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14. ABSTRACT Emerging research into how decisions are made in real world situations indicates that they are made through a synthesis of analysis and intuition. Joint doctrine recognizes intuition but overwhelmingly emphasizes analytical methods. The joint community has ample guidance and receives training and education in support of analytical decision making. However, there is significantly less guidance, training, and education for intuitive decision making. Research has shown that the best preparation for intuitive decision making is relevant real-world experience and feedback. The nature of decision making at the strategic level of war makes gaining this experience problematic. Fortunately, decision making theory illuminates leverage points that can be used to enhance intuitive decision making expertise. Equally useful, practical methods demonstrated at the tactical level can be adapted to address this problem at the strategic level. Strategic decision games should be used to improve the national security professional's strategic intuition.

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Strategic Decision Games:

Improving Strategic Intuition

By

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United States Joint Forces Command

A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

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Strategic Decision Games: Improving Strategic Intuition

Abstract:

Emerging research into how decisions are made in real world situations indicates that they are made through a synthesis of analysis and intuition. Joint doctrine recognizes intuition but overwhelmingly emphasizes analytical methods. The joint community has ample guidance and receives training and education in support of analytical decision making. However, there is significantly less guidance, training, and education for intuitive decision making. Research has shown that the best preparation for intuitive decision making is relevant real-world experience and feedback. The nature of decision making at the strategic level of war makes gaining this experience problematic. Fortunately, decision making theory illuminates leverage points that can be used to enhance intuitive decision making expertise. Equally useful, practical methods demonstrated at the tactical level can be adapted to address this problem at the strategic level. Strategic decision games should be used to improve the national security professional's strategic intuition.

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Introduction

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

One could learn math by studying the theory and history of math, along with reviewing how others have solved specific types of math problems. While this is useful and enlightening, the truly powerful method of learning mathematical techniques is to work through many and various problems using previous solutions and methods as guides. The U.S. trains its military on tactical techniques in the classroom, certainly, but also expends a great deal of resources on giving its tactical leaders practical experience doing tactics at training facilities such as the National Training Center. Although more conceptual than at the tactical level, the continuous and repeated planning efforts conducted at the operational level of war by Combatant Command staffs and commanders is a form of training for operations at this level. This is a part of the benefit that General Eisenhower referred to in his expression that plans are worthless, but planning is everything. And yet, at the strategic level of war, our future national security leaders are given very little opportunity to practice doing strategy outside of actual real-world strategy formulation.

This study will demonstrate the criticality of intuition to decision making in general, and of strategic intuition – the "*coup d'oeil*" referred to by Carl von Clausewitz – to successful strategy formulation in particular, as well as the importance of experience to developing one's intuition, and will then proceed to propose a method which will

improve the strategic intuition of our national security professionals. First, strategy will be defined and scoped for the purposes of this paper. Next, emerging theory relating to intuition will be presented. As a synthesis of these two discussions, strategic intuition will then be introduced and examined. Finally, strategic decision games will be presented as a method for improving the strategic intuition of our national security professionals.

The Emerging Strategic Environment

> In the past century there have been three seismic world wide changes, all producing major reorderings – after World War I, after World War II, and after the Cold War. By reordering, I mean a drastic change in the total environment – the balance of power among the great states, and how the international economy functions. Such significant changes require change in thinking about, and approaches to, that new world.
>
> - General Tony Zinni, *The Battle for Peace*

In 1972, evolutionary scientists Stephen Jay Gould and Niles Eldredge proposed an alternative framework for biological evolution which they called "punctuated equilibrium." This new framework presents species as generally stable, changing little for millions of years. This leisurely pace is "punctuated" by a rapid burst of change that results in a new species. For example, one group of coral-like sea organisms called bryozoan shows this kind of pattern. The well-preserved fossil record of bryozoans shows that one species first appeared about 140 million years ago and remained unchanged for its first 40 million years. Then there was an explosion of diversification, followed by another period of stability for a vast amount of time.[1]

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[1] Public Broadcasting Service, "Punctuated Evolution" (accessed at http://www.pbs.org/wgbh/evolution/library/03/5/l_035_01.html on 15 December 2006).

Whether or not punctuated equilibrium stands the test of time as a useful theory in the field of evolutionary developmental biology, it is a useful analogy for the rapid changes that are currently taking place in the post-Cold War strategic environment. The relative stability and predictability of the Cold War has given way to an era of rapid and fundamental change. As the National Intelligence Council puts it, "At no time since the formation of the Western alliance system in 1949 have the shape and nature of international alignments been in such a state of flux. The end of the Cold War shifted the tectonic plates, but the repercussions from these momentous events are still unfolding." [2]

Russia is increasing its economic influence over its European neighbors through its oil and gas reserves and exports. China's gross national product (GNP) will likely exceed those of all the individual Western states except the United States by 2020. Within this same time period, India's GNP also will likely have surpassed or nearly surpassed that of individual European economies, with those of Brazil and Indonesia not far behind. Nonstate actors will almost certainly continue to grow in power and influence.[3]

The National Intelligence Council considers increasing globalization as a relative certainty and as the key driver of the future security environment:

> We see globalization—growing interconnectedness reflected in the expanded flows of information, technology, capital, goods, services, and people throughout the world—as an overarching "mega-trend," a force so ubiquitous that it will substantially shape all the other major trends in the world of 2020.[4]

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[2] National Intelligence Council, *Mapping the Global Future: Report of the National Intelligence Council's 2020 Project* (Pittsburg: Government Printing Office, 2004), 9.
[3] Ibid., 111.
[4] Ibid., 10.

Harry R. Yarger, Professor of National Security Policy at the U.S. Army War College, in his monograph *Strategic Theory for the 21st Century: The Little Book on Big Strategy*, describes the strategic environment is characterized by volatility, uncertainly, complexity, and ambiguity (VUCA):

> VUCA thinking argues that the strategic environment is volatile. It is subject to rapid and explosive reaction and change, often characterized by violence. Uncertainty also characterizes this environment, which is inherently problematic and unstable. New issues appear, and old problems repeat or reveal themselves in new ways so that past solutions are dubious, and the perceived greater truth often vacillates with time. Everything is subject to question and change. This environment is extremely complex. It is composed of many parts that are intricately related in such a manner that understanding them collectively or separating them distinctly is extremely difficult and often impossible. Sometimes the environment is so complicated or entangled that complete understanding and permanent solutions are improbable. The strategic environment is also characterized by ambiguity. The environment can be interpreted from multiple perspectives with various conclusions that may suggest a variety of equally attractive solutions, some of which will prove to be good and others bad. Certain knowledge is often lacking and intentions may be surmised, but never entirely known.[5]

The 2006 Quadrennial Defense Review (QDR) describes the new strategic environment as moving from a peacetime tempo to a wartime sense of urgency. It also reinforces the idea that the global security environment is transitioning from a time of reasonable predictability to an era of surprise and uncertainty. The central theme of the QDR is that winning the Long War is the Nation's top priority. The Long War is described as "a global war against violent extremists who use terrorism as their weapon of choice, and who seek to destroy our free way of life."[6]

One framework within which to think about the conduct of the Long War is the four generations of war construct proposed by Bill Lind, et al., in the 1989 Marine Corps

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[5] Harry R. Yarger, *Strategic Theory for the 21st Century: The Little Book on Big Strategy* (Carlisle, PA: Strategic Studies Institute, 2006), 18.
[6] Donald Rumsfeld, *Quadrennial Defense Review Report*, v.

Gazette article "The Changing Face of War: Into the Fourth Generation" and expanded upon by Thomas X. Hammes in *The Sling and the Stone.* Hammes describes 4th generation warfare as using:

> …all available networks – political, economic, social, and military – to convince the enemy's political decision makers that their strategic goals are either unachievable or too costly for the perceived benefit. It is an evolved form of insurgency. Still rooted in the fundamental precept that superior political will, when properly employed, can defeat greater economic and military power, 4GW makes use of society's networks to carry on its fight. Unlike previous generations of warfare, it does not attempt to win by defeating the enemy's military forces. Instead, via the networks, it directly attacks the minds of enemy decision makers to destroy the enemy's political will. Fourth-generation wars are lengthy – measured in decades rather than months or years.[7]

Hammes points out that only fourth-generation opponents have defeated super-powers – in Vietnam, Lebanon, and Somalia against the United States and in Afghanistan against the Soviet Union. Hammes goes on to point out that fourth-generation opponents also defeated the French in Vietnam and Algeria. Fourth-generation war "continues to bleed Russia in Chechnya and the United States in Iraq, Afghanistan, and in other countries against the al-Qaeda network." To this list one could add Israel's recent less than fully successful actions against Hezbollah in Lebanon July to September, 2006. The Long War and other fourth-generation wars are human centric. High technology and massive firepower didn't win in Vietnam or Somalia and aren't the solution in Iraq. As American strategic theorist John Boyd pointed out, "Machines don't fight wars, people do — and they use their minds."[8]

In the Cold War, the United States developed its strategy early on – containment. If containment failed and it came to direct military confrontation with the Soviet Union, the U.S. knew, or at least assumed, that the battlefield would the plains of Europe and

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[7] Thomas X. Hammes, *The Sling and the Stone* (St. Paul, MN: Zenith Press, 2004), 2.
[8] Franklin Spinney, "Genghis John," *Proceedings of the U. S. Naval Institute*, July 1997, 42-47.

especially the Fulda gap. The U.S. used that relative certainty to plan for the battle which in time resulted in AirLand Battle doctrine. But now those relative certainties are gone. One of the major strategic uncertainties for the United States is who the major strategic competitors will be over the next several decades. Possibilities include nation-states such as China and India, groups of nations such as the European Union, a non-state actor or group of non-state actors, or some combination these. However the security environment unfolds, history shows that violent conflict is an enduring element of human nature. Recent history shows that adversaries will not rely on conventional means alone in the pursuit of their objectives.

In summary, the emerging strategic environment is one of profound change and marked by volatility, uncertainty, complexity, and ambiguity. The conduct of conflict will likely evolve to include a greater emphasis on non-traditional forms of warfare. These factors drive the need for, the criticality of, an insightful and effective strategy – one that is human-centric, rather than technology-centric. Due to the dynamic nature of the strategic environment, constant monitoring of the strategic situation and refinement of our strategy will also be necessary. Hence, above all, the United States needs strategists.

Strategy

> Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.
>
> - Sun Tzu, *The Art of War*

The brief analysis of the emerging security environment presented above indicates that the United States can expect the current condition of international and non-state global competition and conflict to continue for the foreseeable future. How should the

U.S. act in order to facilitate the achievement and maintenance of its national interests? That is the realm, and the importance, of strategy.

The Department of Defense Dictionary of Military and Associated Terms defines strategy as, "The art and science of developing and employing instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives." This paper will examine the various elements of this definition, as well as one very important missing element.

First, and fairly straightforward, is the idea of "employing instruments of national power in a synchronized and integrated fashion." The aim is to employ all the means at a nation's disposal in a mutually reinforcing manner. This is the strategic level equivalent of the tactical idea of combined arms. At the tactical level, an enemy could disperse and hide from aerial attack or mass and counter a land attack, but be vulnerable when both are applied in an integrated fashion. Similarly, at the strategic level the aim is to relentlessly pressure an adversary in multiple domains and present him with multiple, simultaneous dilemmas.

Next is the phrase "to achieve theater, national, and/or multinational objectives." This phrase firmly places strategy at the theater, national, and coalition level. This is not a universally applicable limitation to the scope of strategy in general. A great deal of energy goes into developing business strategies, for example. However, this limitation usefully scopes the definition of strategy for national security discussions.

The phrase "developing and employing" fits very well within the Clausewitzian notion of preparing for war and the conduct of war being two distinct activities: the

"maintenance of the fighting forces" and the "actual conduct of war."[9] Leaders must be developed who can successfully employ the instruments of national power.

The phrase "the art and science" is not further defined or explained in JP 1-02. Looking across multiple definitions for both "art" and "science," the relevant aspects are that "art" relies on human creativity and judgment while "science" relies on methodical and systematic study. Decision making falls into two similar categories: intuitive and analytical.

Finally, the critical aspect of strategy that is not explicitly included in the JP 1-02 definition is consideration of the adversary. A strategy that does not contend with a thinking, willful adversary, a strategy for fighting forest fires, for example, has very different dynamics than the type of strategy of interest to national security professionals. A leader developing national security strategy needs to be able to not only deal with the mechanical aspects of employing national power (the science), but also with the competitive human aspects (the art).

The Logic of Strategy

Dr. Colin S. Gray, leading strategy theorist, prolific author, Professor of International Politics and Strategic Studies at the University of Reading, and Senior Fellow at National Institute for Public Policy, argues that, "There is an essential unity to all strategic experience in all periods of history because nothing vital to the nature and function of war and strategy changes."[10] Dr. Gray considers himself part of the "historical" school of strategic thought. The central tenant of this school of thought is

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[9] Carl Von Clausewitz, *On War*. trans. Michael Howard and Peter Paret (New York: Knopf, 1993), 147.
[10] Colin S. Gray, *Modern Strategy*. (Oxford: Oxford University Press, 1999), 1.

that there are "common elements to war and strategy in all periods, in all geographies, and with all technologies."[11] He posits that "strategy has a complex nature and a function that is unchanging over the centuries."[12] He identifies seventeen dimensions of strategy ranging from people, society, culture, politics, and ethics to military operations, command, geography, and friction that are enduring across time and place and that "encompass most of what contributes to the making and execution of strategy."[13]

Edward N. Luttwak, internationally recognized authority on strategic affairs, shares this view of an enduring logic of strategy. His book, *Strategy: The Logic of War and Peace,* is intended in part to "demonstrate the existence of strategy as a body of recurring objective phenomena that arise from human conflict."[14] He does not claim that war exactly repeats itself: "I like others before me concluded that each experience of war is unique, the product of an unrepeatable convergence of political aims, transient emotions, technical limits, tactical moves, operational schemes, and geographical factors."[15] Rather, he states that there are enduring patterns and continuities to the conduct of strategy.[16] He goes on to identify what he considers the fundamental, enduring characteristic of strategy that sets it apart from other human endeavors – its paradoxical nature:

> Strategy does not merely entail this or that paradoxical proposition, blatantly contradictory and yet thought valid, but rather that *the entire realm of strategy is pervaded by a paradoxical logic* very different from the ordinary "linear" logic by which we live in all other spheres of life. …Within the sphere of strategy, however, where human relations are conditioned by armed conflict actual or possible, another and quite different logic is at work and routinely violates

[11] Ibid., 1.
[12] Ibid., 2.
[13] Ibid., 24.
[14] Edward N. Luttwak, *Strategy: The Logic of War and Peace*. (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 2001) 267.
[15] Ibid., xi.
[16] Ibid., xii.

> ordinary linear logic by *inducing the coming together and reversal of opposites.* Therefore it tends to reward paradoxical conduct while defeating straightforwardly logical action, yielding results that are ironical or even lethally damaging.[17]

Clausewitz provides the theoretical underpinnings of why war has an enduring nature different from other human activities. First is war's two-sided nature, what Clausewitz called "zweikampf," or "two-struggle." Clausewitz explains:

> The essential difference is that war is not an exercise of the will directed at inanimate matter, as is the case with mechanical arts, or at matter that is animate but passive and yielding, as is the case with the human mind and emotions in the fine arts. In war, the will is directed at an animate object that *reacts.* It must be obvious that the intellectual codification used in the arts and sciences is inappropriate to such activity.[18]

The second major differentiating factor Clausewitz presents is that "war is a paradoxical trinity – composed of primordial violence, hatred, and enmity, which are to be regarded as a blind natural force; of the free play of chance and probability within which the creative spirit is free to roam; and of its element of subordination, as an instrument of policy, which makes it subject to reason alone."[19] These factors distinguish war from other human endeavors and give it its unique dynamics.

Given that strategy has an enduring nature and that this nature distinguishes it from other fields of human endeavor, two implications arise. First, history as well as current and recent experience can be used to prepare for the future. Second, in order to prepare to do strategy well, practitioners must learn to apply strategy in a realistic environment that duplicates real world strategic dynamics.

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[17] Ibid., 2.
[18] Clausewitz, 173.
[19] Ibid., 101.

Planning and Strategy

> If you get the strategy right, a lieutenant can draft the plan.
> - Woodword quoting Rumsfeld quoting Marshall, *Plan of Attack*

> Harry R. Yarger makes a clear distinction between strategy and planning:
>
> *Strategy is not planning.* As described above, it partakes of a different mindset. Planning makes strategy actionable. It relies on a high degree of certainty – a world that is concrete and can be addressed in explicit terms. In essence, it takes a gray world and makes it black and white through its analysis of the facts and assumptions about the unknown.[20]

Yarger goes on to acknowledge that uncertainty "increases exponentially as we ascend from the tactical to the operational to the strategic level."[21]

In essence, strategy looks up and out while planning looks in and down. Hence, a key discriminator between strategy and planning is that the strategist must be able to deal with increased uncertainty with regards to ends as well as the environment within which he is operating. As shall be seen, this requirement to deal effectively with uncertainty is one of the major drivers for developing the strategic intuition of national security professionals.

Strategy Matters

> Poor strategy is expensive, bad strategy can be lethal, while when the stakes include survival, very bad strategy is almost always fatal.
> - Colin S. Gray, *Modern Strategy*

History is replete with examples of poor strategy leading to defeat in many cases regardless of tactical brilliance. Hannibal's victory at the battle of Cannae, 216 B.C., is a

[20] Yarger, 47.
[21] Ibid., 47.

classic example of tactical brilliance. Hannibal defeated a rebuilt Roman force of 85,000, which was almost twice the size of his own force. Of this Roman force of 85,000, only about 15,000 survived.[22] Cannae was a signal victory for Hannibal that resonates still, twenty-two hundred years later. In the early 1900s, then German Army Chief of Staff Alfred von Schlieffen developed what later would become called the Schlieffen Plan for the invasion of France modeled on Hannibal's success at Cannae.[23] However, as crushing a tactical victory as this was for Hannibal, it did not translate into strategic success:

> Yet only few months after Cannae the Carthaginian leader must have realized that the victory foreshadowed his own downfall. The very extent and completeness of a Cannae made the greatness of Rome the more convincing, while showing up in pitiless clarity the lack of Carthaginian resources. From the beginning Hannibal had made it plain that he did not hope to conquer Rome on the battlefield. Tactical victories were to be only the strategic means of raising all Italy in arms against harsh conquerors of recent memory. "I come," said the invader, "not to place a yoke on Italy, but to free her from the yoke of Rome."
>
> As a Carthaginian, he reckoned without the moderation and wisdom of a Roman administration. There was no yoke on Italy, and few peoples of the peninsula cared to exchange Roman liberties for a Carthaginian promise.[24]

Hannibal's tactical mastery enabled him to continue his campaign on the Italian peninsula against the Romans. As Montross expresses it, "For thirteen more years Hannibal stood off three and four Roman armies simultaneously by means of marches and manoeuvers more brilliant than his battlefield victories."[25] Eventually, however, these tactical accomplishments were made irrelevant by Rome's adoption of a new strategy. Publius Cornelius Scipio, eventually to be known as Scipio Africanus, "realize[d] that Hannibal could be beaten more decisively in Spain and Africa than in

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[22] Lynn Montross, *War Through the Ages* (rev. and enl. 3d ed. New York: Harper & Row, 1960), 62.
[23] Peter Paret, ed., *Makers of Modern Strategy* (Princeton: Princeton University Press,1986), 318.
[24] Montross, 63.
[25] Ibid., 64.

Italy."[26] Scipio led the Roman forces to victories in Spain and then Africa which eventually led to Carthage's surrender to Rome[27] and the complete destruction of the city of Carthage.

Other examples of tactical success failing to ensure strategic vistory include those of Napoleon, who won more battles than any other commander in history, and Germany in World War II, whose early tactical victories led to the defeat of Poland in five weeks and France in seven. Both showed tactical brilliance, but both of their strategies ultimately put them in untenable positions. Finally, and still most viscerally relevant for the United States, is the American defeat in Vietnam. As the often quoted exchange between U.S. Army Col Harry Summers and a North Vietnamese officer goes:

> "You know you never beat us on the battlefield," I said to my North Vietnamese Army (NVA) counterpart in Hanoi a week before the fall of Saigon. "That may be so," he replied, "but it is also irrelevant."[28]

This is not an argument that good strategy wins wars without sound operational art and solid tactical execution, merely that good strategy is a sine quo non – an essential element – of victory. While good strategy can be confounded by poor tactics, good tactics cannot make up for bad strategy. As Gray puts it, "Tactical achievement has meaning only in terms of operational intention and strategic effect. Nonetheless, without positive tactical achievement the operational intention and the desired strategic effect are moot."[29] Tactical, operational, and strategic competence are vitally important.

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[26] Ibid., 66.
[27] Ibid., 66-69.
[28] Harry G. Summers Jr., *On Strategy: A Critical Analysis of the Vietnam War* (Novato, CA: Presidio Press, 1982), 1.
[29] Colin Gray, 25

Therefore, the United States must strive to achieve excellence across the full range of tactics, operational art, and strategy.

Two Distinct Thought Processes, One Mode of Thought

Daniel Kahneman, who won the Nobel prize for his research into the psychology of intuitive beliefs and choices, identifies the existence of two distinct thought processes: intuitive and deliberate.[30] With the intuitive process, judgments and decisions are made automatically and rapidly. The controlled process is deliberate and slower.

Kahneman states that, "there is considerable agreement on the characteristics that distinguish these two types of cognitive processes."[31] Intuition is "fast, automatic, effortless, associative, and difficult to control or modify."[32] Reasoning is "slower, serial, effortful, and deliberately controlled; [it is] also relatively flexible and potentially rule-governed."[33] Kahneman provides a useful definition for intuitions as those "thoughts and preferences that come to mind quickly and without much reflection." Figure 1 summarizes the distinguishing characteristics of the intuitive and reasoning thought processes.

[30] Daniel Kahneman, *Maps of Bounded Rationality: A Perspective on Intuitive Judgment and Choice* (Nobel Prize Lecture, December 8, 2002), 1.
[31] Ibid., 2.
[32] Ibid., 2.
[33] Ibid., 2.

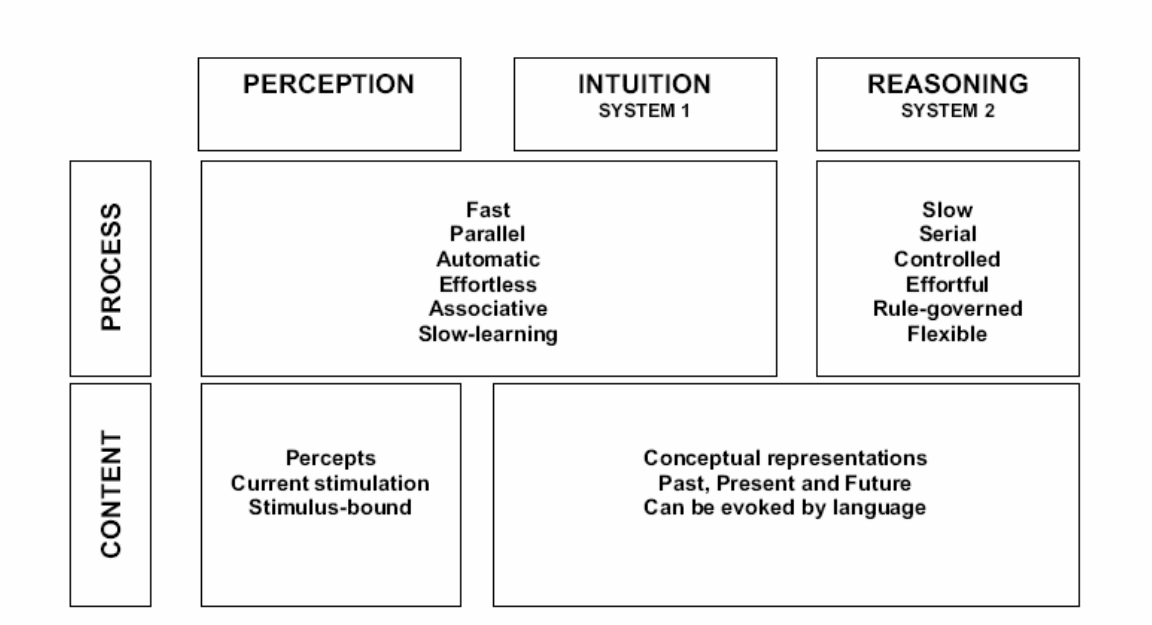

Fig. 1. The Two System View[34]

Even though there are two distinct thought processes, that does not mean one can be chosen to the exclusion of the other. These two processes combine to form a single mode of thought that combines reasoning and intuition. This combination becomes "creative insight… the ability to take existing pieces of information and combine them in novel ways that lead to greater understanding and suggest new behaviors and responses."[35]

Intuition

> The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honors the servant and has forgotten the gift.
>
> - Albert Einstein

[34] Ibid., 3.
[35] Stickland and Walker, "To Sleep, Perchance to Gain Creative Insight?" *Trends in Cognitive Sciences*, Vol 8, No. 5, (May 2004), 191.

In *The Power of Intuition,* Dr. Gary Klein defines intuition as "the way we translate our experience into action."[36] Klein states that "we rely on intuition to make all kinds of judgments."[37] Klein builds on the concept of "bounded rationality," introduced by Herbert Simon, a Nobel prize winning researcher of decision making and problem solving, which suggests that people use heuristics ("rules of thumb") to develop satisfactory answers rather than strict rules of logic and rationality to develop optimal answer in complex situations. This is because "it is impossible to make any important decision by gathering and analyzing all the facts. There are too many facts and too many combinations of facts. The more complex the decision, the faster the complications add up."[38] Complexity, uncertainty, and ambiguity, all fundamental aspects of the strategic environment, combine to greatly exacerbate the problem. It is impossible to process and compute all of the alternatives. Instead, Klein argues, "what enables us to make good decisions is intuition, in the form of very large repertoires of patterns acquired over years and years of practice."[39]

Intelligent Memory

Dr. Barry Gordon, a professor of neurology and cognitive science, has identified a phenomenon similar to intuition that he calls "Intelligent Memory." Dr. Gordon describes Intelligent Memory as:

[36] Gary Klein, *The Power of Intuition* (New York: Currency Doubleday, 2004), 4.
[37] Ibid., 5.
[38] Ibid., 5.
[39] Ibid, 5-6.

> …the memory that "glues" our thinking – and the pieces of our ordinary memory – together. Intelligent Memory is both a thought or idea as well as a cognitive process, yielding what is often called critical or creative thinking. [40]

In other words, Intelligent Memory is the seat of our creativity and sophisticated thinking, which are, of course, critical characteristics for effective strategic intuition.

Gordon provides another way to think about what goes on in Intelligent Memory:

> Intelligent Memory… is like connecting dots to form a picture. The dots are pieces or ideas, the lines between them are your connections or associations. The lines can coalesce into larger fragments, and these fragments can merge to form a whole thought. This whole thought may be a visual image, a piece of knowledge, an idea, or even a solution to a problem.[41]

The concept of Intelligent Memory gives another perspective from which to think about intuition in general and strategic intuition in particular. For example, Intelligent Memory has three main elements: the pieces of information or knowledge; the connections between these pieces; and the mental processes that manage the pieces and connections.[42] Importantly, this additional perspective leads to insights into ways in which to strengthen and improve strategic intuition.

The Recognition-Primed Decision Model

The traditional problem solving process consists of the following steps:

- Problem analysis where information about the problem is gathered and analyzed
- Idea generation where many different potential solutions are created
- Idea evaluation and selection where the pool of potential solution are will be reduced to one or two that are likely to solve the problem[43]

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[40] Barry Gordon and Lisa Berger, *Intelligent Memory: Improve the Memory That Makes You Smarter* (New York: Viking/The Penguin Group, 2003), xi.
[41] Ibid., 8-9.
[42] Ibid., 7.
[43] Arthur B. VanGrundy, *Techniques of Structured Problem Solving* (New York: Van Nostrand Reinhold Company, 1981), 6.

Based on his research, Klein has developed an alternative decision making model that he calls the Recognition-Primed Decision Model. Research indicates that the Recognition-Primed Decision (RPD) process is likely to be successfully employed in situations characterized by ill-defined goals, dynamic conditions, time pressures, and experienced decision makers.[44] For example, in studies by Klein and others, firefighters were found to use the RPD process for more than 80 percent of their toughest incidents. Army officers used intuition in 96 percent of their decisions during planning, and Naval commanders used intuition in 95 percent of their decisions. Ninety percent of decisions made by offshore oil platform managers, British Army officers, and U.S. Navy electronic warfare specialists were also based on intuition.[45]

The RPD process is shown graphically in Figure 2 and follows these basic steps, as presented by Klein in *The Power of Intuition*:

- Cues let people recognize patterns
- Patterns activate action scripts
- Action scripts are assessed through mental simulation
- Mental simulation is driven by mental models[46]

[44] Gary Klein, *Sources of Power: How People Make Decisions* (Cambridge, Massachusetts: The MIT Press, 1998), 95.
[45] Klein, *The Power of Intuition*, 28.
[46] Ibid., 28.

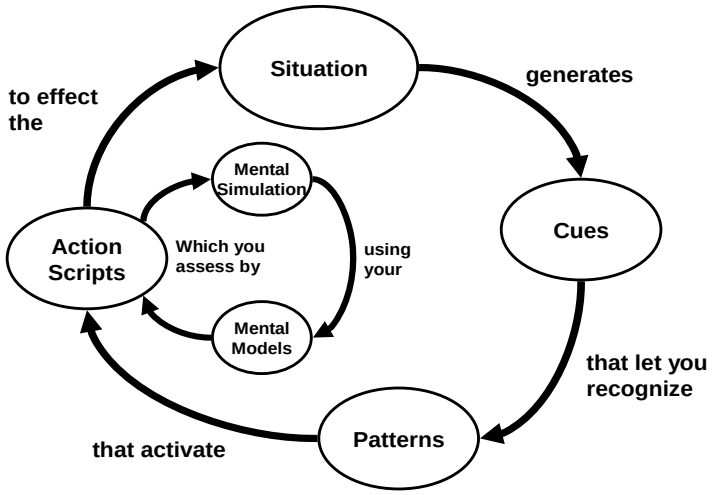

Fig. 2. The Recognition-Primed Decision Model[47]

Cues observed in the situation enable the decision maker to recognize patterns. These patterns then led to an "action script," also known as a potential course of action. This potential course of action is not compared to other potential courses of action, as the tradition model of decision making would dictate. Instead, it is assessed through mental simulation based on mental models. The decision maker thinks through what he would expect to happen if he put this solution into effect based on his understanding of the state of the situation and its dynamics.

Of import are experience and mental models. Klein's initial research on intuitive decision making dealt with highly experienced firefighters. These firefighters had the advantage of years of facing similar situations and gaining immediate feedback as to the effectiveness of various coursed of action. This experience base "resulted in internalizing

[47] Ibid., 26.

a large set of patterns,"[48] forming the foundation for their expert intuitive decision making ability.

A surprising but key feature of the RPD process is that consistently, across divergent problem domains, expert decision makers tended to not come up with multiple potential courses of action, but just one. They did not compare various courses of action against each other or to a set of criteria to find the best, but used their experience to come up with one potential course of action and run it through a mental simulation to assess whether it would be good enough. They looked to satisfy rather than to optimize. Mental models play a critical role in this assessment by mental simulation. Mental models represent not only the pieces, but the relationships between the pieces, the dynamics of the situation. Just as large sets of patterns are built up through experience, so too are these mental models.

OODA Loop Model

Another important decision making model is John Boyd's Observe – Orient – Decide – Act model. This model is best known by as the OODA loop and is well integrated into how the security establishment thinks about decision making. Colin Gray writes, "The OODA loop may appear too humble to merit categorization as a grand theory, but that is what it is. It has an elegant simplicity, an extensive domain of applicability, and contains a high quality of insight about strategic essentials, such that its author well merits honourable mention as an outstanding general theorist of strategy."[49]

[48] Klein, *The Power of Intuition*, 25.
[49] Colin Gray, 91.

The essence of the OODA loop, presented in Figure 3, is perhaps best explained by Franklin Spinney, a long time associate of Boyd:

> He [Boyd] thought that any conflict could be viewed as a duel wherein each adversary observes (O) his opponent's actions, orients (O) himself to the unfolding situation, decides (D) on the most appropriate response or counter-move, then acts (A). The competitor who moves through this OODA-loop cycle the fastest gains an inestimable advantage by disrupting his enemy's ability to respond effectively. He showed in excruciating detail how these cycles create continuous and unpredictable change, and argued that our tactics, strategy, and supporting weapons' technologies should be based on the idea of shaping and adapting to this change — and doing so faster than one's adversary.[50]

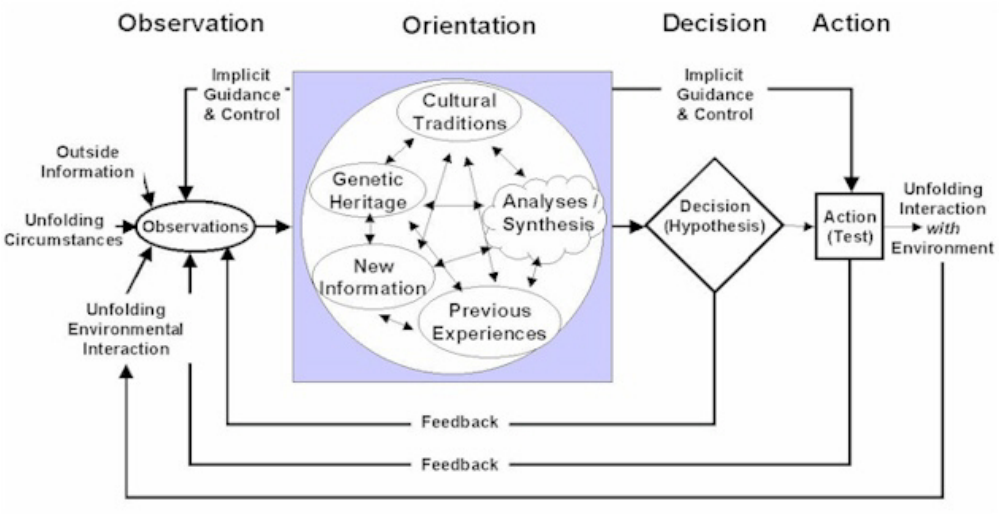

Fig. 3. John Boyd's OODA Loop[51]

For Boyd, orientation is the central and most important feature of the OODA Loop: "Orientation is the schwerpunkt. It shapes the way we interact with the environment – hence, orientation shapes the way we observe, the way we decide, the way we act."[52] "Schwerpunkt" is the Clausewitzian term for center of gravity – the "hub of

[50] Spinney, 47.
[51] Accessed at http://www.belisarius.com/images/ooda_loop.jpg on 19 JAN 2007.
[52] John Boyd, *Organic Design for Command and Control* (March, 1987, accessed at http://www.d-n-i.net/second_level/boyd_military.htm#discourse on 28 DEC 2006), 16.

all power… on which everything depends."[53] Not only is orientation critical to decision making, attacking the opponent's orientation is the key to victory. To Boyd, the fundamental aim of effective strategy is "to isolate [the] adversary — physically, mentally, and morally — from his external environment by destroying his view of the world: his orientation."[54] According to Spinney, "The key to appreciating the power of Boyd's idea is to understand why the orientation function is the door through which a competitor can penetrate his opponent's decision cycle."[55]

Boyd defines orientation as, "an interactive process of many-sided implicit cross-referencing projections, empathies, correlations and rejections that is shaped by and shapes the interplay of genetic, heritage, cultural tradition, previous experiences, and unfolding circumstances."[56] It is important to note that "orientation" influences "observe" on its left in Figure 3 as well as "decide" and "act" to its right.

There are important similarities between Boyd's "orientation," the schwerpunkt of the OODA loop, and the pattern matching and mental simulation of Klein's RPD process. Both are cognitive constructs where the action takes place in the mind of the decision maker. Both use this mental process to make sense of what has been observed ("cues" in Klein's model). Both use this process to generate and evaluate potential courses of action (the "synthesis" in Boyd's model). Both are driven by experience. And both make extensive use of the idea of mental models.

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[53] Paul K. Van Riper, *Planning for and Applying Military Force: An Examination of Terms* (Carlisle, PA: Strategic Studies Institute, 2006), 6.
[54] Spinney, 47.
[55] Ibid., 47.
[56] John Boyd, *Organic Design for Command and Control,* 15.

Mental Models

Although equally important at the strategic level of war, an example of a mental model "gone wrong" at the immediate level of action and decision making provides an accessible and compelling illustration as to the fundamental nature of mental models to decision making. Kevin Burns, Principal Scientist at the MITRE Corporation, uses an example from the 1984 book entitled *Normal Accidents: Living with High-Risk Technologies* by Charles Perrow (highlighting is Burns'):

> On a beautiful night in October 1978, in the Chesapeake Bay, two vessels sighted one another visually and on radar. On one of them, the Cost Guard cutter training vessel Cuyahoga, the captain (a chief warrant officer) saw the other ship up ahead as a small object on the radar, and visually he saw two lights, indicating that it was proceeding in the same direction as his own ship [Figure 4(t1), top panel]. He **thought** … it possibly was a fishing vessel. The first mate saw the lights, but saw three, and estimated (correctly) that it was a ship proceeding toward them [Figure 4(t1), bottom panel]. He had no responsibility to inform the captain, nor did he think he needed to. Since the two ships drew together so rapidly, the captain **decided** … that it must be a very slow fishing boat that he was about to overtake [Figure 4(t2), top panel]. This reinforced his incorrect interpretation. The lookout knew the captain was aware of the ship, so did not comment further as it got quite close and seemed to be nearly on a collision course. Since both ships were traveling full speed, the closing came fast. The other ship, a large cargo ship, did not establish any bridge-to-bridge communication, because the passing was routine. But at the last moment the captain of the Cuyahoga **realized** … that in overtaking the supposed fishing boat, which he assumed was on a near-parallel course, he would cut off that boat's ability to turn as both of them approached the Potomac River [Figure 4(t3), top panel]. So he ordered a turn to the port [Figure 4(t4), top panel]. This brought him directly in the path of the oncoming freighter, which hit the cutter [Figure 4(t4), bottom panel]. Eleven coastguardsmen perished. [57]

[57] Kevin Burns, *Mental Models and Normal Errors* (The MITRE Corporation, Bedford, MA, 2002), 1-2.

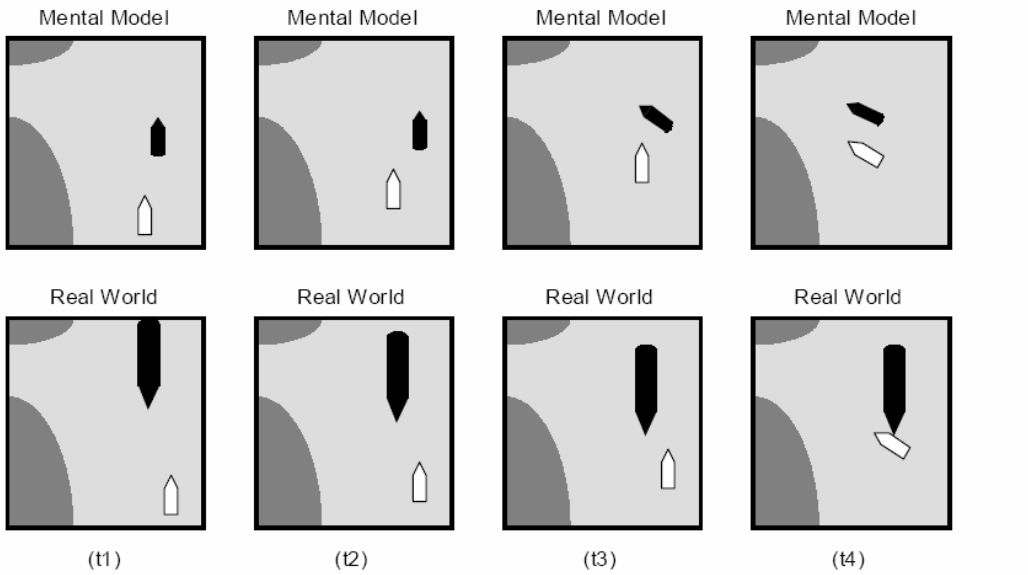

Fig. 4. The Cuyahoga collision. Top panels depict captain's mental model and bottom panels depict real world. Small black boat (top panels) denotes fishing vessel and large black boat (bottom panels) denotes freighter. White boat denotes Cuyahoga in top and bottom panels. Time epochs are labeled (t1), (t2), (t3) and (t4)[58]

Perrow goes on to ask the pertinent question: "*Why would a ship in a safe passing situation suddenly turn and be impaled by a cargo ship four times its length?"* Burns supplies Perrow's conclusion: "… they built perfectly reasonable **mental models** [emphasis added] of the world, which work almost all the time, but occasionally turn out to be almost an inversion of what really exist."[59]

In short, mental models are intrinsic to decision making. They describe and explain the state and dynamics of the current world and predict possible future worlds. Mental models are constructed by relevant experience. Thus, within the RPD model of decision making, relevant experience is critical in both the building of a set of patterns and for assessing potential courses of actions through mental simulation.

[58] Ibid., 2.
[59] Ibid., 1.

Common Sources of Error

Although most behavior is "intuitive, skilled, unproblematic, and successful,"[60] intuition-based decision making is not, as shown above, infallible. Some common sources of error include *uneven accessibility*, *lax self-monitoring*, and *framing effects*.[61]

Accessibility is the ease with which particular mental contents come to mind.[62] Based on the cues perceived, certain patterns, potential courses of action, and mental models will be more accessible than others. These more accessible constructs may not be the most appropriate or useful of those available.

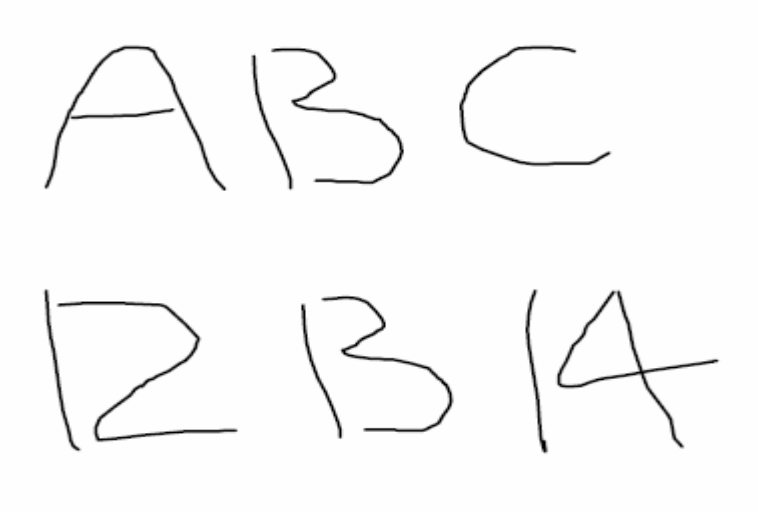

Fig. 5. The Effect of Context on Accessibility[63]

A visual example of accessibility is provided by Kahneman[64] and is shown above in Figure 5. This example illustrates the effect of context on accessibility. Next to letters, the ambiguous symbol appears as a letter. Next to numbers, it appears as a

[60] Kahneman, 35
[61] Ibid., 2-11
[62] Ibid., 4.
[63] Ibid., 7.
[64] Ibid., 7.

number. Equally problematic for the use of intuition for strategy formulation is that while intuition can provide insight and patterns, intuition also can suppress uncertainty. Kahneman notes, "…when the two lines are shown separately, observers will not spontaneously become aware of the alternative interpretation. They 'see' the interpretation that is the most likely in its context, but **have no subjective indication that it could be seen differently**"[65] (emphasis added).

One source of the accessibility error in strategy formulation is the attraction of applying perceived lessons learned from recent events. An example of this type is Secretary of Defense Rumsfeld using the success in the invasion of Afghanistan to draw conclusions about the military force required for the invasion of Iraq. This example is explored in the section below entitled "Examples of Intuitive Decision Making at the Strategic Level."

Kahneman offers a simple, illustrative example of the second common source of error – *lax self-monitoring*:

> Shane Frederick… has used simple puzzles to study cognitive self-monitoring, as in the following example: "A bat and a ball cost $1.10 in total. The bat costs $1 more than the ball. How much does the ball cost?" Almost everyone reports an initial tendency to answer "10 cents" because the sum $1.10 separates naturally into $1 and 10 cents, and 10 cents is about the right magnitude. Frederick found that many intelligent people yield to this immediate impulse: 50% (47/93) of Princeton students, and 56% (164/293) of students at the University of Michigan gave the wrong answer. Clearly, these respondents offered a response without checking it.[66]

Arguably, a recent, egregious strategic level example of lax self-monitoring is the assumption of the existence of Iraqi weapons of mass destruction. Institutionally, the U.S. national security apparatus made the assumption that Iraq possessed weapons of

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[65] Ibid., 7.
[66] Ibid., 2.

mass destruction and did not update this assumption even when no hard evidence was forthcoming. Included on Secretary of Defense Rumsfeld's 2002 list of "things could go wrong in an Iraq war"[67] was that the "U.S. could fail to find WMD on the ground."[68] And yet, the U.S. went to war in Iraq with WMD as the key issue.

Kahneman lists *framing effects* as a third common source of error for intuition-based decision making. Framing is the initial guidance or tasking given to the decision maker. The form and content of this guidance has been shown to have the potential to excessively influence the decision. One obviously relevant example is provided by Kahneman:

> Shafir (1993) presented respondents with problems in which they played the role of a judge in adjudicating the custody of a child between divorcing parents. Each parent was described by a list of attributes. One of the descriptions was richer than the other: it contained more negative and more positive attributes. The framing of the instruction was varied. Some respondents were asked which custody request should be accepted, others decided which request should be rejected. The rich description was favored under both instructions, presumably because the respondents attended to its many advantages in deciding which custody request to accept, and to its many disadvantages in deciding about rejection.[69]

In the domain of strategy formulation, framing effects could occur in two distinct modes. In the first, the framing effect could occur when the task is passed from Commander to staff. This guidance could inadvertently misdirect the course of the strategic analysis. The staff should be aware of this possibility and correct for it by verifying with the Commander their understanding of assumptions and guidance. In the second mode, the staff, or subordinate, could provide more details about certain potential

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[67] Bob Woodward, *State of Denial* (New York: Simon and Schuster, 2006), 99
[68] Ibid., 99.
[69] Kahneman, 9.

courses of action of analyses than others, thereby skewing the decision of the decision makers.

In summary, while critical for creative problem solving, including in the area of strategy formulation, intuition is prone to certain types of errors and hence needs to be checked and refined by deliberate reasoning and analysis.

Other Limiting Factors

Another source of potential problems when dealing with strategy formation is that complexity, uncertainty, and ambiguity complicate the successful use of intuition. While complexity, uncertainty, and ambiguity are fundamental aspects of the strategic environment, this creates two distinct problems in the application of intuitive decision making. First, it is difficult to build the necessary sets of patterns and mental models. As Klein states, "It's hard to develop intuitions based on pattern matching when the situation you are trying to resolve is complicated."[70] Secondly, even if sets of patterns and mental models are constructed, it is often difficult to apply them correctly. Klein puts it this way: "Even if you think that you recognize a pattern, you may be fooling yourself."[71]

In the realm of strategy formulation, it is unlikely that any one individual will have sufficient expertise across all the relevant subject domains, such as military, economic, psychological, and political matters, that come into play in today's globally networked and interconnected environment. As senior Office of the Secretary of Defense researchers David S. Alberts and Richard E. Hayes put it, "It is becoming increasingly clear that the complexity of the situations faced and the responses needed have outpaced

[70] Klein, *Power of Intuition*, 67.
[71] Ibid., 67

not only decision theoretic approaches, but have also outpaced the ability of even the best of experts (super stars) to deal with the complexities involved."[72] The solution to this problem is leveraging the perspectives, knowledge, and expertise of a diverse set of experts through collaboration. The national security institution requires the organization, tools, and culture necessary to enable and encourage this collaboration across all the elements of national and coalition power.

Experience and Intuitive Decision Making

> In no other profession are the penalties for employing untrained personnel so appalling and so irrevocable as in the military.
>
> - General Douglas MacArthur

Perhaps the greatest limiting factor to the successful use of strategic intuition is the relative limited number of opportunities to gain relevant experience with timely feedback. Expert decision making is based on experience that enables the decision maker to build up sets of patterns and mental models of the dynamics peculiar to their particular problem domain.

In Klein's study of expert decision makers, he chose to study experienced firefighters and nurses, among others, who had the opportunities to make decisions within their field of expertise and gain immediate feedback on a more or less daily basis. These experts built up sets of patterns and mental models over the course of years based on thousands of data points, all with the relevant feedback of which approaches worked and which did not.

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[72] David S. Alberts and Richard E. Hayes, *Power to the Edge: Command… Control… in the Information Age* (Command and Control Research Program, 2003), 88.

At the tactical level of war, the U.S. does a good job of putting its leaders at every level into realistic training situations such as at the National Training Center where they can build up relevant experience and mental models. An important element of this training is timely and relevant feedback in the form of After Action Reviews (AARs). Even more effective in building useful mental models at the tactical level, every time a unit goes on patrol in Iraq or Afghanistan, or elsewhere, its personnel are building pattern sets and mental models based on real world dynamics.

The strategist is not presented this opportunity to build an extensive set of patterns and mental models by the real world strategic environment. However, this lack of real world experience can be offset by education and simulation.

The Role of Deliberate Rationality

As shown in the previous section, intuition is subject to many forms of error. Problem solving works best when intuition works with what Klein calls "deliberate rationality."[73] The description Klein uses for deliberate rationality comes from *Mind over Machine* by Bert and Stuart Dreyfus:

> The hoary old split between the mystical and the analytic will not do… for neither pole of that misleading dualism names the ordinary, non-mystical intuition that we believe is the core of human intelligence and skill… analysis and intuition work together in the human mind. Although intuition is the final fruit… analytic thinking is necessary for beginners learning a new skill. It is also useful at the highest levels of experience, where it can sharpen and clarify intuitive insights… Detached deliberations and intuition need not be viewed as [opposite] alternatives, as is all too often [the case] in simplistic treatments.[74]

[73] Klein, *The Power of Intuition*, 64
[74] Ibid., 64.

In *The Power of Intuition,* Klein provides a useful analogy for the roles of intuition and deliberate rationality. In the human eye, the fovea provides our sharp central vision required for reading and other activities dependent on fine visual detail. Peripheral vision, on the other hand, provides for the vision over the vast majority of our viewing arc, although at a much less fine level of retail. These two systems work in tandem to provide wide angle of vision and fine detail where it is needed. Without peripheral vision, awareness of surroundings is lost. Without the fovea, high resolution vision is lost.

Intuition can be likened to peripheral vision and deliberate rationality to the fovea. Intuition maintains a broad awareness of the situation, trying to match previously learned patterns and directing deliberate rationality to specific areas of high interest. Deliberate rationality, on the other hand, works best on smaller, more discrete tasks and analyzes these to a depth and resolution that intuition cannot match. An intuition-heavy approach works best under conditions of time pressure, ill-defined goals, dynamic conditions, and with experienced participants. An analytical approach works best under conditions of conflict resolution, optimization, justification, and computational complexity.[75]

Some possible sources of error still exist when using the synthesized intuition/deliberate rationality approach. Often, intuition will be used creatively to generate kernels of potential courses of action that deliberate rationality will then further develop. In these cases, the intuitive impression will remain the anchor point for assumptions underlying this development. Under-correction of assumptions and the initial direction of the potential solutions tends to be more likely than over-correction. As

[75] Ibid., 75.

Kahneman puts it, "A conservative general prediction is that variables that are neglected in intuition will remain underweighted in considered judgments."[76]

Strategic intuition thus keeps the strategist oriented within the strategic environment and provides creativity and sophistication of thinking. It provides the "aha… here's what we need to do" factor. Strategy formation does not stop there, of course. Facts and assumptions still need to be checked and the potential courses of action need to be more fully developed and refined. Strategic intuition does not completely formulate strategy by itself, but it does provide the awareness, insight, and spark of creativity.

Examples of Intuitive Decision Making at the Strategic Level

In *Plan of Attack*, Bob Woodward portrays the intuitive natural of decision making at the strategic level of war. In this example, he presents the events that led to the decision for the United States to invade Iraq in 2003. What follows here are merely illustrative extracts that are meant to briefly illuminate the intuitive nature of decision making at this level, not an exhaustive, definitive study in and of itself. Similarly, the point of these examples is not to show that intuition necessarily leads to correct, or incorrect, decisions, but that intuition is an integral part of the process of strategy formulation.

On the afternoon of September 11, 2001, Secretary of Defense Rumsfeld had already turned his thoughts towards Iraq:

> At 2:40 P.M. that day, with dust and smoke filling the operations center as he was trying to figure out what had happened, Rumsfeld raised with his staff the possibility of going after Iraq as a response to the terrorist attacks, according to an

[76] Kahneman, 35.

> aide's notes. Sadam Hussein is S.H. in these notes, and UBL is Usama bin Laden. The notes show that Rumsfeld had mused about whether to "hit S.H. @ same time – not only UBL" and asked the Pentagon lawyer to talk to Paul Wolfowitz about Iraq "connection with UBL."[77]

This is a clear example of intuition early in the decision process directing the analytical process where to search for answers.

Later, on November 21, 2001, President Bush met with Secretary of Defense Rumsfeld and instructed him to review and update the war plan for Iraq.[78] This was apparently without specific analytical evidence that Iraq was connected to al Qaeda or global Islamic terrorism. This is one more example of intuitive judgment guiding an analytical and deliberate follow-on process.

Michael R. Gordon and General Bernard E. Trainor, in *Cobra II,* describe the presentation of Central Command's contingency plan for a war with Iraq, OPLAN 1003-98, to Secretary of Defense Rumsfeld in late 2001:

> Newbold [the three-star general who served as chief operations deputy for the Joint Chiefs of Staff] was armed with a pile of slides as the generals and Rumsfeld sat around a conference table. As Newbold outlined the plan, which called for as many as 500,000 troops, it was clear that Rumsfeld was growing increasingly irritated. For Rumsfeld, the plan required too many troops and supplies and took far too long to execute. It was, Rumsfeld declared, the product of old thinking and the embodiment of everything that was wrong with the military.
>
> Myers asked Rumsfeld how many troops he thought might be needed. The defense secretary said in exasperation that he did not see why more than 125,000 troops would be required and even that was probably too many.
>
> … The plan, which had been regularly exercised in war games, reflected long-standing military principles about the force levels that were needed to defeat Iraq, control a population of more than 24 million, and secure a nation the size of California with porous borders. Rumsfeld's numbers, in contrast, seemed to be pulled out of thin air.[79]

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[77] Bob Woodward, *Plan of Attack* (New York: Simon and Schuster, 2004), 24-25.
[78] Ibid., 30.
[79] Michael R. Gordon and Bernard Trainor, *Cobra II* (New York: Pantheon Books, 2006), 4.

This exchange shows how intuitive judgments at the highest levels can override previous analytical efforts and restart those efforts under different assumptions and guidance.

On December 4, 2001, Rumsfeld held a conference with General Tommy Franks, Commander of U.S. Central Command, and Major General Gene Renuart, Gen. Frank's operations director, to discuss the Iraq war plan. The plan that Gen. Franks submitted for consideration called for the employment of 400,000 troops, a trimming of 100,000 from the previous version of the plan. Both Rumsfeld and Franks thought that this number was still too high. Importantly, they made this judgment intuitively, based on previous professional experience including the on-going war in Afghanistan rather than on a deliberate analysis or study:

> Franks began by saying that in the short period of time all he had been able to do was to tinker with Op Plan 1003. He had now trimmed it down to a force level of 400,000 over six months, having cut 100,000 and one month from the base plan… Franks and Rumsfeld looked at each other. They had already agreed that this was not where they were going to end up… "I'm not sure that that much force is needed given what we've learned coming out of Afghanistan," Rumsfeld said… "You'll get no argument out of me," Franks replied. "I don't think we'll have to do it either, but it is what it is," he repeated.[80]

Richard E. Neustadt and Ernest R. May, in *Thinking in Time*, describe, among other fascinating snapshots in time, the strategic orientation and decision making that took place in the Kennedy White House in October, 1962 at the early stages of what became known to history as the Cuban Missile Crisis:

> The group assembles in the cabinet room of the White House a little before noon. Experts from the Central Intelligence Agency explain the U-2 photographs. A few questions are asked about details. Then, in a measured southern accent, part rural Georgian and part Rhodes scholar, Secretary Rusk starts substantive discussion by setting forth two choices: give an ultimatum for withdrawal of the missiles or stage a quick surprise strike to destroy them. The crackling confident voice of McNamara asserts that "any air strikes must be directed not solely

[80] Woodward, *Plan of Attack*, 40.

> against the missile sites but against the missile sites plus airfields plus the aircraft… plus all potential nuclear storage sites." Joint Chiefs Chairman General Maxwell Tailor says clearly, "What we'd like to do… take 'em out without any warning whatever," but he tallies other military options including a naval blockade. After some back and forth, Kennedy himself, his famous Boston cadence soft-voiced and hesitating, sets the terms for the rest of the day's debate. He specifies three choices: "One would be just taking out these missiles. Number two would be to take out all the airplanes. Number three is to invade." His conclusion as the group recesses is, "We're certainly going to do Number One. We're going to take out these missiles."[81]

Here again is the familiar pattern of judgments being made intuitively with only a minor amount of specific knowns and little or no deliberate analysis. Neustadt and May continue with the story providing an interesting illustrative example of stored pattern sets and mental models coming into play:

> During the initial meeting analogies make an appearance. Saying that the Russians may be trying to draw attention to Cuba because they planned move elsewhere, perhaps against Berlin, Rusk speaks of the "Suez-Hungary combination," alluding to 1956, when Western preoccupation with Suez had made it easier for the Soviets to use tanks to crush a revolution in Hungary. Subsequently, "Suez" becomes shorthand for such a diagnosis.[82]

One last example taken from Neustadt and May to illustrate this point concerns the start of the Korean War:

> At 9:20 P.M. on June 24, 1950, a phone rang in the white clapboard, gingerbread Wallace house on North Delaware Street in Independence, Missouri, where Bess and Harry Truman were spending a summer weekend. Dean Acheson, the Secretary of State, was calling from Washington to alert the President that the North Koreans had just invaded South Korea.
>
> The next day President Truman flew back to the capital, his mind already made up. "[W]e are going to fight," his daughter, Margaret, wrote in her diary. Met at National Airport by Acheson, Under Secretary of State James Webb, and Secretary of Defense Louis Johnson, Truman said on the drive into Washington, "By God, I am going to hit them hard."
>
> … Truman within the week had ordered American warships, planes, and foot soldiers to rescue South Korea.[83]

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[81] Richard E. Neustadt and Ernest R. May, *Thinking in Time* (New York: The Free Press, 1988), 5.
[82] Ibid.
[83] Ibid., 34.

Strategy matters. While not attempting to cast judgment on the wisdom, or lack thereof, of these decisions, the illustrative examples presented above show that intuitive judgment is at the heart of strategy formation. Intuitive judgment comes before deliberate analytical study and thereby shapes the follow-on, more deliberate thinking and planning. This is how decision making occurs in the real world. Instead of shying away from this fact, and putting more and more emphasis on doing deliberate, analytical planning better and faster in the attempt to obviate intuitive orientation, deliberate planning must be complimented with greater skill in making the initial guiding and scope intuitive judgments.

Strategic Intuition

As has been shown above, all human decision making and problem solving starts with the spark of intuition that is in turn built up through previous experiences. Strategy formulation is no different. Clausewitz describes *coup d'oeil* thusly:

> Stripped of metaphor and of the restrictions imposed on it by the phrase, the concept merely refers to the quick recognition of a truth that the mind would ordinarily miss or would perceive only after long study and reflection.[84]

Clausewitz writes that only combat experience prepares leaders and their armies for the conduct of war.[85] But, in typical Clausewitzian dialectic style, since "a commander and his army will not always have it readily available," he goes on to include training as an important supplementary source of preparation:

> No general can accustom an army to war. Peacetime maneuvers are a feeble substitute for the real thing; but even they can give an army an advantage over others whose training is confined to routine, mechanical drill. To plan maneuvers

[84] Clausewitz, 118.
[85] Ibid., 141.

> so that some element of friction are involved, which will train officer's judgment, common sense, and resolution is far more worthwhile than inexperienced people might think. It is immensely important that no soldier, whatever his rank, should wait for war to expose him to those aspects of active service that amaze and confuse him when he first comes across them.[86]

Four relevant insights within this guidance are applicable to improving strategic intuition. First, as Clausewitz indicates, and is affirmed by current research, actual real world experience is the best source of preparation. A second insight is that every domain of effort has its own dynamics. For Clausewitz, violence and friction were two characteristics that distinguished the conduct of war from other endeavors and from theory. These dynamics are difficult to replicate in peacetime – hence the emphasis on combat experience. This leads to the third and forth insights: that maneuvers can be used to supplement combat experience, but they must replicate as closely as possible real world dynamics.

Applied to the subject of improving strategic intuition, these insights indicate that, first of all, strategists should be allowed to gain as much real world experience as possible in formulating strategy and receiving real world feedback as to its effectiveness. Since real world experience opportunities are in short supply, this experience should be supplemented with, in Clausewitz's terminology, "maneuvers." Elsewhere in *On War* Clausewitz speaks to the value of theory and military history,[87] but in the passage quoted above he is referring to the execution of tasks in as realistic an environment as possible. These "maneuvers" are more like exercises and rehearsals than schoolhouse training or education. Strategic decision games are one possible method of providing "maneuver" opportunities for developing strategic intuition.

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[86] Ibid., 141.
[87] Ibid., 163.

Dr. William Duggan, professor at Columbia Business School and frequent guest lecturer at the U.S. Army War College, defines strategic intuition as, "the selective projection of past elements into the future in a new combination as a course of action that might or might not fit your previous goals, with the personal commitment to follow through and work out the details along the way."[88] He explicitly recognizes the concept of combined intuition and analysis in decision making and problem solving:

> Field Manual (FM) 5-0, *Army Planning and Orders Production*, … presents "analytical" and "intuitive" as two different types of decisionmaking, for two different situations…
>
> This divide between analysis and intuition reflects an outmoded view of the human mind that science no longer supports. Recent advances in how the mind works have overturned the old idea that analysis and intuition are two separate functions that take place in two different parts of the brain. In the new view, analysis and intuition are so intertwined that it is impossible to sort them out. There is no good analysis without intuition, and no good intuition without analysis.[89]

Hence, strategy formulation necessarily relies, inter alia, on strategic intuition. This strategic intuition is best strengthened through direct real-world experience. Training can supplement real-world experience, but it must replicate the essential dynamics of the real world.

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[88] William Duggan, *Coup D'oeil: Strategic Intuition in Army Planning* (Carlisle, PA: Strategic Studies Institute, 2005), 4.
[89] Ibid., v.

Proposal for Strengthening Strategic Intuition

> The past few years have seen the fiascos associated with … [command and control] exercises together with the real world fiascos epitomized by the evacuation Saigon, Desert I, and others. The institutional response for overcoming these fiascos is: more and better sensors, more communications, more and better computers, more and better display devices, more satellites, more and better fusion centers, etc. – all tied into one giant, fully informed, fully capable C&C system. This way of thinking emphasizes hardware as the solution. I think there is a different way – a way that emphasizes the implicit nature of human beings.
>
> - John Boyd, *Organic Design for Command and Control*

The purpose of the preceding short analysis of intuition, Intelligent Memory, and the Recognition Primed Decision Model was not to argue for their formal adoption in Joint doctrine, but rather to demonstrate that some form of intuition is often useful in decision making and to illuminate leverage points for strengthening and improving it. Similarly, strategic intuition is a necessary part of strategy formulation. In many real-world cases, strategy was strongly shaped by intuitive judgments. Fortunately, intuition theory including the Recognition-Primed Decision Model and Intelligent Memory provide leverage points for learning how to apply intuitive decision making more effectively.

Based on his extensive research into intuitive decision making, Klein states that "the key to using intuition more effectively is experience – more specifically, *meaningful* experience – that allows us to recognize patterns and build mental models."[90] He has developed a training program for strengthening intuition skills that began with a course designed for Marine Corps rifle squad leaders and officers and has since been expanded

[90] Klein, The Power of Intuition, 37.

to include commercial and military pilots, fire departments around the country, and business executives.[91]

Klein points out that that teaching people new ways to make decisions is not the intent. Rather, what is needed is "a richer experience base and stronger models to use in making decisions."[92] The three elements of Klein's program are "to identify and understand the decision requirements of your job; practice the difficult decisions in context; and review your decision-making experiences."[93]

For Gordon, the professor of neurology and cognitive science who developed Intelligent Memory theory, "it [is] practice that [makes] Intelligent Memory work quickly, smoothly, and correctly."[94] Similar to Klein, Gordon is recommending practice – learning by doing – over direct formal study of decision making methods.

As previously presented within John Boyd's OODA model of decision making, orientation is the key to the process and is approximately equivalent to intuition. His solution to the question of how to make appropriate orientation possible is to "expose individuals, with different skills and abilities, against a variety of situations – whereby each individual can observe and orient himself simultaneously to the others and to the variety of changing situations."[95]

The key to improving strategic intuition, which in turn is critical to the formulation of effective strategies, is relevant strategic experience. However, real-world strategic learning opportunities are not available on a day-to-day basis for the bulk of

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[91] Ibid., 37.
[92] Ibid., 38.
[93] Ibid., 38.
[94] Gordon and Berger, 10.
[95] Boyd, *Organic Design for Command and Control*, 18.

current and future national security professionals. Also, gaining strategic experience on the job is not an ideal solution. As John Schmitt put it:

> Experience is the great teacher. Unfortunately, ours is a field in which experience can cost dearly. As Field Marshal Sir William Slim wrote of taking over British forces in Burma in 1942: "Experience taught a great deal, but with the Japanese with instructors it was an expensive way of learning." We are professionally obligated to do whatever we can to gain whatever experience we can without paying full price.[96]

Therefore, in order to bridge the gap between theoretical and historical study, on the one hand, and actual real-world experience, on the other, current and future national security professionals should develop their experience – their mental models and recognized sets of patterns – by participating in **strategic decision games**.

Wargames as Training

The first wargames, such as early versions of Go in China and Chess in India, were used primarily for entertainment.[97] In 1824, Lieutenant George Heinrich Rudolf Johann von Reisswitz of the Prussian Guard Artillery introduced a wargame called Anleitung zur Darstelling militarische manuver mit dem apparat des Kriegsspiels (Instructions for the Representation of Tactical Maneuvers under the Guise of a Wargame) which employed "topographical maps to portray the battlefield and rigid rules which specifically quantified the effects of combat."[98] This game appealed to Prussian Prince Wilhem, who then recommended it to the Chief of the Prussian General Staff, General von Muffling who, "so cool towards the idea at the beginning, became more and more interested as the game went on, until he exclaimed, "This is not a game! This is

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[96] Schmitt, 5.
[97] Wilber Gray, *A Short History of War Games* (accessed at www.nhmgs.org/articles/historyofwargaming.html on 27 Jan 2007)
[98] Ibid.

training for war! I must recommend it to the whole army.""[99] From there the idea of wargaming for training, and Reisswit's game specifically, gained irreversible traction:

> Reisswitz' work particularly impressed one Leutnant Helmuth von Moltke who, in 1828, founded a wargame club called the Kriegspieler Verein which soon began to publish its own periodical. This kept interest in wargames alive and when von Moltke became Chief of Staff in 1837, he officially pushed wargaming from the top. His influence had the desired effect and by 1876 another set of German wargame rules was published, this time by Colonel Julius Adrian Friedrich Wilhelm von Verdy du Vernois. Vernois' system was a "free" Kriegsspiel as opposed to Reisswitz rigid variety. This meant that most calculations and die rolling was eliminated in favor of an umpire who would determine results based on the situation and his own combat experience. Whether "free" or "rigid," however, wargames had become a mainstay of German military training.
>
> Other countries around the world became interested in German wargaming as a result of the 1870-71 Franco-Prussian War. In this conflict, the militia and reserve based armies of Prussia decisively defeated the totally professional army of France, then thought to have had the finest soldiers in the world. Many believed that wargames in part were used to successfully compensate for Prussia's reliance on an army of Reserven und Landwehren.[100]

Wargaming is intrinsic to today's U.S. military from evaluating potential courses of action during the planning process to underpinning the Department's joint experimentation effort in support of broad transformation efforts. These games tend toward the large and complex. Perhaps an extreme example is the Joint Forces Command 2002 experiment cum wargame Millennium Challenge 2002 (MC-02) which took over 2 years to plan and execute, involved over 13,500 military personnel,[101] and reportedly cost $250 million.[102] However, wargames do not have to be large and

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[99] Ibid.
[100] Ibid.
[101] USJFCOM Public Affairs. "Largest Military Experiment Ends" (Accessed at http://www.jfcom.mil/newslink/storyarchive/2002/pa081502.htm on 18 December 2006)
[102] NOVA, *Battle Plan Under Fire* (Accessed at http://www.pbs.org/wgbh/nova/wartech/nature.html on 18 December 2006)

expensive to be useful. An existing form of effective, simple, quick, and inexpensive wargames is the Tactical Decision Game.

Tactical Decision Games

Tactical decision games are used in a variety of domains such as military small-unit tactics, firefighting, and transit system design. Many of these efforts, such as those by the National Interagency Fire Center (2003) and the Transportation Research Board (Moon, 2003), refer back to work done by then Captain John F. Schmitt, U.S. Marine Corps, in the early 1990s. He developed and promulgated the idea of using tactical decision games to develop the decision making skills of USMC small-unit leaders. Then Major General Paul K. Van Riper, U.S. Marine Corps, captured the purpose and methodology of tactical decision games when he wrote:

> Military leaders are members of a profession that does not routinely practice its skills. Only constant war, a condition too abhorrent to even contemplate, would allow such practice. Thus, the honing and developing of military skills must be achieved in other ways. Field exercises, manual and computer-aided wargames, reading, and more recently simulators provide vicarious experience. Tactical decision games perform the same function, but at less cost in terms of time and resources. Their ease of use allows them to be employed in those odd minutes that are too often wasted. By design they are equally effective for corporals and generals. Used correctly they can reinforce other methods of education and training. Most importantly, they enable leaders and future leaders to gain experience that otherwise could not be gained. Only those who have challenged themselves with countless tactical situations in peacetime, only those who have refined their ability to make decisions and communicate clearly with subordinates, are prepared to command in war.[103]

The theory underpinning Schmitt's development of tactical decision games is captured in a short quotation from Robert Glaser and Michelene Chi out of the article

[103] John F. Schmitt, *Mastering Tactics: A Tactical Decision Game Workbook* (Quantico, VA: Marine Corps Association, 1994), x.

"The Mystery of Mastery" originally appearing in *Psychology Today*, July 1986 that Schmitt included in his 1994 workbook:

> The most important principle of skill performance is that skill depends on the knowledge base. In general, the more practice one has had in some domain, the better the performance, and from all indications, this increase in expertise is due to improvements in the knowledge base.[104]

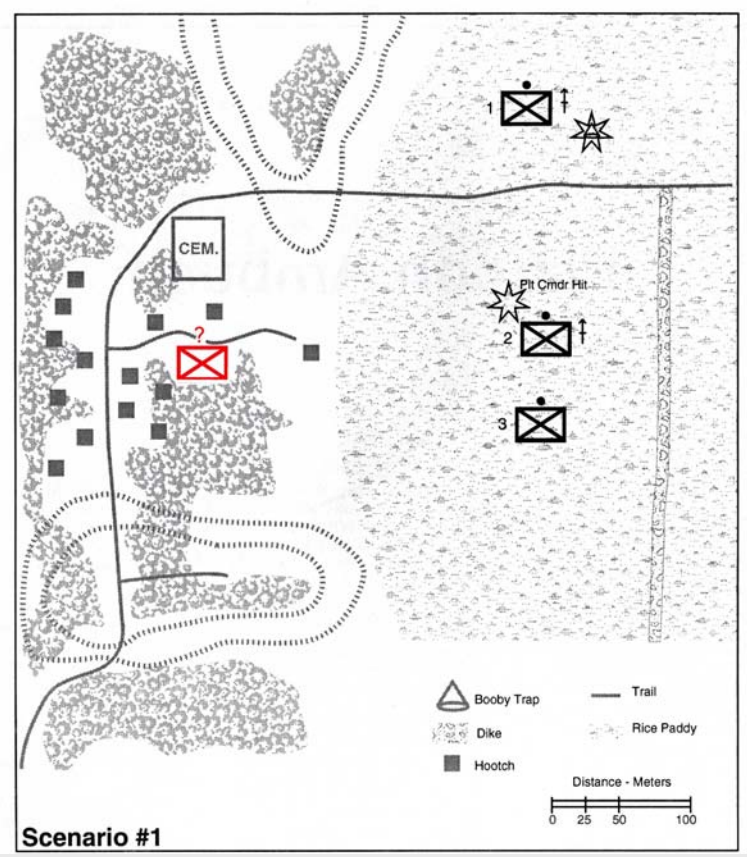
Hence, tactical decision games improve tactical decision making skills through practice which builds a knowledge base of patterns of tactical situations and approaches. In John Schmitt's words, "By repeatedly working through problems like these [realistic tactical situations] you will learn not only to make better decisions, but you will also learn to make decisions better – that is, more quickly and efficiently."[105]

The tactical decision game shown below is the first of fifteen included in Schmitt's 1994 "Mastering Tactics: A Tactical Decision Game Workbook." It neatly illustrates the purpose and method of Schmitt's approach to using these games to improve the intuitive tactical decision making ability in Marine Corps small unit leaders.

[104] Ibid., 2.
[105] Ibid., 2.

Scenario #1: Ambush at Dusk

Situation



You are the squad leader of 1st Squad, 1st Platoon, Company C, 1st Battalion, 9th Marines. You are fighting in a tropical area against guerrilla forces armed with small arms, light machineguns, and sometimes mortars and rocket-propelled grenades. Recently, Company C has been conducting patrols in a tropical region to counter increased insurgent activity. Today, your platoon with a machinegun squad attached is running a security patrol along a designated route. You are to attack and destroy any enemy forces you locate. Dusk is approaching within the hour. Your squad is the point of the platoon patrol column, some 200 yards forward of the platoon's main body, advancing north through a rice paddy, paralleling a 2-foot-high dike to your right. You have learned from experience not to walk on the dikes or trails because they are frequently booby-trapped; although uncomfortable, the rice paddies are generally the safest places to move. To your west is a village. East of the dike is another rice paddy and another small village.

As you squad crosses a trail at the northern edge of the paddy, one of your Marines trips a booby trap, suffering a severe leg wound. Suddenly, the enemy opens fire with automatic weapons from the village to the west, and the platoon commander is hit. The steady volume of fire from the village has 2d and 3d squads pinned down in the rice paddy. After tending to the lieutenant, the corpsman courageously makes his way forward under fire to your position, followed shortly by one machinegun team. The corpsman tells you the lieutenant is in a bad way. You wish you had a radio, but the platoon's radioman is pinned down near the lieutenant. The enemy fire against your position is sporadic; the two squads in the paddy are returning fire but appear unable to move. You estimate that the sun will disappear within a half hour. You have no communications with your platoon sergeant. What will you do?

Requirement

In a time limit of five minutes, draft the frag order you would issue to your team leaders and describe any additional actions you would take. Include an overlay sketch and provide a brief explanation of the rationale behind our action.

While there is no single correct solution, the follow-on discussion to this particular game could emphasis various tactical elements such as the importance of acting immediately, taking the initiative, the balance between protection and mission accomplishment, and the synergistic application of fire and movement.[106]

Tactical decision games are still used within the Marine Corps for developing tactical decision making skills. As an illustrative example, two recent tactical decision games listed on the Marine Corps Gazette web site as of 1 Feb 2007 are shown in the Appendix 1.

Another domain that makes extensive use of tactical decision games is firefighting. The National Interagency Fire Center has produced an excellent handbook on the use of tactical decision games to "provide firefighters with an opportunity to 1) practice the decision-making process, and 2) practice communicating that decision to others."[107] It describes the advantages of tactical decision games as providing "a simple, adaptable, and effective method of repeatedly challenging a firefighter with tactical situations that include limitations of time and information."[108] Appendix 2 provides a sample tactical decision game from this handbook. Within the domain of firefighting, other organizations also use these types of decision games for training. Appendix 3 provides a tactical decision game used for training by the Los Angeles Fire Department.

As a final example, and in order to illustrate the variety of domains that are employing tactical decision games, the Transportation Research Board of the National Academies published a report in 2003 entitled *Determining Training for New*

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[106] Ibid., 42-44.
[107] National Interagency Fire Center and the U.S. Marine Corps University. *Design and Delivery of Tactical Decision Games Sand Table Exercises* (Leadership Committee of the NWCG Training Working Team, 2003), 4
[108] Ibid., 4.

Technologies: A Decision Game and Facilitation Guide in which the tactical decision game methodology is applied to providing "an interactive learning experience to professionals in the transit industry engaged in making decisions about training during the implementation of new technologies."[109] This report evaluates the use of tactical decision games in this way:

> Generally, the purpose of decision games of this type is to provide the player with the experience of thinking about the high-level decisions and the consequences of different assessments and decisions throughout an operational process. The games are domain specific and are geared toward the experience of a particular planning process and its challenges.[110]

Decision games are a widely used mechanism for training leaders across many diverse domains to improve their ability to make high value intuitive decisions through the development of large sets of applicable patterns of situations and solutions from which to draw on as needed. One domain that has not widely adopted this technique is strategy formation. And yet, as argued above, strategic intuition is fundamental to good strategy.

Strategic Decision Games

> Tell me and I will forget, show me and I may remember, but involve me and I will understand.
>
> – Chinese proverb

In order to bridge the gap between real-world experience, the best source of experience but of limited availability, and the studying of theories and history, which are certainly useful but far removed from the actual dynamics of strategy, **strategic decision**

[109] Transit Cooperative Research Program, *Determining Training for New Technologies: A Decision Game and Facilitation Guide* (The Federal Transit Administration, 1996), 16
[110] Ibid., 16.

games should be developed and employed as a mechanism for strengthening the strategic intuition of current and future national security professionals.

Just like tactical decision games, strategic decision games should focus on developing intuitive decision making ability. Hence, they should share many characteristics with established tactical decision games. The format, if not the content, should be simple and straightforward. Similarly, quick and helpful feedback, the after action review, is critical.

Certain design elements from established methods of conducting tactical decision games can be applied to the construct of strategic decision games. These include elements from John Schmitt's approach, where tactical decision games[111]

- Improve decision making skill through building sets of mental models and patterns of situation as well as "opportunities and options by exposing the learner" to a large set of different relevant situations
- Can be "simple, fun, and effective"
- Focus on applying concepts to specific situations
- Have no "schoolbook" solutions
- Incorporate timely and useful feedback on proposed solutions
- Require a description of the situation, a visual graphic, and a solution requirement statement
- Require that the solution include both the recommended course of action and the reasoning behind it (e.g. principles applied, important factors and considerations, assumptions made, etc.)

[111] Schmitt, 2-5.

- Do not provide complete information (this is just as much of an eternal truth at the strategic level as at the tactical, perhaps even more so)
- Can utilize solitaire, group, and two-sided play formats

The National Interagency Fire Center's *Design & Delivery of Tactical Decision Games/Sand Table Exercises* primary design recommendation is that "TDGS are Simple…Keep them Simple." [112] This document also includes design considerations very similar to those listed above with an additional emphasis on after action reviews where the "players analyze or discuss their solution as a means of drawing out the lesson of the experience."[113]

These design elements should translate effectively for the design of strategic decision games with minor adjustment. However, since the focus is on developing strategic intuition, there are differences too. One such difference is times pressure. The time horizon for making low level tactical decisions is often measured in minutes. Hence, tactical decision games are often constructed in such a way as to give the participant only a few minutes to understand the situation presented and make a decision. Strategy formulation, on the other hand, while it may have its own internal time pressures, generally takes place over a longer time period. Therefore creating time pressures within the decision game will not be as important.

Another factor that may not translate directly from tactical decisions games to strategic ones is the use of visual graphics. Visual graphics are recommended to be used in tactical decision games in order to convey situational information to the participant.

[112] National Interagency Fire Center and the U.S. Marine Corps University, 6.
[113] Ibid., 6.

The visual element is also important as part of the participant's explanation of his solution because, "It is much easier to be vague in words, hiding the fact that you haven't thought the problem all the way through, than in a diagram. Diagrams are precise. In order to be able to draw a diagram of your concept, you must have thought the concept through clearly."[114] However, the nature of tactical situations makes them more amenable to graphical representations than do strategic ones. While those strategic decision games where the problem situation is visually representable certainly should include a graphic and encourage the participant to provide similar graphics as part of their explanation of their solution, it should not be required.

Klein, in *The Power of Intuition*, presents one method of generating the content for decision games. The first step is to identify critical, difficult, and frequent decisions or judgments. Then, for each of these, identify:

- What makes this decision difficult?
- What kinds of errors are often made?
- How would an expert make this decision differently from a novice? (Identify cues and strategies.)
- How can you practice and get feedback to help you make this decision next time?[115]

Other sources for content include current, recent, and historical strategic situations. The advantage of historic situations is that they provide insight into the results of the strategic courses of action actually employed.

The Use of Models and Simulations

One strength of tactical decision games is their simplicity. In their standard simple-yet-effective form, tactical decision games consist of a short written situation and

[114] Schmitt, 3-4.
[115] Klein, *The Power of Intuition,* 41.

an accompanying visual graphic. This allows them to be conducted in a very short amount of time – 10 to 15 minutes is not unusual – and also to be very mobile. Tactical decision games can take place equally well in a classroom or lunch room, during a bus ride, or over the internet via a simple web page. The sophistication is in the depth of insight gained by the participants through the discourse stimulated by the game, not in the presentation of the tactical situation.

Strategic decisions games should also take advantage of the strengths of this simple format for the same reasons, but other formats can be used as well. When advantageous, appropriate models and simulations could be employed to create a more sophisticated virtual strategic environment with greater realism and depth than text and a static visual graphic alone can provide. These models and simulations would have to re-create the political, military, and economic factors of the envisioned strategic situation. One model that USJFCOM is currently investigating that could fulfill this role is the Synthetic Environments for Analysis and Simulation (SEAS), which incorporates multiple domains such as social, political, economic, business, and epidemiological.[116] Various off-the-self commercial games such as "Diplomacy," "Balance of Power," and "Conflict: Middle East Political Simulator" could also be investigated and adapted for this purpose. These games all represent the political, military, and economic aspects of different strategic situations to various degrees.

A simulation supported strategic decision game would of course be more expensive to produce, and be less portable, but it would provide the advantages of increased verisimilitude leading to a more compelling experience as well as supporting

[116] Simulex, Inc., *Synthetic Environments for Analysis and Simulation* (Accessed at C:\Documents and Settings\defoorj\My Documents\JAWS\JAWS Thesis\Research\Simulex, Inc_ Synthetic Environments for Analysis and Simulation™.htm on 18 Jan 2007).

the adjudication of multiple move games. Also, these games could then also be used as a test bed for strategic level visualization methods.

Channels of Distribution

Strategic decision games could be distributed via schoolhouses, existing periodic publications, and the internet. The key will be to choose the vector that provides access to the appropriate audience. The National Defense University system is, of course, one center of gravity for current and future national security professionals. Getting strategic decision games incorporated into the curriculum would be an ideal solution.

Example Strategic Decision Game

For illustrative purposes, an example strategic decision game will now be derived from historical examples and presented. The first step in creating a strategic decision game is to identify a critical reoccurring decision in the strategy formulation process on which to focus. For this example, the question of the application of military force in a specific situation of moderate threat will be explored. Next, an appropriate strategic situation has to be developed. For the question of the application of military force in the context of moderate threat, several recent historical examples could serve as sources for the strategic situation. The 1961 Bay of Pigs invasion, the 1962 Cuban Missile Crisis, the 1980 Iranian hostage rescue attempt (Operation Eagle Claw), the 1983 invasion of Granada (Operation Urgent Fury), and the 1989 U.S. invasion of Panama (Operation Just Cause) are all relatively recent examples of the U.S. making a strategic decision to apply military force at various levels and with various levels of success. Finally, the specific

task for the participants must be identified. In this case, the requirement could be along the lines of either "if and how to apply military force" or "which elements of national power should be applied and to what end."

The resulting example strategic decision game "Venezuelan Crisis, 2009" is presented below.

Example Strategic Decision Game: Venezuelan Crisis, 2009

Situation

Tension remains high between Venezuelan president Hugo Chavez and the new U.S. administration. In fact, they have recently taken a turn for the worse. After a failed attempt by U.S. oil companies to regain control of nationalized assets in VZ, anti-U.S. sentiment in VZ runs high fueled on by President Chavez's demagoguery. Two weeks ago, Columbian guerrilla group FARC-EP kidnapped a dozen American tourists in Colombia and were pursued by the Columbian military into Venezuela. VZ has publicly stated that they would recover the Americans, but has made no observable efforts to this effect. The American media and public, and hence Congress, are calling for immediate action. The foreign press in general is calling for restraint and Islamic news outlets are hailing this event as one more sign of American incompetence.

Considerations

- FARC has a previous history of killing Americans in Venezuela after kidnapping them in Colombia
- U.S. remains VZ's largest market for its oil exports
- China is developing infrastructure for increased import of VZ oil
- Anti-Americanism on the rise in Latin America
- U.S. remains involved in nation building in Iraq and Afghanistan
- VZ continues to strengthen its political ties to Iran and North Korea, both of whom are still at odds with the U.S. and are likely developing nuclear weapons

Requirement

You are a strategist on the National Security Council. The President has called for a meeting with the National Security Advisor to discussion potential approaches to resolve this crisis. The NSA has asked for your recommendations. You have 30 minutes to prepare. What do you recommend?

After the participant(s) have developed their solution to this situation, the reasoning behind their solution should be explored. Some of the areas for discussion might include:

- What were your key considerations?
- What broader impacts either within the region or outside of it were considered important?
- What were the key "unknowns" and how should the U.S. go about resolving them?
- What factors were important in making the decision that you did?
- What role did analogies to historical precedents play?

The after action review session should focus on the decision making process, not the specific recommendation developed.

Benefits

According to Klein, this type of intuition training will help the participant:

- Size up situations more quickly and with less effort.
- Recognize problems and anomalies more quickly.
- Feel confident that the first option [thought] of will usually be a good one.
- Have a good sense of what is going to happen next.
- Avoid getting overloaded with data.
- Be calm in the face of time pressure and uncertainty.
- Find alternative solutions when a plan runs into difficulty.[117]

More specifically for strategic decision games, benefits should include improved readiness for intuitive decision making, increased breadth of experience, and an improved ability to think ahead to possible unintended consequences. Additionally, strategic decision games conducted in a group will improve interagency teamwork through

[117] Klein, *The Power of Intuition,* 37.

increased cross-agency cultural understanding and improved trust. Finally, if based on actual past strategic situations, taking part in many games across time will allow the participants to increase the breadth and depth of their historical knowledge.

Impact on Joint Doctrine

Although Joint doctrine recognizes intuition and creativity, it heavily emphasizes analytical decision making. Analytical decision making is appropriately presented as the predominate element of decision making in planning and is also important to strategy formulation. Still, intuition plays an important role that is neither explored nor explained to sufficient degree in Joint doctrine.

The key joint publications for planning and operations are *Joint Publication 1 (JP 1): Doctrine for the Armed Forces of the United States*; *Joint Publication 3-0 (JP 3-0): Joint Operations*; and *Joint Publication 5-0 (JP-5-0): Joint Operation Planning*. These joint publications present one decision making model, one system, and one process. The Joint Operation Planning and Execution System (JOPES) is described as the "principal DOD system for translating policy decisions into operation plans and orders."[118] This makes JOPES an important element of the strategy formulation process. The joint operation planning process (JOPP) is described as "a less formal [than JOPES] but proven analytical process, which provides an orderly approach to planning at any organizational level and at any point before and during joint operations."[119] JP 1 states that "JOPES and JOPP share the same basic approach and problem solving elements"[120]

[118] Peter Pace, *Joint Publication 1: Doctrine for the Armed Forces of the United States* (Chairman of the Joint Chiefs of Staff, 2006), IV-21.
[119] Ibid., IV-21.
[120] Ibid., IV-21.

– the decision model. JP 3-0 and JP 5-0 then go on to describe this decision model as being composed of the following steps:

Step 1: Planning Initiation
Step 2: Mission Analysis
Step 3: Course of Action (COA) Development
Step 4: COA Analysis and Wargaming
Step 5: COA Comparison
Step 6: COA Selection and Approval
Step 7: Plan or Order Development

This decision model is primarily analytical in nature as the joint publications accurately point out. However, as shown in previous sections of this paper, intuition plays an important role in any decisions making process. For example, the initial seeds for possible relevant course of action will come from the intuition of the commander or staff. The criteria by which these courses of action will be evaluated and compared will largely come from intuition.

JP 5-0 implicitly recognizes the importance of the intuitive element within this analytical process. Before a great deal of analysis has taken place, indeed to enable the analysis, the Joint Force Commander, "helps guide initial systems analysis by describing strategic and operational objectives and both desired and undesired effects as part of the commander's planning guidance."[121] Since these elements occur before the analysis, they are, by default, intuitive.

JP 3-0 directly, if briefly, acknowledges intuition and creativity. It describes operational art as the "application of creative imagination by commanders and staffs – supported by their skill, knowledge, and experience – to design strategies, campaigns,

[121] Peter Pace, *Joint Publication 5-0: Joint Operation Planning* (Chairman of the Joint Chiefs of Staff, 2006), III-15.

and major operations and organize and employ military forces."[122] JP 3-0 goes on to explain that operational art requires "broad vision" and that commanders draw on "judgment, perception, experience, education, intelligence, boldness, and character to visualize the conditions necessary for success."[123]

In the section on operational design, JP 3-0 states that, "While operational art is the manifestation of informed vision and creativity, operational design is the practical extension of the creative process. Together they synthesize the intuition and creativity of the commander with the analytical and logical process of design"[124] [emphasis added]. Thus, joint doctrine states that operational art includes intuition and creativity.

While intuition is implicitly recognized as fundamental to operational art and planning, it is not explicitly recognized nor is its development and application discussed. The impact of treating intuition at the implicit rather than the explicit level is that it limits the institutional importance and energy directed at developing intuitive decision making skills. Joint doctrine should explicitly recognize the importance of intuition in order to drive the development of this important skill in our current and future leaders.

Impact on Joint Officer Development

The 2005 *CJCS Vision for Joint Officer Development* articulates Chairman of the Joint Chiefs of Staff General Pace's vision for "the development of strategies and approaches that will in turn produce the joint leaders required by the Nation."[125] This vision is organized around three broad overarching competencies required of joint

[122] Peter Pace, *Joint Publication 3-0: Joint Operations* (Chairman of the Joint Chiefs of Staff, 2006.), IV-3.
[123] Ibid., IV-3.
[124] Ibid., IV-3.
[125] Peter Pace, *CJCS Vision for Joint Officer Development* (November, 2005), iv.

warfighting leaders. These leaders must be strategically minded, critical thinkers, and skilled joint warfighters. The relevant aspects to these competencies are as follows:

> - **Strategically Minded**: …Must be self-aware and at ease with decision making in the absence of complete information… Must be able to use communication skills to build teams at the strategic level through persuasive influence, collaboration, negotiation, and consensus building.
> - **Critical Thinker**: A leader who can decisively and intelligently make decisions within the context of understanding… Has the ability to recognize patterns and changes and is comfortable with uncertainty and ambiguity. Versatile and creative, able to develop innovative solutions, thinking in time and context within the complex environment to bring about desired effects. Thinks in terms of systems/linkages (effects) and is an expert learner.
> - **Skilled Joint Warfighter**: A leader who is able to conduct campaigning and statecraft and understand the role of war and politics…[126]

The *CJCS Vision for Joint Officer Development* also describes what it calls the "continuum of joint learning"[127] as being composed of "training, education, experience, and self-development opportunities."[128] While all four of these development mechanisms are germane, self-development is particularly relevant to the topic at hand, namely developing a tool by which our future national security professionals can bridge the gap between formal education and real-world experience in order to enhance their strategic intuition. Key elements of self-development are described in this way:

> Self-study in the pursuit of knowledge accelerates an officer's development as well as allows flexibility and accommodation to individual circumstance of need, situation, and desire. Every military leader, particularly those whose job it is to practice war, must be given every opportunity to study war. Learning as a life-long process should be supported by unfettered and continuous access to the best and most inclusive program of war studies. Contemporary distance learning technologies permit military students to learn in groups and virtual seminars even when on the job or in some distant theater of war. Every officer who takes advantage of the opportunity to learn must receive recognition and professional reward for the quality of that learning.[129]

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[126] Ibid., 4.
[127] Ibid., 4-5.
[128] Ibid., 5-7.
[129] Ibid., 6.

The *CJCS Vision for Joint Officer Development* also presents a mechanism for supporting self-development – the Joint Learning Portal. Described as a "logical outgrowth of the current Joint Knowledge Development and Distribution Capability (JKDDC) aspect of Training Transformation,"[130] the Joint Learning Portal is envisioned as a "virtual schoolhouse"[131] that will enable non-resident joint individual training and Joint Professional Military Education. This portal could also "serve as a forum for peer-to-peer joint learning and a repository for sharing joint lessons learned."[132]

The *CJCS Vision for Joint Officer Development* sufficiently recognizes the requirement to develop intuitive decision making skill via its description of the three competencies "strategically minded," "critical thinker," and "skilled joint warfighter." It also provides a sufficient discussion of training and educational requirements to develop these competencies. Strategic decision games, as well as similar games at the other levels of war, align well to its overall purpose and would fit into and enhance the self-development element of its "continuum of joint learning." As these developmental programs are formed, decision games should be considered for inclusion.

Relevance at the Operational Level

Intuitive decision making skills are arguably just as important at the operational level of war as they are at the tactical and the strategic levels. It has even been argued that "the theater commander stands most to gain from the intuitive decision making

[130] Ibid., 5.
[131] Ibid., 5.
[132] Ibid., 5.

process."[133] Decision games could be employed to improve the skills of operational level staffs and commanders just as at the other levels of war. One readily available vector for the dissemination of operational level decision games is the Joint Forces Staff College publication *Campaigning*, which is focused on advancing the art of joint campaign planning.

Conclusion

> ...the seeds of wisdom that are to bear fruit in the intellect are sown less by critical studies and learned monographs than by insights, broad impressions, and flashes of intuition.
>
> - Clausewitz, *On War*

Research into how decisions are made in real world situations indicates that they are made through a synthesis of analysis and intuition. Research also shows that intuition is best developed through relevant real-world experience and feedback. Experience enables the development of the mental models that provide the understanding of the dynamics of how things in a particular domain work. However, the nature of decision making at the strategic level of war makes gaining this experience problematic, limiting the opportunity to develop a robust set of mental models.

Fortunately, practical methods demonstrated at the tactical level can be adapted to address this problem at the strategic level. Tactical decision games are used in a variety of domains to develop intuitive decision making skills of small-unit leaders. The theory underpinning the effectiveness of tactical decision games is that, within a specific domain, practice improves performance through improvements in the knowledge base.

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[133] GL Kerr, "Intuitive Decision Making at the Operational Level of Command" (*The British Army Review*, Number 108), 6.

In other words, tactical decision games improve tactical decision making skills by building a knowledge base of patterns of tactical situations and potential solution approaches.

Joint doctrine recognizes intuition but overwhelmingly emphasizes analytical methods. The failure to place an appropriate emphasis on intuition inhibits the level of effort directed at developing intuitive decision making skills. Joint doctrine should more clearly emphasize the importance of intuition in order to drive the development of this important skill.

The implementation of strategic decision games could be one element in the development of strategic intuition skill, filling the gap between limited opportunities for real-world experience and formal education in strategic theory and history. Strategic decision games must focus on developing intuitive decision making ability through expanding the participant's set of mental models of strategic situations and potential courses of action with their various possible outcomes. Benefits of an intuition training program such as strategic decision games include being able to more quickly grasp the essential factors of a situation, including problems and anomalies, as well as having a sense of what is going to happen next. Benefits will also include increased breadth of experience of strategic possibilities and improved interagency teamwork through increased cross-agency cultural understanding and improved trust. Finally, if based on actual past strategic situations, the games will allow the participants to increase the breadth and depth of their historical knowledge. Therefore, strategic decision games should be developed and employed as a mechanism for strengthening the strategic intuition of current and future national security professionals.

Appendix 1: Example Tactical Decision Games from the Marine Corps Gazette Web Site

Tactical Decision Game #06-8
Marine Corps Gazette Web Site

Dilemma in Intopia

**by SGT Kristian Bregaard,
Norwegian Army**

Situation
You are a U.S. Marine infantry squad leader operating in the country of Intopia. At the moment there is a lot of tension in Intopia. For the last 2 weeks there have been several terrorist attacks against civilians and the peacekeeping allied forces. One of your supply convoys is about to move from the city of Sagados to Nafiq, a distance of 35 miles. There are five trucks in the convoy loaded with ammunition and explosives.

You are sent with your squad to the little village of Beggina, halfway between Sagados and Nafiq. Your mission is to establish a covert observation post (OP) in Beggina in order to secure the road through the village from attacks from terrorists or rebels against the convoy. Because it gives the best observation angle of the village, you have placed your OP in the barn next to House 12.

At 1408 the convoy reports that they are approximately 7 minutes west of Beggina. Two minutes later one of your Marines reports that he observes two gun barrels pointing from a window on the fourth floor of the southern side of Building 2. The barrels are pointing westward. Only the gun barrels are visible, so a clean shot from the barn is impossible. South of Building 2 there are 10 children at play. You try to raise your parent unit on the net without any luck. A change of battery and antenna gives no positive result.

Requirement
In a time limit of 5 minutes, write down your orders and the reports that you will make to higher headquarters. Provide an overlay of your plan of action. Include the rationale for your actions.

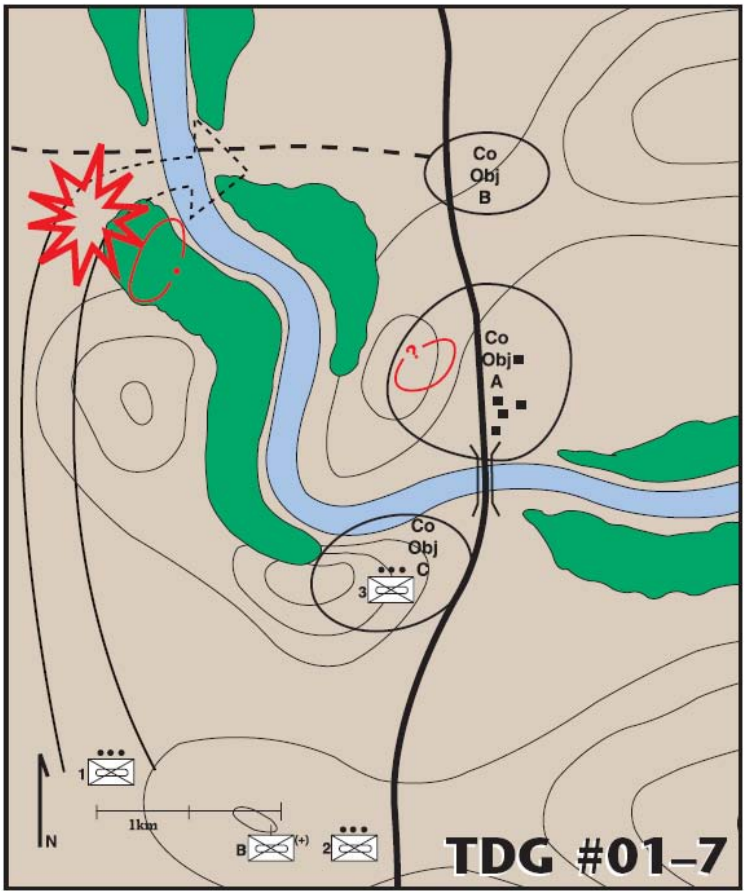
Tactical Decision Game #01-7
Marine Corps Gazette Web Site

The Commander's Intent

by GySgt Timothy D. Graves

Situation

You are the commanding officer of Company B, Battalion Landing Team (BLT) 1/2. Your company's mission is to secure the bridge crossing the Minse River. The enemy is reported to be a reinforced rifle platoon holding the key terrain surrounding the bridge. They are well organized and possess some automatic weapons but have no indirect fire capabilities. A section of 81mm mortars is directly attached to your company and is embarked on your assault amphibious vehicles (AAVs). You have direct support from the Marine expeditionary unit's artillery battery. Charlie Company is in reserve approximately 15 km south of your position.



According to your concept of operations and the company's scheme of maneuver, 1st Platoon, with machineguns attached, will envelop the enemy and establish a support-by-fire position in the vicinity of company Objective B. The company's 60mm and attached 81mm mortars will provide both suppression and obscuration on the enemy position southeast of the bridge (company Objective C). 3d Platoon will assault this enemy position. 2d Platoon will assault the enemy position north of the bridge (company Objective A). 2d Platoon is the main effort. You intend to utilize both indirect and direct fires to support 2d Platoon's maneuver to company Objective A.

You have begun your attack, and your fires upon Objective C have been effective. You then receive this report from 1st Platoon: "Contact with enemy. Squad-sized unit has immobilized one of our AAVs. The platoon commander and the first squad leader are seriously wounded. The enemy squad has withdrawn now that we have returned fire." This report from the 1st Platoon platoon sergeant continues: "We are about 700 meters from our river crossing point and about 4 to 5 clicks from company Objective B."

3d Platoon has reached Objective C and has begun their consolidation. Your 60s have ceased fire. 81s have shifted to provide obscuration for 2d Platoon, and artillery suppression of company Objective A is about to cease. Your original commander's intent was "to isolate and destroy the enemy in order to secure the bridge for the BLT's movement north."

Requirement

In a time limit of 3 minutes, issue your orders to your team leaders. Provide a brief rationale for your actions and a sketch of your plan.

Appendix 2: Example Tactical Decision Game from the National Interagency Fire Center

Design and Delivery of Sand Table Exercises Handbook

EXAMPLE TDGS/STEX #1[134]

TRAINING OBJECTIVE:
Given the scenario below, the players will practice the decision-making process by deciding how the fire can be safely approached and then verbally communicate their decision to the appropriate individuals.
(Do not read this objective to the players before the exercise. It helps if this objective is not revealed to experienced players).

SCENARIO:
You are the leader of an initial attack module (SELECT: Engine, IHC squad, Helitack crew, SMJ Stick, etc.) being ordered for a dry lightning storm that has ignited several fires in your response area. The module has not worked together for very long but you know they have been trained well…you did it yourself. This is the module's first fire and everyone is excited about getting out and fighting some fire. The module consists of four firefighters – yourself, one second season firefighter, and two rookie firefighters. You are equipped with one chainsaw, two backpack pumps, a full compliment of hand tools, and a two-way radio.

The Fire Management Officer is swamped; several of the new fires appear to be growing larger. He calls you in and gives you the specific location information for the fire. His instructions are to "Keep this one small, I'll try to get you some help if you need it, but for now you are on your own. Call the dispatcher with a size-up and keep me posted. Hey! Let's be careful out there."

As you travel to the fire (SELECT: Mode of travel consistent with module type) you note the weather and fuel conditions (DESCRIBE: Typical local conditions for mid-season and map distance scale). Also during your travel out to the fire you hear the Aerial Recon tell dispatch that your fire looks to be about a ½ acre in size with some flame showing. After walking about ½ mile from your drop off point traveling south through a saddle, you and your module are finally able to see the smoke from the fire, it is below you and to your right (DESCRIBE: How the smoke column looks). The time is 1000, what instructions will you give?

EXECUTION:
Allow 5 minutes for the players to decide on their course of action.

Select player(s) to communicate their decisions to their subordinates (other players assuming the roles of crewmembers).

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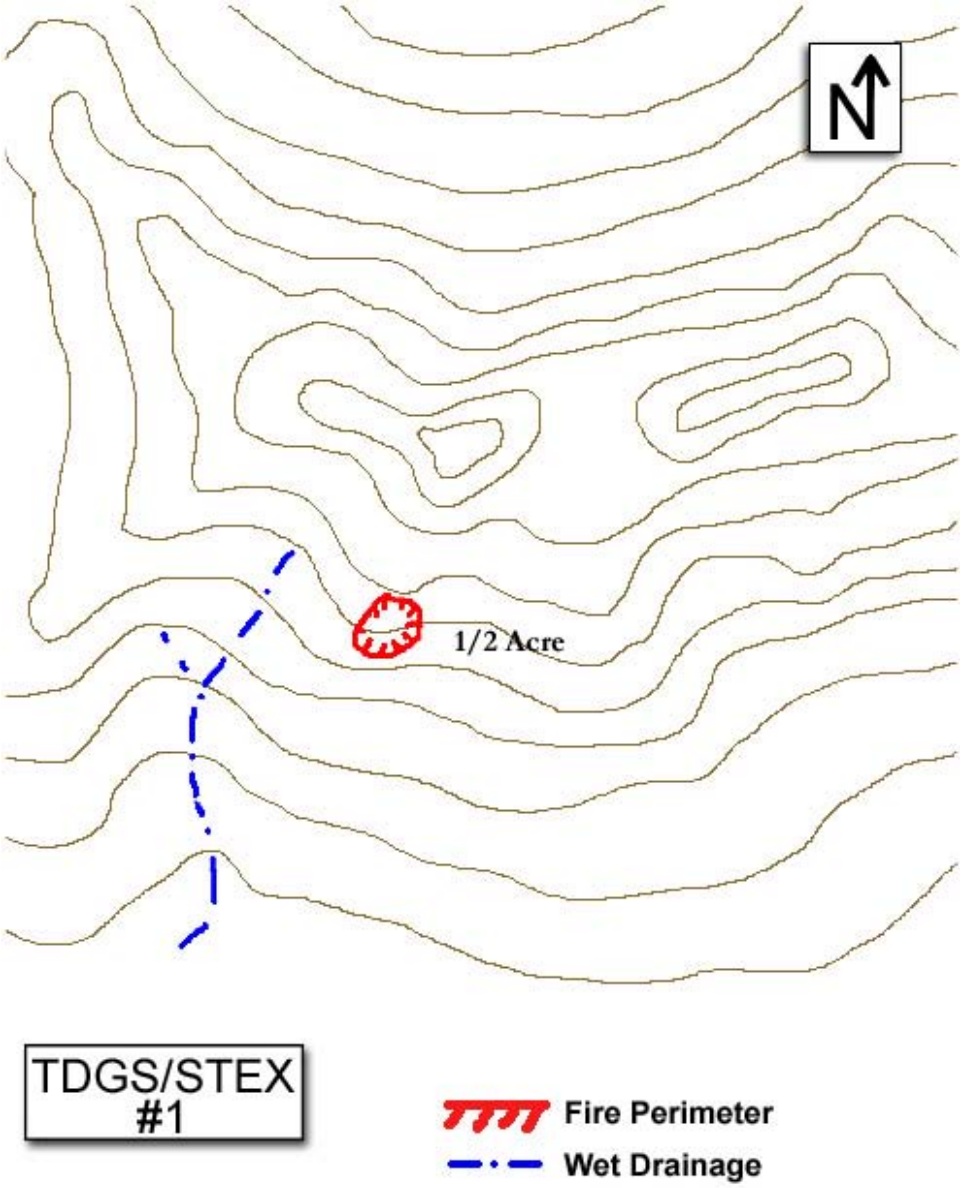
[134] National Interagency Fire Center, *Design and Delivery of Tactical Decision Games Sand Table Exercises* (Leadership Committee of the NWCG Training Working Team, 2003), 17.

The “Murphy’s Law Suggestions” listed below can be added as “What Ifs” at any time during the scenario to raise the stress level of the leader or use one of your own:

- The fuels make foot travel difficult or fuels are continuous cured grass
- Time of day is late in the burning period
- Cannot see any sign of the fire during the approach
- Wind shifts or increases
- Other crewmembers voice differing opinions
- The facilitator role plays a concerned Dispatcher or FMO demanding feedback

AFTER ACTION REVIEW (AAR): Conduct AAR with focus on the training objective.



Appendix 3: Example Tactical Decision Game from the Los Angeles Fire Department

Auto Fueling Station[135]

You are the Captain assigned to Engine 91. It is approximately 1700 hours. You are dispatched alone to an intersection on a traffic accident. Traffic is congested on the way to the incident. Enroute you notice a small "loom-up" in the general vicinity of the address. Upon arrival at the intersection, you observe a small fire near the rear of a white SUV. The SUV is located in an auto fueling station (see above photo). From your vantage point, you cannot tell exactly what is on fire. As you get closer you realize that there has been some sort of traffic accident. You observe a two-car traffic accident. A small compact car has collided into the white SUV. All occupants of the compact car are out and not injured. As you exit your apparatus, a hysterical female runs up to you and states that her two year old daughter is in the white SUV and is still in her car seat. The impact of the accident has sheared off the gas pump. There is a heavy odor of fuel in the air. The auto fueling station is congested with cars and people because of low gasoline prices.

Captain Guidelines:

- **Describe your fire suppression tactics**
- **Describe emergency systems typically required in auto fueling stations**
- **Describe tactics you would use to rescue the two year old**
- **What additional companies would you order?**

[135] LAFD Tactical Training Group, *Tactical Decision Games (*accessed at http://www.lafdtraining.org/tdg/tdg17/TDG17.pdf on 22 Jan, 2007).

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