

Sailor assigned to Electronic Attack Squadron (VAQ) 132 signals to E/A-18G Growler pilot as he taxis on flight line during snowstorm at Naval Air Facility Misawa, Japan, January 10, 2013 (U.S. Navy/Kenneth G. Takada)



Simplicity

A Tool for Working with Complexity and Chaos

By Dale C. Eikmeier

If you can't explain it simply, you don't understand it well enough.

—ANONYMOUS

A good plan, violently executed now, is better than a perfect plan next week.

—GENERAL GEORGE S. PATTON

Dale C. Eikmeier is an Assistant Professor in the Department of Joint, Interagency, and Multinational Operations at the U.S. Army Command and General Staff College.

In comedian Don Novello's satirical skit "The Five Minute University," Father Guido Sarducci offered college degrees after completing a 5-minute curriculum.¹ The premise is only to teach what one could recall 5 years later because more than that was a waste of time and money. Thus, the economics course was "supply and demand," and business was "buy low and sell high." The skit was a huge hit, especially among university audiences. Novello capitalized on human nature's need to simplify complexity by reducing its key components to reasonably accurate "rules of thumb." These simple rules help facilitate informed, timely, and acceptable problem-solving and decisionmaking.²

Rules of thumb like supply and demand are heuristics that enable reasonably good decisionmaking without the time-consuming and occasionally paralyzing need to understand all the complexities and nuances of a situation.³

The fact is the “benefits of such heuristics are not only that they reduce complex information to a simple and manageable set of choices [but that] they [also] help people turn an intention into a realized action.”⁴ A good heuristic simplifies complexity by providing a “manageable set of choices” for taking action. Therefore, they are powerful tools that counter “paralysis by analysis” and procrastination and enable leaders to think and decide more quickly thus getting ahead of a competitor’s decision cycle.

Why Heuristics and Simplification

Why are heuristics and simplification worth discussing? Because the joint force is looking for “better ways to develop agile and adaptive leaders who can operate in the complex and chaotic environment the Army [and joint force] expects for future conflicts.”⁵ Heuristics, especially acronym heuristics, and simplification can play important roles in promoting agile thinking. Unfortunately, the current doctrinal approach to this challenge is to add complexity on top of complexity in a quixotic quest for true understanding. Antoinette Schoar in “The Power of Heuristics” states:

*The typical program aims to counter the inherent complexity of the decision by providing in-depth information. By providing such extremely detailed and complex information, these interventions try to enable people to make perfect decisions. For example, in the aftermath of the financial crisis in the United States, some policymakers suggested that individual savers should be taught about the complexities of interest rate models, portfolio allocation, and so on. . . . Everywhere, policy seeks to improve complex decisions by providing people with commensurately complex information.*⁶

An example of adding “commensurately [more] complex information” are discussions in military forums of using quantum mechanics as a way to improve our understanding of complex environments.⁷ However, Milan Vego argues against adding more complexity in his article “The Bureaucratization of the

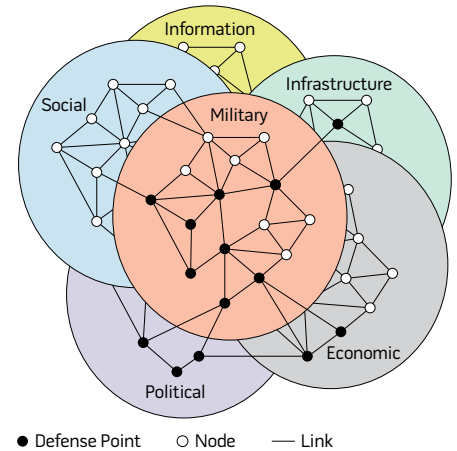
U.S. Military Decisionmaking Process.” He states, “Since the early 1990s, the trend has been to progressively clutter each step of the estimate with poorly related or even unrelated considerations. This in turn has made the decisionmaking process cumbersome, rigid, and time-consuming.”⁸ So rather than creating agile and adaptive leaders capable of timely decisions, doctrine is having the opposite effect by exacerbating the complexity problem and unintentionally promoting decisionmaking paralysis.

An example of this “clutter” is the Joint Publication (JP) 5-0, *Joint Planning*, replacement of the 2011 JP 5-0 figure III-5 (figure 1) with figure IV-5 (figure 2).⁹ The latter figure, “Holistic View of the Operational Environment,” contains approximately 27 to 29 elements. The intent is to capture just about everything that makes up the operational environment. By contrast, the 2011 figure is quite simple, containing only six factors: political, military, economic, social, information, and infrastructure, collectively known as PMESII.

The question is which figure contributes to better understanding the environment and decisionmaking: the figure with close to 30 factors, that no one will recall, or the one with 6 easily recalled factors that is probably a “good enough” framework for describing the environment? A generation of military professionals, when asked to describe the operational environment, will quickly recall and frame their answer using PMESII, a “recognition” heuristic, and their description, while not perfect, will be acceptable. On the other hand, the 2017 figure IV-5 generation may have difficulty recalling anything other than a Rubik’s Cube and will probably struggle to start.

A component of the quest for agile and adaptive leaders should include simplification and the expanded use of heuristics that enable leaders to make decisions faster and move forward in the face of overwhelming complexity and chaos. Like battle-drills or emergency procedures, heuristics such as “Aviate, Navigate, Communicate” jumpstart the decisionmaking process, enabling quicker action in the face of chaos and complexity.

Figure 1. Political, Military, Economic, Social, Information, and Infrastructure Systems Analysis



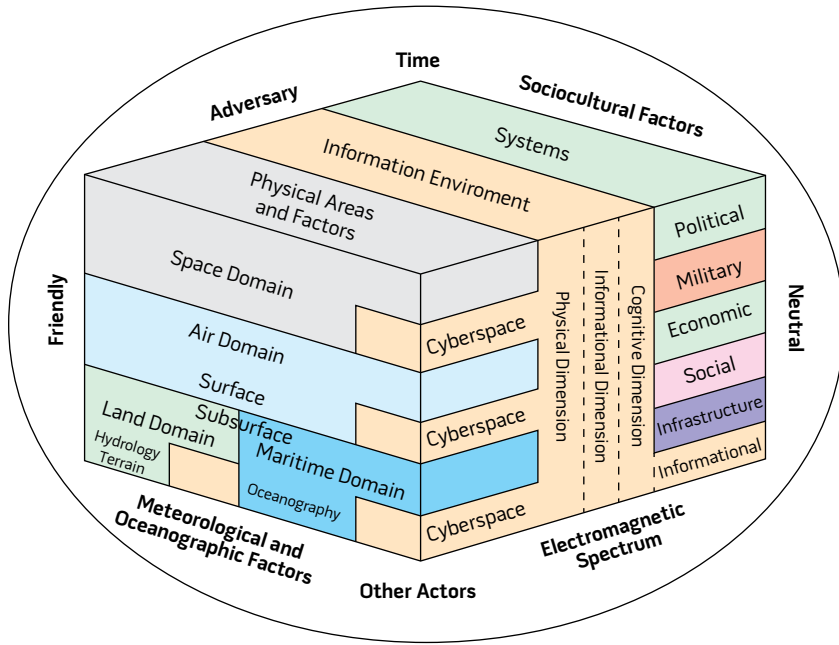
The Science of Heuristics and Simplification

There are two types of heuristics. First is the recognition or “availability” heuristic that aids problem-solving and decisionmaking by making already stored information more easily recalled. The second is the “representative” heuristic that aids decisionmaking by providing a mental prototype to compare with the current situation.¹⁰ More simply, one recalls, and the other provides a model for comparison.

So how do heuristics actually work? Behavioral scientists and psychologists identified three factors that affect our decisionmaking process: limited memory, complexity-induced procrastination, and distraction caused by information overload.¹¹

Psychologists confirmed that simplified and bundled information is more easily absorbed, recalled, and acted on because, beyond a certain level, the mind ignores complex information. Scientists discovered that the most successful students group long bits of information into manageable, easily recalled bundles. An example is the way we group a series of digits. For example, we say, “In the year fourteen ninety-two,” two easily remembered digits, rather than, “In the year one thousand, four hundred, and ninety-two.” Or rather than understanding

Figure 2. Holistic View of the Operational Environment



unwittingly creates a blind “check the block” mentality devoid of holistic and critical thinking. What decisionmakers and planners need is more simplification, or rules of thumb, because simplification clears the clutter and feeds clarity, and clarity enables sound and timely decisionmaking.

A study at the Army’s Command and General Staff College titled “The Effect of Simple Role-Playing Games on the Wargaming Step of the Military Decision Making Process (MDMP): A Mixed Methods Approach” reinforced the value of simplification. In this study, students using a relatively simple war game learned to employ those visualization skills in a complex war game more effectively than a control group. The researchers, led by Dr. Richard McConnell, concluded:

this study suggests that there is a correlation between playing simple role-playing games such as Kriegspiel [a 19th-century Prussian game], which would then make planners more effective at Course of Action Analysis (wargaming) during the Military Decision Making Process (MDMP). Specifically, participants who played Kriegspiel demonstrated a statistically significant increased capability to see themselves in the context of their operational environment while addressing threats and opportunities and integrating those discoveries across war fighting functions.¹⁶

They found that playing the simple Kriegspiel game first provided the students some useful mental tools that contributed to better visualization and execution during the much more complex course of action analysis in military planning. In other words, experience gained with a simple application provided insights that enabled a higher level of performance in a more complex application.

This suggests that experience with simple processes first, combined with rules of thumb (insights), can help overcome complexity-induced procrastination, memory limitations, and information distraction in more complex processes, thus enabling higher performance when dealing with complexity and chaos.

and explaining the complexity of market variables, commodities, and supply chains, we explain a change in commodity prices by “supply and demand.” Two words joined by a conjunction. The conclusion is that “a single, easy-to-remember rule—a recognition heuristic—is more likely to be recalled and thus acted upon than a complex explanation of the underlying theory.”¹² Thus, in a crisis one is more likely to recall and rely on a simple rule of thumb—a representative heuristic—rather than a time-consuming detailed analysis of the exact situation. The classic example is the “fight or flight” process—an instinctive heuristic.

Behavioral scientists also found that complexity causes procrastination regardless of how important the task is. This is why most people file tax returns at the last moment. Complexity overwhelms and people often do not know how or where to begin. However, when provided with simple rules, such as “stop, drop, and roll,” scientists found that the likelihood of task completion increased.¹³ So when faced with seemingly complex problems, often all that is needed is a framework or a model—the representative heuristic—to help jumpstart the problem-solving

and decisionmaking process. Whereas complicating decisionmaking by adding more complex lists, steps, factors, and considerations of environmental understanding actually slows the process. Rather than focusing on solving the problem, we let the process capture us.

The third factor is overload caused by too much information. Studies have shown that “Having a lot of secondary information ‘clutter’ obscures key information and makes people less likely to grasp and absorb the key message.”¹⁴ A possible solution to limited memory, complexity-induced procrastination, and information overload is *less*, not more.

The Advantages of Simplicity

To better achieve understanding in complex environments, evolving doctrine believes more is the key. This leads to the addition of processes, lengthy checklists, and an ever-increasing number of steps and substeps. According to Professor Vego, this quest for better understanding has obscured the original intent and distinctions between estimates, planning, and decisionmaking—and prioritized format over process.¹⁵ This clutter drives the need for longer complex checklists and



Sailor prepares to mark location of simulated casualty on damage control plates during general quarters drill aboard USS *Dewey* during RIMPAC exercise, July 14, 2018 (U.S. Navy/Devin M. Langer)

Cautions and Limitations

Heuristics and simplification have their limitations. Daniel Kahneman, in his book *Thinking Fast and Slow*, argues, “In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors.”¹⁷ Any unthinking use of heuristics, especially representative heuristics, can lead to bias resulting in poor judgments and stereotyping. Kahneman goes on to state, “A better understanding of these heuristics and of the biases to which they lead could improve judgments and decisions in situations of uncertainty.”¹⁸ The key to using heuristics wisely is understanding their potential for bias and using critical thinking to overcome it. Combining these can inoculate the user against “severe and systematic errors.”

The other limitation is potential simplification of what is *not* simple.¹⁹ If time permits, and a detailed study of a complex situation is important to sound decisionmaking, then use heuristics cautiously and continually review their

applicability to the situation. Jacob Mong of the Command and General Staff College cautioned, “we need to be vigilant in that those heuristics must be re-examined, challenged, and adjusted to fit individual situations. So, treat the acronyms and mnemonics as a start point/first try, then re-evaluate/assess, and adjust accordingly.”²⁰

Acronyms as Powerful Heuristics

Acronyms are recognition heuristics that enable us to simplify the complex, absorb key elements, and quickly recall them so that we can move forward. They help provide simple rules of thumb or frameworks that can combat limited memory, procrastination, and information overload.

Acronyms used as recognition heuristics have two functions: storage and recall. First, they create a framework that helps label and categorize new information. Second, they then serve as a search engine helping to recall the stored

information. For example, inexperienced platoon leaders using the acronym of METT-C (mission, enemy, troops, terrain and time, and civilians) can quickly grasp and recall the complexities of the combat environment and take action. OCOKA (observation, cover and concealment, obstacles, key terrain, and avenues of approach) is another example that captures the complexity and nuance of the physical environment. Without the use of these acronyms, the education of new officers would be more difficult and their performance in the field would arguably suffer from complexity procrastination.

At a higher level, the acronym DIME (diplomacy, information, military, and economics) frames and captures in a simple but powerful way the complexities of international power. However, for some, DIME was too simple. Following the natural trend to increase complexity, there was a short-lived attempt in the early 2000s to make DIME more descriptive and complete. DIME-FIL added finance, infrastructure, and legal.



Stinger missile team with 35th Air Defense Artillery Brigade identifies unmanned aerial vehicle target during RIMPAC 2018 at Pacific Missile Range Facility, Barking Sands, Hawaii, July 24, 2018 (U.S. Army/Adan Cazarez)

Then there was MIDLIFE (military, information/intelligence, diplomatic, legal, infrastructure, finance, and economic). Common sense prevailed and, in the end, a simple four-letter word won.

The Army added “physical environment and time,” for PMESII-PT, to joint doctrine’s PMESII. This is probably acceptable because it does not violate memory limitation or information clutter, unlike JP 5-0 figure IV-5. However, the Army needs to be wary of the bureaucracy’s tendency to add more letters. Is a “C” for cyber lurking out there?

Some Nondoctrinal Heuristics

According to JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment*, having a system’s perspective is critical to understanding the operational environment (OE).²¹ However, recognizing and describing a system can be challenging, especially if one does not have tens of hours of instruction in systems theory. The Army’s Command and General Staff Office’s Course (CGSOC), not having hours of curriculum time for systems

theory, used the Five Minute University model and managed to successfully teach systems theory using the acronym RAFT (relationships, actors, functions, and tensions). It is systems theory’s equivalent of supply and demand for economics. Easily understood and recalled, RAFT jumpstarts the understanding and description of systems.

In RAFT, an environment is comprised of various systems or subsystems called “actors” (also referred to as nodes). Each actor has “relationships” to other actors (also referred to as links). These relationships between actors serve some purpose, which is the “function.” Functions are typically verbs, such as supply, control, or feed. “T” is for tension, and it is a characterization of the relationship/function. Tensions are typically adjectives, such as strong, required, positive, negative, or adversarial.

Using RAFT, CGSOC students are able to quickly chart and describe environments to an adequate level of detail for use in operational design and the joint planning process. They then identify the key actors and their relationships. These

become decisive points, or “high points of leverage,” that indicate where and what types of action may be appropriate. This becomes the outline of an operational approach or solution to a problem. Technically, a more accurate acronym would be ARFC (actors, relationships, functions, and characterizations) because it better describes the sequence of the process. However, it is cognitively weaker. Acronyms that use existing words, such as DIME or RAFT, which already reside in the mind, make filing and recall easier. Therefore, we use RAFT, not ARFC.

Another example is RCP (remove, change, and provide), which is a framework for problem-solving, and planners use it in the development of a broad operational approach during the operational design process. Just about any problem and solution can be reduced to the rule of thumb “remove, change, and provide.” If something in the environment causes the problem, remove it. If it is a required part or cannot be removed, then change its behavior. Alternatively, if the problem is that something is missing, provide it. For problems that are

more complex, combinations of RCP may work. For example, if the problem is crime, remove criminals, change the behavior of people to reduce crime, and provide opportunities other than crime. Again, it is a simple rule of thumb to help start the problem-solving process.

Conclusion

The scientific opinion of many psychologists and behavioral scientists suggests the key to time-sensitive decisionmaking in complex and chaotic situations is simplicity, not complexity. Simple-to-remember rules of thumb, or heuristics, speed the cognitive process, enabling faster decisionmaking and action. Recognizing that heuristics have limitations and are not a substitute for basic research and analysis, they nevertheless help break complexity-induced paralysis and support the development of good plans that can achieve timely and acceptable results.

The best heuristics capture useful information in an intuitive, easy-to-recall way. Their utility is in assisting decision-makers in complex and chaotic situations to make better and timelier decisions that lead to effective actions. While tested and vetted heuristics provide opportunities to create better ways to pass and retain knowledge and skills, designers must ensure that they capture reliable best practices.²²

Leaders and doctrine writers seeking to enable better decisionmaking and situational awareness should seriously consider taking a new direction toward simplification of processes. Rather than adding more to already bloated and complex processes, they should answer three questions: First, does this add or reduce clutter? Second, does this complicate or simplify understanding? Last, is it forgettable or memorable? If the answers are the former then consider cutting and simplifying by using reasonable heuristics. JFQ

Notes

¹ Father Guido Sarducci (Don Novello), "Five Minute University," available at <www.templaruniversity.com/guido.html>.

² Kendra Cherry, "What Is a Heuristic and How Does It Work?" *VeryWellMind.com*, November 13, 2018, available at <www.verywellmind.com/what-is-a-heuristic-2795235>.

³ Antoinette Schoar and Saugato Datta, "The Power of Heuristics," *Ideas42.org*, January 2014, 2, available at <www.ideas42.org/wp-content/uploads/2015/05/ideas42_The-Power-of-Heuristics-2014-1.pdf>.

⁴ Ibid.

⁵ David Vergun, "Solarium 2015: Developing Agile, Adaptive Leaders," *Army.mil*, available at <www.army.mil/article/143630/solarium_2015_developing_agile_adaptive_leaders>.

⁶ Schoar and Datta, "The Power of Heuristics," 2.

⁷ Grant M. Martin, "Carl von Clausewitz, Meet Albert Einstein and Max Planck," *Small Wars Journal*, n.d., available at <http://smallwarsjournal.com/index.php/jrnl/art/carl-von-clausewitz-meet-albert-einstein-and-max-planck>.

⁸ Milan Vego, "The Bureaucratization of the U.S. Military Decisionmaking Process," *Joint Force Quarterly* 88 (1st Quarter 2018), 35.

⁹ Joint Publication (JP) 5-0, *Joint Planning* (Washington DC: The Joint Staff, June 2017), IV-12; and JP 5-0, *Joint Operational Planning* (Washington DC: The Joint Staff, August 2011), III-10.

¹⁰ Cherry, "What Is a Heuristic and How Does It Work?"; and Daniel G. Goldstein and Gerd Gigerenzer, "Models of Ecological Rationality: The Recognition Heuristic," *Psychological Review* 109, no. 1 (2002), 75-90, available at <www.dangoldstein.com/papers/RecognitionPsychReview.pdf>.

¹¹ Schoar and Datta, "The Power of Heuristics," 3.

¹² Ibid.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Vego, "The Bureaucratization of the U.S. Military Decisionmaking Process."

¹⁶ Richard A. McConnell et al., "The Effect of Simple Role-Playing Games on the Wargaming Step of the Military Decision Making Process (MDMP): A Mixed Methods Approach," *Developments in Business Simulation and Experiential Learning*, vol. 45 (2018), 340.

¹⁷ Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011), 419.

¹⁸ Ibid., 431.

¹⁹ Cherry, "What Is a Heuristic and How Does It Work?"; and Goldstein and Gigerenzer, "Models of Ecological Rationality."

²⁰ Jacob Mong, email to author, "Subject: Quote from Your Recent Study, 10 April 2018."

²¹ JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment* (Washington DC: The Joint Staff, May 2014), I-4.

²² Schoar and Datta, "The Power of Heuristics," 6.

New from NDU Press

for the Center for the Study of Chinese Military Affairs

Strategic Forum 299
China's Future SSBN Command and Control Structure
by David C. Logan



China is developing its first credible sea-based nuclear forces. This emergent nuclear ballistic missile submarine

(SSBN) force will pose unique challenges to a country that has favored tightly centralized control over its nuclear deterrent. The choices China makes about SSBN command and control will have important implications for strategic stability. China's decisions about SSBN command and control will be mediated by operational, bureaucratic, and political considerations. A hybrid approach to command and control, with authority divided between the navy and the Rocket Force, would be most conducive to supporting strategic stability.



Visit the NDU Press Web site for more information on publications at ndupress.ndu.edu