constructs that exceed the scope and imagination of existing modern indoctrinated practices in security activities. Modern militaries would go "beyond the pale" and design so that new ways of thinking and acting in complex warfare might be realized. NATO-OPP and JPP reflect a reductionist epistemology that seeks systematic (input to output) analysis and objectivity as the exclusive and quantitative construct for all decision-making in warfare. The traditional military orientation on emulating scientific processes takes the multiplicity of complex reality and reduces it to manageable "principles," "axioms," and "formulaic sequences." Instead, the military needs to consider how the subjectivity of "military art" emphasizes the reverse task of complexifying military thinking, sensitizing strategists and planners to the subtle nuances of complex, often chaotic security challenges.[3]

Modern military decision-making remains fixated on "value propositions" logic where complex reality can be interpreted (and simplified) through mathematical metaphoric devices and functionalist models (uniform, universal, timeless, and constant). This logic becomes the interiority of the military institution, protected by the pale ditch surrounding this conceptual frame. Capability is established in linear causality with the proposed problem-solution line of inquiry that NATO-OPP/JPP guides planners through. The modern military sequence of decision-making activities adheres to a series of models that all share the same classical mechanics reasoning and language. NATO-OPP/JPP appears to suggest that the "cause-effect" of directed security activities will provide clear, predictable, and ultimately controllable security contexts where military forces can accomplish activities that propel such a complex system toward preconceived institutional goals and end states. Anything outside of this parameter is beyond the pale and irrelevant or counterproductive to the overarching military strategy and operational design to accomplish national security goals.

Returning once more to Robert Chia, he states, "The tendency to attribute a 'false concreteness' to objects of analysis is traceable to the logical structuring of language which organizes our thought processes so that our experiences are describable only in discrete, static, and linear terms. Action, movement, and emergence are . . . deprivileged in favour of static end states, entities, and events."[4] This cognitive framework (that of military modern war thinking) conflicts with complexity theory and system theory fundamentals, as no "wicked problems" have artificial stopping points other than those our institutions construct and apply toward our own socially constructed desires. Modern war thinking can be disrupted, explored, and critiqued through postmodern introspection. Such reflection requires considerable organizational reorientation, including different language, models, and theories to generate alternative methodologies (in a deconstruction of modern, institutionalized military doctrine). We must become comfortable with military designers moving out into the exteriority of our bounded institutional frames—exploring and returning with alien and unimagined concepts for our institution to consider, experiment with, and integrate into our belief system. At the same time, there are many areas that require profound reflection, disruption, experimentation, and destruction so that our organization is unencumbered to progress forward.

Why might this notion of exploring "beyond the pale" matter? This stance of retaining (and relabeling) a modernist, centralized, and technologically rationalized perspective on war is often an institutional act of self-relevance in the face of possible unit, service, or functional elimination, assimilation, or replacement. It represents a preservationist argument where the modern Westphalian order for war and the application of organized violence must be retooled and modified to remain relevant in what has become postmodernity. In cataloging the last two centuries of declared/categorized wars, Sebastian Gorka asserts that due to the preponderance of wars being irregular, our militaries are entirely disoriented to what war has changed into. Nevertheless, we continue to apply outdated ideas and beliefs regardless of the technological sophistication of how we tactically function. Abstractly, we continue to fight as we did decades ago and expect that the methods, tactics, models, and underpinning theoretical foundations of our current war frame will somehow adapt to the changing times. Gorka contends that this expectation is inverse to the realities of today and how wars are most likely to continue to occur:

> As a nation, we must move beyond outdated and Clausewitzian understandings of war as solely a functional operation of the nation-state. This is not to denigrate the Prussian's genius. However, his description of war as a continuation of politics by other means was an idealized description of state-on-state war and as such is fit fine for describing and understanding World War II or the Gulf War, but definitely lacking when we face groups that are not motivated by politics as we understand them, like al-Qaeda or . . . [the Islamic State]. Whether fighting Shaka Zulu in Africa in the 19th century, the Taliban in Afghanistan, or . . . [the Islamic State] today, our adversaries do not play by the Clausewitzian rule book. His concepts of friction and fog still apply, but the idea that our enemies will make rational cost-benefit analyses about the reasons for going to war in ways that

serve the *raison d'etat* really does not apply in the irregular domain, especially one in which our main enemy is transcendentally and apocalyptically motivated.[5]

NATO and joint forces can deconstruct their existing decision-making methodologies and, in doing so, reflect on recent patterns in system behavior where adversaries might have been targeted effectively at a tactical level. Yet they continue to operate in unimagined, emergent, and nonlinear ways that in retrospect rendered many early analytical predictions false.[6] Scott Atran addresses revolutionary movements and their resistance to previously well-engineered, modern military solutions to security challenges. He observes that contemporary terror networks such as the Islamic State are paradoxically able to exist and even flourish under conditions that entirely defeated and destroyed previous adversaries.[7] For instance, "during the surge of American troops in Iraq, up to three-fourths of the fighters were neutralized in al-Qaeda's Iraqi affiliate, which would become ISIL, and an average of about a dozen high-value targets were eliminated monthly for 15 consecutive months, including its top leader, Abu Musab al-Zarqawi." Nevertheless, notes Atran, "the organization survived and the group went on to thrive beyond all expectations amidst the chaos of Syria's civil war and Iraq's factional decomposition."[8]

The dominance of the centralized hierarchical form for military organizations (as well as criminal entities) may also be faltering or under some redesign. This occurrence is of profound importance to NATO and joint forces applying NATO-OPP/JPP or similar decision-making methodologies. Christopher Dishman, in studying criminal and terrorist organizations, notes that analysts used to be better at determining the goals, motives, and impacts of terror groups and criminal entities like drug cartels because they followed a modern, centralized hierarchical form—one familiar to those using the modern war paradigm and seeking similar structured adversaries.[9] Douglas Farah argues that the new relationships between adversarial nation-states and criminal and terror groups have changed, and along with it, the dynamics for understanding and acting for security challenges in this new, postmodern world.

Farah indicates that "in the construct of the new rules they are writing for their game, none of the state-sanctioned or state-sponsored activities with transnational organized crime (TOC) groups or terrorist groups are illegal or questionable—they are revolutionary tools to obtain a strategic objective."[10] Militaries themselves are considering organizational alternatives to the steeply centralized military hierarchy, with interest in decentralization, "rounded organizations," technological enhancements to horizontal command and control, and some biomimicry of swarm theory and rhizomic structures.[11] Rhizomic theory originates from biology but would be adapted by postmodern theorists and later still be introduced to militaries through the military design movement. The centerless rhizome is antithetical to the Clausewitzian "centers of gravity" war metaphoric device, illustrating a tension between classical mechanics thinking and the postmodern deconstruction of warfare.

Previously, most military strategists and operational planners might acknowledge the incompleteness, incompatibility, or irrelevance of existing modern decision-making methodologies that rely exclusively on the associated models, concepts, language, and theories bounded in the interiority of the modern institutional war frame. Yet ultimately, these frustrated strategists and planners would become paralyzed when attempting to deviate from or replace the modern decision-making framework because *there were no other alternatives* that did not simply mimic the problematic constructs in question. If the travelers return from beyond the pale, they would only be let back inside if they brought recognizable (interior approved) things and ideas with them that required little or no adaptation to assimilate. Anything exterior or alien must be rejected outright.

One might observe this misapplication in some of the changes in NATO and joint doctrine over the last two decades of constant warfare. Linear sequences and campaigns would be recreated in nonlinear metaphoric devices, yet the cohesive flow of directed activities still would occur in the exact linear-causal manner of the earlier campaign design.[12] Doctrine writers would add new buzzwords: "asymmetric" became "irregular" warfare, "integrated deterrence" replaced "competition," and "the grey zone" substituted for "low-intensity conflict." In actuality, there would be no deviation from the modern military ontological, epistemological, and methodological functions within military comprehension and decision-making. Swapping terminology and metaphoric devices without addressing core institutional and conceptual dynamics is akin to the expectations of a rain dance as in the Ackoff quote that began this book. Word replacements have no impact on enabling reflective practice in war, "but it makes those who engage in it feel that they are in control."[13]

*Beyond the Pale: Designing Military Decision-Making Anew* first deconstructed and explained the contemporary NATO-OPP/JPP methodology encoded in modern military doctrine and practice. It demonstrated that the systematic logic and technical rationalism encompassing all modern military strategic thought and operational coordination of actions is insufficient for current and emergent complex security challenges. Next, it introduced alternative frames, theories, models, and necessary references supporting those theoretical alternatives to finally move away from defaulting to the existing modern decision-making scaffolding. The indirect strategic approach was presented as a way to avoid perpetually repeating direct strategic activities through systematic logic on warfare. Centers of gravity have dominated modern military decision-making at the operational and strategic levels since the end of the Vietnam War for most of the industrialized West. Yet a security force has not applied a self-organizing, decentralized, or alternative organizational logic toward contemporary warfare.

This book introduced ways that humans conceptualize a problem through complexity theory to broaden military decision-making away from strictly problem-solution constructs. It explained complex systems and how modern military practices, doctrine, and methodologies cater to simple and complicated systems at the expense of complex and chaotic ones. Modern military decision-making ignores emergence and nonlinearity despite their substantial roles in complex and chaotic systems. The notion of rhizomes was presented as a postmodern alternative model for conceptualizing military decision-making beyond COG modeling and centralized hierarchical reasoning. The strict adherence of modern strategy and planning to a single desired future state (expressing the ends-ways-means epistemology for modern war framing) was deconstructed, and readers were introduced to multiple futures as an alternative conceptualization method for thinking systemically about warfare. Lastly, Deleuzian folds were discussed as another alternative way of strategic conceptualization that permits strategists and planners to depart from the powerful pull of modern military decision-making.

Militaries might use the ideas and methods in this book to encourage a design team to examine an organization's existing decision-making methodology and attempt a range of experimental prototypes of alternative methodologies for security activity management that do not rely on the same institutional underpinnings. The concepts offered here are already used in a wide range of nonmilitary fields, disciplines, and organizations. They are not at this point used in any security application outside of a few limited military design experiments. NATO and joint forces have an opportunity and a choice in this post-Afghanistan period of institutional reflection. They can dig a deeper trench to further fortify the institution against what lies "beyond the pale." Or, instead, they might produce novel approaches to what is a wickedly complex problem for the greater security enterprise in today's ever-transformative landscape of conflict and emergent threats. Revising established doctrinal practices and tweaking methods or models is insufficient. A total redesign is needed, but such a transformation must be explored through careful realization of the modern military frame and why the boundaries are dug in as they currently exist.

Returning to this book's preface and institutional resistance to intellectually rigorous and novel ideas, war is complex—it requires cunning and flexible minds willing to explore beyond institutional limits. On the complexity of warfare and why military professionals need to push themselves beyond established (traditional) conceptual limits, retired Israeli brigadier general Shimon Naveh remarked, "I read a comment made by an analyst that it was very hard to learn." Naveh, who also holds a PhD in war studies from King's College, London, added, "You know," "wars are very hard to fight and yet we go and fight them. If indeed this is crucial and important, it is not an option. We should go and do it. . . . All you need is some intellectual stamina, some energy. If you're serious about your profession, then you'll go through it."[14]

This experimentation will be high risk in terms of conceptualization, and any design prototype will need to iteratively develop concepts as well as bridge them back into traditional (modern) military practices that will remain the dominant landscape for the rest of the Department of Defense and NATO and beyond. However, the potential opportunities for innovation in these conceptualized spaces for undiscovered ways to think about complex security activities also offer the emergent opportunities of transforming into a different, unrealized form. In turn, this new form functions in novel ways that disrupt and outpace adversaries who themselves are unable to realize their own institutional barriers. The failures of Kabul in 2021 echo those of Vietnam in the mid-1970s. Yet will militaries be able to critically reflect once more on what went wrong, why we must reexamine our belief system, and how we make decisions in warfare? Antoine Bousquet's summary of the Vietnam follies remains just as valid now despite the military spending two decades and trillions of dollars attempting to once again accomplish strategic goals through modern decision-making methods:

> The conduct of the [Vietnam] war was blighted by the attempts of the military and political hierarchy to micro-manage the conflict and by an obsession with statistical evaluation and information-gathering which frequently created assessments of the war that were completely at variance with the reality on the ground. . . . Perhaps more seriously, a misguided faith in the powers of technoscience to grant military omnipotence led policy-makers to embrace armed force more willingly as the means to solve complex strategic problems.[15]

Those observations relate to a different war that occurred nearly six decades earlier. Yet one might copy and paste the above paragraph into contemporary discussions on what fell apart in Afghanistan in 2021 without changing much. We continue to rearrange deck chairs without exploring foundational tensions with how we make sense of conflict and organize within warfare. With complexity, we must move away from the legacy military belief that meaning and knowledge might be fixed (even briefly) in some representational manner that permits set principles, rules, formulas, and "hidden codes" to unlock how to control warfare. We also cannot imagine technological sophistication as any antidote beyond some immediate, temporary, or tactically limited applications. Instead, as Paul Cilliers offers, in complex systems where warfare unfolds in wickedly dynamic fashion, *knowledge is provisional at best.* He notes that "we cannot make purely objective and final claims about our complex world. We have to make choices and thus we cannot escape the normative or ethical domain."[16] We must let go of several centuries' worth of military concepts that have generated a legacy frame for decision-making that no longer serves as it once might have. It is in this legacy system where current adversaries and competitors understand how the Western military institution currently conducts business. Only those who risk innovating can reach new locations unimagined by those unable or unwilling to take similar conceptual risks.

**Notes**

1. Tsoukas, *Complex Knowledge*, 173.

2. Gharajedaghi, *Systems Thinking*, 17.

3. Chia, "Teaching Paradigm Shifting," 411. Chia's concepts on "business entrepreneurship" inspired this adaptation to complex military affairs.

4. Chia, "From Modern to Postmodern Organizational Analysis," 600.

5. Gorka, "Adapting to Today's Battlefield," 354.

6. Again, tactical analysis is not the focus of this book. There are countless examples of strategic, policy, and operational assumptions based on extensive analysis in contemporary security contexts being entirely wrong or proven false over time. Military arguments against these charges often point to the analytical successes of what are ultimately complicated (or even simple) security missions and not complex (or chaotic).

7. The Islamic State today is a far less dangerous terror threat than at the height of its power in 2015. However, it is a useful example here in that surrogates and other emerging rival organizations learned from its successes and failures and continue to improve on its model.

8. Atran, "Islamic State Revolution," 67.

9. Dishman, "Terrorist and Criminal Dynamics."

10. Farah, "Convergence in Criminalized States," 181.

11. Sageman, *Leaderless Jihad Century*; Brafman and Beckstrom, *Starfish and the Spider; Bousquet*, "Chaoplexic Warfare"; Zweibelson, "Swarm Theory"; and Henkin, "On Swarming."

12. An example is Gen David Petraeus's strategic graphic of the "Anaconda Campaign Model" first used in Iraq and later repeated in Afghanistan where the linear campaign plan is reorganized into a constricting sphere. Another example is General McChrystal's strategic graphic for a new Afghan counterinsurgency approach where "ten minus two equals twelve" and a mathematical paradox is employed for designing the campaign approach. These broke with traditional linear "end state on the right with lines of effort extending to the left" depictions done previously.

13. Ackoff, "On the Use of Models in Corporate Planning," 359.

14. Naveh, interview by the author.

15. Bousquet, "Chaoplexic Warfare," 925.

16. Cilliers, "Complexity, Deconstruction and Relativism," 82.

# Abbreviations

| | |
|---|---|
| AFDSC | acceptable, feasible, distinguishable, suitable, and complete |
| CARVER | criticality, accessibility, recuperability, vulnerability, effect, recognizability |
| CIA | Central Intelligence Agency |
| COA | course of action |
| COG | center of gravity |
| COPD | Comprehensive Operations Planning Directive |
| DOD | Department of Defense |
| EBO | effects-based operations |
| IED | improvised explosive device |
| JPP | joint planning process |
| JPPA | US Air Force Joint Planning Process for Air |
| MCPP | US Marine Corps Planning Process |
| MDMP | Military Decision-Making Process |
| MSHARPP | mission, symbolism, history, accessibility, recognizability, population, proximity |
| NATO | North Atlantic Treaty Organization |
| NATO-OPP | NATO Operations Planning Process |
| NTM-A | NATO Training Mission – Afghanistan |
| OE | operational environment |
| OODA | observe, orient, decide, act |
| OR | operations research |
| PMESII | political, military, economic, social, infrastructural, informational |
| SHAPE | Supreme Headquarters Allied Powers Europe |
| SOF | special operations forces |
| SOP | standard operating procedure |
| SWOT | strengths, weaknesses, opportunities, and threats |
| TOC | transnational organized crime |
| TTPs | tactics, techniques, and procedures |
| USJFCOM | United States Joint Forces Command |
| USSOCOM | United States Special Operations Command |
| USSPACECOM | United States Space Command |

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# Index

*Beyond the Pale: Designing Military Decision-Making Anew* gives contemporary military strategists tools based on revolutionary approaches to adapt to and succeed in complex environments where traditional institutionalized approaches are insufficient. A single, entirely consuming war paradigm governs the military force, discouraging any operator to think or act outside of its imposed limits. Yet in contemporary practice, militaries using modern decision-making methodologies are increasingly frustrated, confused, or defeated due to complex security contexts not conforming to such methodological form and function.

Ben Zweibelson, a retired Army infantry officer, is the director of US Space Command's Strategic Innovation Group at Peterson Space Force Base, Colorado. Previously, he was the lead design educator and facilitator for US Special Operations Command through the Joint Special Operations University. In that capacity, he brought the concepts in this book to the special operations community, international militaries, and national policy level for defense and security concerns.

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