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Traits and Techniques for Restoring Rigor to
U.S. Grand Strategy**

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James Blackwell and James Thomason

There is no reason to believe that strategic success in the future will not depend on the same qualities that made strategy of the past successful: proactive rather than reactive choices, nimbleness rather than rigidity, and discipline rather than improvisation in pursuing chosen goals.¹

History usually makes a mockery of our hopes or our expectations.²

Overview

There are of course many very important choices to be made in developing a great grand strategy, such as what alliances to honor, how to honor them, how best to build strong international partnerships to advance shared interests and values, and how to decide what conditions should be in place before the United States intervenes overseas unilaterally, to name a few. Not all of these choices, indeed likely very few of them, can be based on rigorous evidence alone. But the overriding theme of this article is that – wherever possible – U.S. strategists should seek to ground their ways and means in the most rigorous evidence. We have confidence in our government’s ability to develop facts using rigorous methods in test and evaluation processes for many national security technologies (such as radar, stealth, precision-guidance systems, etc.), and DoD has demonstrated remarkable (though hardly perfect) acuity at developing and adapting courses of action for military campaigns. However, we believe we need to work harder to do as well at the art of developing and adapting grand strategy. Toward that end, this article offers some proven methods and techniques for helping decision makers to determine as efficiently and effectively as possible what the critical facts are as well as what is likely to work – and what is not – to promote our strategic ends. We then offer several prescriptions for centering the development of an enduring American Grand Strategy: focus incessantly on the most critical elements of all – what we call the HEART – and ensure that the strategy is a GLOBAL one. Such ends are timeless American ideals, and they should transcend, synthesize, and rise above political, economic, social, and cultural special interests. We conclude with examples of analytic techniques that work in adapting grand strategy towards those ends.

Introduction

There have been a gazillion proposals over the past several years for a new U.S. grand strategy. Some experts assert that the demands of 21st century strategy are so confounding that we should simply learn as we go, innovate, and adapt along the way; just let the strategy thus emerge.³

¹ Richard Hart Sinnreich, “Afterword,” in *Successful Strategies: Triumphant in War and Peace from Antiquity to the Present*, Williamson Murray and Richard Hart Sinnreich, editors, Cambridge: Cambridge University Press, 2014, loc. 13463.

² Robert Jervis, “The Future of World Politics: Will It Resemble the Past?” *International Security* Winter 1991/92 (Vol 16, No. 3), 39.

³ Ionut C. Popescu, “Grand Strategy vs. Emergent Strategy in the Conduct of Foreign Policy,” *The Journal of Strategic Studies*, 10 February 2017, <http://dx.doi.org/10.1080/01402390.2017.1288109>.

Serious theorists have categorized these contending strategies into various summary types: primacy versus restraint, or Jacksonian versus Hamiltonian.

Richard Hooker typifies the primacy school of strategy, although he prefers the label “preponderance.” This theory is characterized by the role asserted by a globally dominant power to sustain the functioning of the international system to maximize its opportunities to achieve its values.⁴ A rising chorus of voices is challenging this primacy view, asserting that the strategic environment has so eroded American power that we can no longer expect to be able to exert predominance.⁵ Some analysts prefer to call this “offshore balancing.” We should, these theoreticians argue, pursue a strategy of restraint.⁶ Richard Burt advocates a grand strategy of “great-power balancing” to deal with what he views as “the main challenge to American primacy in the twenty-first century: the emergence of China as a potential peer competitor.”⁷ These are essentially arguments over the ways and means of grand strategy.

From a somewhat different perspective, Humanities Professor Walter Russell Mead argues that U.S. grand strategy has alternated between “Hamiltonian” and “Jacksonian.”⁸ This way of categorizing grand strategy has more to do with strategic ends than with ways or means. Hamiltonians, according to Professor Mead, assert that the U.S., in order to protect and promote its interests, must exert its power in order to create and sustain a global liberal order. The Jacksonian grand strategy, in contrast, focuses on the protection and preservation of the individual citizen’s well-being, exerting its power only when threatened by attack.

The fact of the modern era is that we will not soon see a time when strategy is reduced to a simple governing principle. In the past, it seemed to many that if the grand strategy could take care of the greatest threat, then other threats would be treated as lesser included cases. Today we

⁴ R.D. Hooker, Jr. *The Grand Strategy of the United States*, Washington D.C.: National Defense University Press, October 2014. <http://ndupress.ndu.edu/Portals/68/Documents/Books/grand-strategy-us.pdf> See also Hal Brands, Peter Feaver, William Imboden and Paul D. Miller, *Critical Assumptions and American Grand Strategy* Washington D.C.: Center for Strategic and Budgetary Assessments, 2017, http://csbaonline.org/uploads/documents/CSBA6245_%28Critical_Planning_Assumptions%29v2.pdf, and Derek Chollet et. al. *Building “Situations of Strength”: A National Security Strategy for the United States*, Washington D.C.: The Brookings Institution February 2017.

⁵ A good summary of the views of the “restraint” school is provided by one of its “predominance” critics: Hal Brands, *The Limits of Offshore Balancing* Carlisle PA: U.S. Army War College Strategic Studies Institute September 2015.

⁶ Barry R. Posen, *Restraint: A New Foundation for U.S. Grand Strategy* (New York: Cornell University Press, 2015); John Mearsheimer, “Imperial By Design,” *National Interest* No. 111, January/February 2011, 16-34; Christopher Layne, “From Preponderance to Offshore Balancing: America’s Future Grand Strategy,” *International Security* Vol 22 No 1, Summer 1997, 86-124. Stephen Walt, “Offshore Balancing: An Idea Whose Time Has Come,” *Foreign Policy*, November 2, 2011 <http://foreignpolicy.com/2011/11/02/offshore-balancing-an-idea-whose-time-has-come/>; Benjamin H. Friedman and Justin Logan, “Why Washington Doesn’t Debate Grand Strategy,” *Strategic Studies Quarterly* Vol 10 Iss. 4 Winter 2016, 14-45, http://www.airuniversity.af.mil/Portals/10/SSQ/documents/Volume-10_Issue-4/Friedman.pdf.

⁷ Richard Burt, “A Grand Strategy for Trump: How Does More Hard Power Comport With A Broader Strategic Vision?” *The National Interest*, April 13, 2017, <http://nationalinterest.org/feature/grand-strategy-trump-20176?page=2>.

⁸ Walter Russell Mead, “The Jacksonian Revolt: American Populism and the Liberal Order,” *Foreign Affairs*, March/April 2017, <https://www.foreignaffairs.com/articles/united-states/2017-01-20/jacksonian-revolt>.

face such uncertainty and so many complex challenges that no single prescription may provide such a powerful integration of ends, ways, and means.

We may disappoint you by not building a case for or against a particular contending school of grand strategy. To begin with, we have found a degree of consensus on the ends of American strategy. Whether through predominance or restraint, Jacksonian or Hamiltonian, American grand strategists generally agree that our strategy must provide for the common defense, establish justice, insure domestic tranquility, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity. But there is a great divide on the specific objectives we should pursue in our foreign policy and our national security strategy, and there is no consensus on the ways and means of our strategy. We instead present particular aims, or traits, to guide the pursuit of strategic ends and we offer techniques or methods that have been proven to work in applying policies and resources to those ends.

In our view, what is far more important than a bumper sticker or a strategic tweet is to have an effective process for coming up with a strategy in the first place and for adapting ends, ways, and means as the strategy encounters the real world. *The U.S. needs rigor and discipline in developing a grand strategy for the ages.* As Colin S. Gray put it: “It is the duty of the strategists to try to match purposeful military effort and its consequences with the country’s political interests expressed as policy. This can be a mission of heroic difficulty, even to the point of impossibility.”⁹

We provide a framework, several guidelines, and some illustrations for instilling the rigor we believe is necessary, and for avoiding the pitfalls of an undisciplined approach.

The Nature of Grand Strategy

Some strategists take a grandiose approach to grand strategy. Their concepts can be really big:

For the United States, a grand strategy is a generation’s plan to create the global conditions necessary for the country to pursue the great purposes set forth in the preamble of the U.S. Constitution. It looks at the world, it looks at America, and it defines the broad path the country must take to advance its most sacred objectives.¹⁰

Fundamentally, grand strategy describes how the nation sees its role in the world and the broad objectives that govern its action...strategy describe(s) the political, economic and military means that policy makers use to accomplish the state’s broad objectives...all

⁹ Colin S. Gray, *Schools for Strategy: Teaching Strategy for 21st Century Conflict* Carlisle PA: US Army War College, Strategic Studies Institute November 2009, vii,
<http://strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=947>.

¹⁰ Patrick Doherty, “A New U.S. Grand Strategy: Why Walkable Communities, Sustainable Economics, and Multilateral Diplomacy are the Future of American Power,” *Foreign Policy* January 9, 2013,
<http://foreignpolicy.com/2013/01/09/a-new-u-s-grand-strategy/>.

efforts undertaken by states to marshal their political, economic, military and social resources to achieve a common goal.¹¹

John Lewis Gaddis describes grand strategy as the calculated relationship of means to large ends. Paul Kennedy has suggested that grand strategy is about the evolution and integration of policies that should operate for decades, or even centuries.¹²

Perhaps because we have tried to build a strategy around such lofty principles, our grand strategy has created volumes of detail. We have a National Security Strategy, a National Defense Strategy, a National Military Strategy, a National Security Space Strategy, National Strategies for: Intelligence, Maritime Security, Public Diplomacy and Strategic Communication, Counterterrorism, Drug Control, Combatting Weapons of Mass Destruction, Infrastructure Protection, Health Security, Money Laundering, Border Patrol, Cryptology, Information Sharing, Arctic Region, Biosurveillance, Pandemic Influenza, Combatting Antibiotic-Resistant Bacteria, Global Supply Chain Security, Modernizing the Regulatory System, Financial Literacy, and on and on.

These documents may reflect a desire to gain credit for having a “strategy,” but they may also be evidence of the absence of disciplined, rigorous strategic thinking. The National Security Strategy never became an explicit campaign issue in the 2016 election because, “...almost everyone (including U.S. government officials, foreign leaders, policy experts, and the media) ignored (it). It is hard to find a strategy document that received less attention in U.S. history.”¹³

We understand grand strategy as proffered by Edward Meade Earle, resting on what the state does both conceptually and practically to deal with the conduct of war, preparations for war and mobilizing its economy and society¹⁴. For Earle, who wrote the classic compendium of works on strategy¹⁵, grand strategy is “The science and art of controlling and utilizing the resources of a nation, including its armed forces, to the end that its vital interests (as interpreted by its de facto rulers) shall be effectively promoted and secured against all enemies.”¹⁶

This is not to assert that the military instrument of power should dominate our grand strategy. Indeed, grand strategy differs from military strategy in that grand strategy integrates elements of both hard and soft power so that our approach to national security provides for the application of

¹¹ William C. Martel, *Grand Strategy in Theory and Practice: The Need for an Effective American Foreign Policy*, New York: Cambridge University Press, 2015, 4.

¹² Lukas Milevski, *The Evolution of Modern Grand Strategic Thought*, Oxford: Oxford University Press, 2016, 2.

¹³ James Goldgeier and Jeremi Suri, “Revitalizing the U.S. National Security Strategy,” *The Washington Quarterly*, 38:4 Winter 2016, 39,

https://twq.elliott.gwu.edu/sites/twq.elliott.gwu.edu/files/downloads/TWQ_Winter2016_Goldgeier-Suri.pdf.

¹⁴ Martel, p. 51. For related conceptualizations of grand strategy by B.H. Liddell Hart and Robert Art, see Milevski 2, 53-54, and 148.

¹⁵ Edward Meade Earle, *The Makers of Modern Strategy: Military Thought from Machiavelli to Hitler*, Princeton NJ: Princeton University Press, 1943. Revised and updated by: Peter Paret, Gordon Craig and Felix Gilbert, editors, *Makers of Modern Strategy Machiavelli to the Nuclear Age*, Princeton NJ: Princeton University Press, 1986.

¹⁶ Eliot A. Cohen, *The Big Stick: The Limits of Soft Power & the Necessity of Military Force* New York: Basic Books, 2016., 204.

the overwhelming power we possess in optimally integrated ways. The U.S. military is the most powerful ever to inhabit the planet. We can defeat any military force anywhere, anytime. But we cannot use only the military instrument of power to solve every problem; not only would we use it up but we have also learned it can sometimes be counterproductive to try. And we have found that some national security problems are just not solvable by focusing only on killing people and breaking things.

Consider then-Colonel H.R. McMaster's approach to counter-insurgency operations in Iraq, for example.¹⁷ We have learned in the present time of war and conflict that we need not always overmatch our adversaries by military capabilities alone; we can amplify the influence of our military capabilities by leveraging diplomatic, economic, informational and other elements of power to create brilliant alternatives that influence adversaries and potential partners to do more of what we want them to do. Hard and soft power. Carrots and sticks. What are the most effective combinations and sequences? What works best, under what conditions?

The U.S. needs an approach to strategy that applies rigor as to what works without creating analytic rigor mortis¹⁸. We need discipline that does not degenerate into strategy by diktat, and we need to accommodate the unprecedented uncertainties that we face in a world so much more complex than what any of our progenitors confronted.

What Is Rigor, Anyway?

The practice of grand strategy is no less in need of empirical thoroughness, precision, and exactitude than the practice of medicine. Both professions are fraught with risk of bias in making life-and-death decisions based on imperfect information. Both require skill and rigor in making sound choices in crisis and in steady state, day-to-day decision making. Both demand protocols for managing risk in real-world practice. The need for rigor in medicine was established at least by the 19th century.

In that time, the protocol for a doctor to wash hands before examining a patient was not common practice at all. In fact, doctors in those days considered it an insult that the hands of a gentleman professional might be "unclean." Hand washing was first advocated in the mid-1840s by Dr. Ignaz Semmelweis, an assistant to the chief of the First Obstetrical Clinic of the Vienna General Hospital. It is hard to imagine today that the practice of health personnel washing their hands before dealing with a patient was, in the mid-19th century, ridiculed and rejected by medical professionals. Making this scientifically derived recommendation took uncommon courage.

The First Clinic's maternal mortality rate was more than double that of its sister clinic; its reputation was so bad that many women preferred to give birth in the streets rather than being taken to the First Clinic. Ironically, the First Clinic was a teaching hospital for medical students,

¹⁷ Thomas E. Ricks, *The Gamble: General David Petraeus and the American Military Adventure in Iraq, 2006-2008*. New York: Penguin Press, 2009, 60-61.

¹⁸ Stephen Walt, "Rigor or Rigor Mortis? Rational Choice in Security Studies," *International Security*, Vol. 23, No. 4 (Spring 1999), 5-48.

while the Second Clinic was staffed by midwives. Semmelweis set out to identify the cause of the difference between the two clinics in handling such “childbed,” or puerperal, fever cases. His data collection and analysis¹⁹ led him to reject prevailing contemporary hypotheses, such as religion, climate, overcrowding, and even “poison air” – a leading explanation of the day – as potential causes.

In 1847, one of his colleagues was inadvertently cut by a student who had just made an incision into a cadaver. Semmelweis’ friend died of infection soon afterward. It looked to Ignaz much the same as the way women in the clinic were dying of puerperal fever. He concluded that he and his students must be transporting “cadaverous particles” on their hands²⁰. This conclusion was contradicted by all 19th century medical “experts.” His colleagues were repulsed by the notion that their hands might be impure and unclean. They firmly held to the conviction (what behavioral scientists today might call “groupthink”) that the cause of such deaths must be complex material in vapors carried in the air – what they called “miasma.”

Convinced by his data and unrepentant towards his colleagues, Semmelweis implemented hand-washing in a solution of chlorinated lime as a requirement among all his clinical staff and later extended it to disinfection of medical instruments. The result was dramatic. The death rate in his clinic immediately dropped to that of the Second Clinic, and within two months was at zero.

Ironically, when the political revolutions of 1848 swept through Vienna, in a movement led by medical students and faculty in collaboration with workers, Semmelweis’ appointment to the First Clinic was not renewed, amidst a cloud of suspicion. He fled to Hungary, where his methods were, again, summarily rejected by the medical professionals there. He eventually published his data and analysis in 1861, but his conclusions were disputed by other researchers who held steadfast to the view that there were multiple causes of such infections and hand washing could not be the single most important response. Semmelweis’ personality and behavior became afflicted and he was tricked into visiting a mental hospital, whereupon he was detained, straitjacketed, and beaten. He died of infection from his wounds while he was held in a darkened cell in an insane asylum.²¹

We know of no grand strategist whose data and analysis were so outrageously received that he suffered such persecution. But it is no less essential that the propositions advocated by strategists be subject to empirical review and methodological validation. Doing so is not without precedent in this profession. Hans Delbrück was a 19th century military strategist who dared to challenge conventional wisdom with facts and analysis.

In his *History of the Art of War*, as well as in his more than 30-year association with the military journal *Prussischer Jahrbuch*, Hans Delbrück applied empirical methods to test the precepts that Clausewitz had previously promulgated. His unique method of “Sachkritik” involved examining

¹⁹ Ignaz Philipp Semmelweis, *Die Aetiologie der Begrifff und die Prophylaxis des Kindbettfiebers* (Pest, Wien und Leipzig: C.A. Hartleben’s Vertags-Expedition 1861, <http://real-eod.mtak.hu/2450/1/11971.pdf>.

²⁰ Hanninen, O.; Farago, M.; Monos, E. (September–October 1983), “[Ignaz Philipp Semmelweis, the prophet of bacteriology](#)”, *Infection Control*, 4 (5): 367–370, [doi:10.1017/S0195941700059762](https://doi.org/10.1017/S0195941700059762), [PMID 6354955](https://pubmed.ncbi.nlm.nih.gov/6354955/), accessed 4 April 2017.

²¹ https://en.wikipedia.org/wiki/Ignaz_Semmelweis.

the writings of venerated classics to see if their claims could withstand the rigor of empirical verification.

For example, he thoroughly demolished Herodotus' contemporary account of the Greek-Persian War by showing that the strength of the Persian Army could not possibly have been 2,641,610 as claimed by the venerated ancient historian. Delbrück simply calculated the length of the column that would be required for that many soldiers and showed that the distance between the two cities was not long enough to accommodate such a force. With similar methods, he also showed that the Greeks probably outnumbered the Persians in this campaign and that the battle of Marathon took place not on the traditional open plain, but most likely in a smaller valley to the southeast. He cast doubt on the credibility of Herodotus' assertion that the Greek phalanx at Marathon executed a heavy infantry charge across 5,480 feet of open terrain, demonstrating that, at most, a human soldier weighted down with arms and equipment could run at full speed only 1,000-1,200 feet before exhaustion set in.²²

Such validation checks influenced the education of Schlieffen and others in the 19th century German school of military strategy. Even John Keegan seems to grant credit to such methodology in his 1994 epic *A History of Warfare*. We must be no less empirical in our own development of grand strategy.

The approach to grand strategy really boils down to the philosophy of science. Do you believe that strategy is so complex and uncertain as to escape the boundaries of empiricism? If so, then you are freed from the discipline of rigor and you can just make it up as you go. We don't think so.

We believe that the American people, though willing to suffer much in the way of strategic folly while such evils are sufferable, deserve a more perfect response to granting their consent to those who would promulgate a grand strategy: to have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent States may of right do. There must be a fundamental role for facts and empirical logic in our approach to a grand strategy for defending our values and interests.

As the philosopher of science Carl Gustav Hempel taught, both natural sciences and social sciences seek to explore, describe, explain, and predict the occurrences of the world we live in, whereas the non-empirical disciplines, such as logic and pure mathematics, consist of propositions without essential reference to empirical findings.²³ There is no universal theory of grand strategy from which originates a set of self-evident propositions and laws. Hence, in the practice of the defense of the nation, as in the practice of medicine, we should apply the methods suggested by Hempel and others of the empirical school.²⁴

²² Gordon A. Craig, "Delbrueck: The Military Historian," 326-353 in Peter Paret, Gordon A. Craig, and Felix Gilbert, eds. 1986. *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*. Princeton, NJ: Princeton University Press.

²³ Carl G. Hempel, *Philosophy of Natural Science* Englewood Cliffs, NJ: Prentice-Hall Inc.: 1966, 1.

²⁴ https://en.wikipedia.org/wiki/Carl_Gustav_Hempel.

For a grand strategy to be rigorous, the development of the strategy must be designed to achieve the requisite degree of validity. Donald T. Campbell and Donald W. Fiske introduced the notions of convergent validity – a confirmation by independent measurement procedures – and discriminant validation – the ability of a test to discriminate among findings that are known to differ.²⁵ “In order to examine discriminant validity, and in order to estimate the relative contributions of trait and method variance, more than one trait as well as more than one method must be employed in the validation process.”²⁶ Likewise, before you build a strategy, you must demonstrate both convergence and discrimination among the tenets of the strategy and the methods for assessing it. Campbell and Fiske developed a multi-trait-multimethod matrix approach to facilitate the assessment of the validity of an empirical construct, an approach now widely accepted as a best practice in social science research. A field of inquiry as complex and uncertain as grand strategy is an ideal domain for application of a multi-trait-multimethod approach to the design of empirical analysis.

We offer five methods for developing an empirically sound grand strategy, whatever the ends, ways, and means articulated by the strategy. Then we articulate nine traits, or enduring principles, that are applicable and should be embodied in any grand strategy adopted by the U.S.

A Multi-Trait Multi-Method Approach to Grand Strategy

- **Methods**
 - Be Agile & Adaptive
 - Apply History – Thinking in Time
 - Counter Analytic Bias
 - Build A Cross-Species Team
 - Assess Risk Systematically
- **Traits (HOME & HEART)**
 - Begin at Home
 - Protect Outposts of Sovereignty – Embassies
 - Defend Arteries of Commerce & Prosperity
 - Protect & Advance Regional Interests
 - Defend & Defeat Transnational Threats
 - Global in Scale
 - Leverage Comparative Advantages
 - Overmatch Our Foes
 - Employ Brilliant Alternatives
 - Take a Long-term Perspective

Method #1. Be Agile in Leveraging the Elements of America’s Power

In their comprehensive historical assessment of successful grand strategies from ancient times to modern, Williamson Murray and Richard Hart Sinnreich argue:

²⁵ Donald T. Campbell and Donald W. Fiske, “Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix,” *Psychological Bulletin* Vol 56, No. 2 March, 1959, 81-105.

²⁶ *Ibid.*, 81.

...successful strategies that last for a decade or more are so extraordinarily rare²⁷...To be successful, long-term strategy requires both an accurate prompting diagnosis and the discipline to conform action to intention over time. Its greatest risk is target fixation – the failure to honor the evidence of the evolving environment when it begins to refute assumptions on which the strategy rested.”²⁸

The epitome of such disciplined flexibility in grand strategy was Themistocles’ dramatic shift in strategy for Athens, in 480 B.C., from the land warfare, agrarian-based heavy infantry maneuver concept that won the day at Marathon in 490 B.C., to the silver commodity-based sea power that won their next war with the Persians in the Battle of Salamis barely ten years later.²⁹

But let’s not conflate flexibility with fecklessness. Our post-Cold War grand strategies have sometimes been many and varied. As James Goldgeier and Jeremi Suri put it:

“U.S. policymakers have displayed a repeated tendency to react (and overreact) to problems, rather than create enduring solutions...U.S. hyper-reactivity to threats represents the opposite of strategic planning.”³⁰

The U.S. is by far the world’s greatest power today, economically,³¹ militarily,³² and diplomatically. Developing a grand strategy to apply and prioritize an optimum blend of our ways and means (of both hard and soft power) to secure the right national security objectives should not be beyond our reach. But it calls for rigorous and continuing examination of what has worked and what has not worked, under what conditions to promote our most important interests and values.

What matters in grand strategy is not how much is enough. What produces effective strategy is the ability to transform a nation’s wealth into military power and other significant tools of influence for national security, prosperity, and freedom. And a nation’s wealth cannot be examined in isolation from its security and temporal context. Consider the Roman Empire. No ancient society was as efficient in applying resources to strategic ends as the Romans.³³ The

²⁷ Williamson Murray, “Introduction,” Williamson Murray and Richard Hart Sinnreich, editors, *Successful Strategies: Triumphant in War and Peace from Antiquity to the Present*, Cambridge: Cambridge University Press, 2014, 3-4.

²⁸ Richard Hart Sinnreich, “Afterword,” Williamson Murray and Richard Hart Sinnreich, editors, *Successful Strategies: Triumphant in War and Peace from Antiquity to the Present*, Cambridge: Cambridge University Press, 2014, 443.

²⁹ Victor Davis Hanson, “The Strategic Thought of Themistocles,” Williamson Murray and Richard Hart Sinnreich, editors, *Successful Strategies: Triumphant in War and Peace from Antiquity to the Present*, Cambridge: Cambridge University Press, 2014, loc 577-loc 1100.

³⁰ James Goldgeier and Jeremi Suir, “Revitalizing the U.S. National Security Strategy,” *The Washington Quarterly*, Winter 2016 vol. 38 No 4 p.36.

³¹ For OECD data in interactive form see: <https://data.oecd.org/gdp/gross-domestic-product-gdp.htm>.

³² International Institute for Strategic Studies *The Military Balance 2017*. (2017) Chapter Two: Comparative Defence statistics, The Military Balance, 117:1, 19-26, DOI: 10.1080/04597222.2017.1271208, <http://dx.doi.org/10.1080/04597222.2017.1271208>.

³³ James MacDonald. 2003. *A Nation Free of Debt: The Financial Roots of Democracy*. Princeton NJ: Princeton University Press. P.65.

Roman government spent somewhere between 3 and 5 percent of gross national product, and 60-75 percent of that on the military.³⁴ Yet, they did not write a new strategy every four years.

Historians and strategists disagree on whether Rome even had a grand strategy. Keegan asserts that they pursued glory, not strategy.³⁵ Some say that the Romans had no concept of military strategy at all; van Creveld interprets their writings as nothing more than what we would today call tactics, techniques, and procedures.³⁶ But Lacy shows conclusively that what the Roman legions did was to develop the military strategy of a mobile defense at the strategic level. Caesar and Pompey, by sheer force of discipline and ruthlessness, subdued the wild lands out to what were to become the natural boundaries of the empire: Northern Africa, Gaul, Spain and Britain, the Rhine, Danube, Nile and Jordan Rivers. For nearly 500 years thereafter, legions were habitually assigned to garrisons along the empire's edges to protect against barbarian intruders.³⁷

In Rome's grand strategy, if ever one location was threatened by an adversary who could present overwhelming force at a particular point, the emperor could rapidly shift reinforcing legions from one sector to reinforce the point at greatest risk, typically by forced march and supported by an unprecedented bureaucratic apparatus, iron-age logistical infrastructure, and a magnificent network of Roman roads, and then re-deploy them back to their home garrisons³⁸. They did not win every battle, as tragically demonstrated in the Battle of Teutoburg Forest, but they won every campaign until their armies and society were weakened by assimilation and corruption. Even then, for another hundred years or so, the Byzantine Empire combined superior arms, cunning, guile, secrecy, and flexibility to keep barbarians and Muslims at bay. They even committed much of their military art, if not their grand strategy itself, to written texts.³⁹

Every great power in human history has maintained its greatness by developing, applying, and adapting an effective strategy relevant to the threats and risks it faced. In our own lifetimes, as articulated by Joint Chiefs Chairman General Joseph F. Dunford, we face five key challenges: Russia, China, North Korea, Iran, and violent extremist organizations. While the current National Military Strategy is classified, General Dunford has expressed some of its key attributes: we face increasingly transregional, multi-domain, and multi-functional threats with a globally integrated

³⁴ Goldsmith, R. W. (1984), "An Estimate of the Size and Structure of the National Product of the Early Roman Empire." *Review of Income and Wealth*, 30: 263–288. doi:10.1111/j.1475-4991.1984.tb00552.x fn 28, pp. 268-269, <http://onlinelibrary.wiley.com/doi/10.1111/j.1475-4991.1984.tb00552.x/abstract#publication-history>.

³⁵ Keegan, John (1993), *A History of Warfare*. New York: Vintage Books, loc 5679-5691.

³⁶ Van Creveld, Martin (2015), *A History of Strategy: From Sun Tzu to William S. Lond*. Kouvola, Finland: Castalia House, loc -305-339.

³⁷ James Lacey, "The Grand Strategy of the Roman Empire," in Williamson Murray and Richard Hart Sinnreich, editors, *Successful Strategies: Triumphant in War and Peace from Antiquity to the Present*. Cambridge: Cambridge University Press, 2014, 49.

³⁸ <https://f.hypotheses.org/wp-content/blogs.dir/1447/files/2014/05/Roman-legions-212-AD-Centrici-site-Keilo-Jack.jpg>.

³⁹ Lacey, Ibid.

Joint Force that can operate across regions, domains, and functions to provide a full range of flexible and responsive options to the nation.⁴⁰

America's military power extends beyond the fight. The U.S. was able to exert considerable influence over adversaries and allies alike with its cruise missile strikes on Syria, use of the Massive Ordnance Air Burst weapon in Afghanistan, and the deployment of a Carrier Strike Group to the Western Pacific near the Korean Peninsula in April 2017. In their key 1978 study, Barry Blechman and Stephen Kaplan document 215 instances, between January 1, 1946, and December 31, 1975, of discrete military moves to influence a particular situation for political purposes – force without war.⁴¹ They found that, “The weight of evidence is consistent with the hypothesis that discrete uses of armed forces are often an effective way of achieving near-term foreign policy objectives...however, this success rate erode(s) sharply over time.”⁴²

General Dunford describes a strategic environment very different from what was the case in creating a strategy for winning the 20th century World Wars and the Cold War. It requires more than just a bunch of guys and girls sitting around the table (BOGGSAT) to craft a strategy document. This is not beyond our capacity to do. The availability of impressive analytic capacities should provide a comparative advantage for the present generation of strategists. Yet we find all too often, especially in the development of strategy, best analytic practices fall into the “too hard” or “not enough time” bins.

Method #2. Apply History Expertly -- Thinking in Time

There once was a course for officials of incoming administrations, taught at Harvard's Kennedy School of Government by Richard Neustadt and Ernest May, on how to apply history to solving current problems of public policy, and how to avoid the misuse of history. Neustadt and May observed that most of those new to governing:

... did not know any history to speak of and were unaware of suffering any lack, who thought the world was new and all its problems fresh...and that decisions in the public realm required only reason or emotion, as preferred. Yet we also saw that despite themselves Washington decision-makers actually used history in their decisions at least for advocacy or for comfort, whether they knew any or not.⁴³

Their course pointed to two success stories, the Cuban Missile Crisis of 1962 and Social Security Reform of 1983, to distinguish from two dozen not-so-successful episodes. It offered seven

⁴⁰ <https://www.defense.gov/News/Article/Article/965661/change-coming-to-strategic-levels-in-military-dunford-promises>, <https://www.defense.gov/News/Article/Article/1066045/dunford-speed-of-military-decision-making-must-exceed-speed-of-war>.

⁴¹ Barry M. Blechman and Stephen S. Kaplan, *Force Without War: U.S. Armed Forces as a Political Instrument*, Washington D.C.: The Brookings Institution, 1978, 12.

⁴² *Ibid.*, 517.

⁴³ Richard E. Neustadt and Ernest R. May, *Thinking in Time: The Uses of History for Decision Makers*, New York NY: The Free Press, 1986, xi-xii.

principles of success for thinking in time. We believe that the techniques they taught are as relevant today as ever.

The first thing any decision maker or decision-making supporter should do is to define the immediate situation and its problems by separating what is *known* from what is *unclear*, and both from what is *presumed*. Applying how the United States got into the Korean War of 1950, for example, the authors urge that such considerations be written down as a way of sharpening decision makers' thinking. Today's white boards and smart boards are productive tools for doing this.

President Truman later acknowledged that during the Korean crisis in the summer of 1950, he had in mind three historical analogies from the 1930s: "...the Manchurian incident of 1931-32, when Japan seized Manchuria from China, Italy's aggression against Ethiopia in 1935; and Hitler's forcible annexation of Austria (the Anschluss) in 1938."⁴⁴ Neustadt and May assert that in June 1950, Truman's aides could have spent a few minutes comparing all those seemingly analogous situations with the present one to consider the *Likenesses* and *Differences* before turning to what should be done now⁴⁵. They argue that, had Truman's advisors done so, they could have clarified the options available and, more importantly, the rationale – both public and private – for the course of action taken.

The second technique is to apply "*The Goldberg Rule*." That is, don't ask, "what's the problem?" ask "what's the story?" You do this initially with construction of a timeline, a string of sequential dates. Follow this by asking the classic questions of responsible journalism: when, what, where, who, how, and why? Then, when you think you have established the starting point of the problem whose story you are trying to build, revisit the start date.

Based on Neustadt and May's experiences, chances are the real narrative of the story behind the current problem begins much earlier than initially perceived. Of course, problem solvers must also limit the data they collect, so they suggest when seeking specifics to select those marked by particularly compelling motivations, especially those of political origin. "The political specifics that count most in such a case are likely to be clustered around changes of importance in the programmatic content of the issue, that is to say in alterations of its statutory, structural, procedural, or budgetary form."⁴⁶ The professors suggest that, had the Carter Administration applied the Goldberg Rule to its 1977 initial approach to Soviet-American negotiations over arms control, they could have avoided what became a gruff and chilly refusal by Soviet Foreign Minister Andrei Gromyko and the subsequent failure of the U.S. to ratify the SALT II Treaty.

Then, having developed the story behind the problem along with its known, unclear, and presumed elements, analysts should be required to give odds that their presumptions will prove to be correct. Having estimated such odds, they then should be tasked to place bets – how much of your own money would you wager on that presumption? This will force them to dig into their own, and each other's, presumptions and biases.

⁴⁴ Neustadt and May, 41.

⁴⁵ Ibid.

⁴⁶ Ibid., 108.

So, if someone says “the Bay of Pigs operation has a fair chance” of success, or that there is a “strong possibility” that there will be a swine flu epidemic, ask, “If you were a betting man or woman, what odds would you put on that?” If others are present, ask the same of each and of yourself, too. Then probe the *differences*: Why? This is tantamount to seeking and then arguing assumptions underlying different numbers placed on a subjective probability assessment.”⁴⁷

The U.S. Intelligence Community has honed this practice to a fine art. Analysts are taught three fundamentals in applying rigor to their analysis, although we shall see that their application of such rigor may be lacking:

- If it’s a fact, it has a source...if it’s not a fact, it’s an assessment.
- If it’s an assessment, it must have a confidence statement, and you have to be able to explain how you arrived at that level of confidence.
- If it’s predictive, it needs a separate probability statement.

Neustadt and May suggest that each presumption be challenged with the question of the odds of occurrence. The question should be posed to each advisor in the presence of others and each advisor should specify what makes this answer different from the others. The strategist should encourage debate to promote the articulation of differences and then review the presumptions accordingly. Don’t accept prescriptions for guiding future national strategy without subjecting the underlying forecasts and assessments to such scrutiny.

Perhaps most importantly, once you have identified the knowns, unclears, and presumptions, and understand the story, established probabilities, and placed bets, Neustadt and May urge the practitioner to pose *Alexander’s question*:

What fresh facts, if at hand, and by when, would cause you to change your presumption?

They argue that much suffering and cost could have been avoided had this question been posed in the swine flu public policy fiasco of the 1970s.

A new form of flu appeared in 1976 at a crowded army camp where 13 cases were clinically identified and one recruit died after going on an all-night march against doctor’s orders. The new flu was technically akin to the devastating flu epidemic of 1918 that struck more than a fifth of the entire population and killed an estimated 50 million people worldwide, more than three times the number killed in all of World War I.

Dr. Russell Alexander, a public health professor at the University of Washington, asked a challenging question in the March 1976 Advisory Committee meeting that preceded the decision to immunize the country against swine flu. He wished to know what fresh data from anywhere, including the Southern Hemisphere, would cause his colleagues to revise or to reverse their judgment that the country should be immunized *en masse* starting next summer. Mild outbreaks only? None? Time frames? Locations? He asked but never got answers.

⁴⁷ Ibid., 152.

The strategy adopted by the federal government at the time was to develop a new vaccine and inoculate the entire population before the flu season of 1976 began. But then field trials of the new vaccine showed negative reactions and manufacturers refused to proceed with packaging and shipping as a result of the consequent insurance risk until Congress passed legislation to indemnify vaccine makers. In October, vaccines finally reached state distribution authorities and inoculations began, but by then it was well after flu season had begun, and coincidental heart attacks killed two men from the same nursing home in Pittsburgh just after they received their flu shots. Immunizations were suspended and public confidence plummeted. Inoculations were halted, even though later statistical analysis showed that the risk resulting from the vaccine itself was small.

Neustadt and May assert that had Dr. Alexander's question been posed before the national inoculation program began, the negative outcome would have been avoided because, at the time, no one was in the habit of reviewing decision-makers' presumptions. The scientific presumptions were wrong, administrative presumptions unduly optimistic, and others were unexamined. "Putting all the assumptions on the table and then testing them is one defense of laymen against experts."⁴⁸ They suggest that strategists ask Alexander's question, then set a watch to see when and if such evidence appears.

Finally, for good thinking in time, *practice "placement."* That is, understand the stories of both individuals and organizations involved in the issue. Too often, our presumptions about a person or organization are the result of stereotypes. Neustadt and May argue that in developing an historical approach to a current problem, one should sophisticate the stereotype that may otherwise be indelible. Placement has to do with inferring personal outlook or institutional proclivity from the historical external signs available. Such indicators may suggest what may be in someone's head or built into incentives in somebody else's bailiwick.

For an individual, placement could involve building a timeline of the person's life from adolescence, historical events that would have had an effect on the person (especially widely known historical events), and details derived from personal history of record. The same should be done for institutions, especially the construct of legislative and regulatory histories, key laws leaders, and controversies faced by the organization, its internal history, and the evolution of its organizational structures, including the procedures and incentives governing its practice. Neustadt and May assert that had they conducted such placement assessments, President Johnson would not have been confounded by Martin Luther King Jr.'s opposition to the Vietnam War, Jimmy Carter would not have misjudged German Chancellor Helmut Schmidt on nuclear weapons issues, and President Kennedy would not have misjudged British Prime Minister Harold MacMillan in the painful "Skybolt" program cancellation.⁴⁹

For organizational placement, they point to the legacy of the Women's Bureau under the leadership of Mary Anderson, the first woman to head a bureau in the U.S. government, held over by President Franklin D. Roosevelt into his administration, and Frances Perkins, who was

⁴⁸ Ibid., 48-55.

⁴⁹ Ibid., 181-195.

appointed by FDR to head the Department of Labor, becoming the nation's first woman cabinet member. Within weeks of her swearing in, Perkins proposed elimination of the Women's Bureau and reallocation of its funds, to which Anderson replied by scathing memorandum to her boss that such a move was illegal and would subject the department to a tremendous amount of criticism from women throughout the country and result in the consequent loss of confidence in the department.⁵⁰

This case study continues to serve as a lasting organizational memory in the bureaucratic psyche of the Department of Labor. Neustadt and May also suggest that similar organizational placement could have better informed how the Carter Administration approached the Central Intelligence Agency in the case of the abortive 1980 Iran hostage rescue mission, had they considered the CIA's experience with the Bay of Pigs invasion, the Center for Disease Control in the 1976 swine flu scare, and Social Security reform in the Carter Administration.

Method #3. Beware Analytic Bias

Sound intelligence analysis is essential to grand strategy. Prominent CIA professional Richards Heuer developed authoritative doctrine for Structured Analytic Techniques, a tradecraft that has become required practice across the Intelligence Community.

In the 1970s, Heuer transferred from the operations side of the CIA to the analysis side as part of the agency's response to criticism from prominent academics that their analytic methods were out of date. His task was to examine quantitative methods that were developed in the 1960s, during what was called the behavioral revolution in academic political science, and to test how these methods could be applied to intelligence analysis. Heuer's work was heavily influenced by the contemporaneous work of Daniel Kahneman and Amos Tversky on cognitive psychology and what came to be called prospect theory. He also worked closely with an Israeli intelligence officer, Zvi Lanir, who had been tasked to assess the Israeli intelligence failure to anticipate the 1973 Yom Kippur War.⁵¹ The outcome of Heuer's work was his book on the Psychology of Intelligence Analysis.⁵²

The book presented 50 techniques for identifying hypotheses, relevant evidence, and how each item of evidence relates to each hypothesis. Its prescriptions for combatting bias remain in the intelligence community's curriculum today, in the form of Structured Analytic Techniques.

⁵⁰ Ibid., 172-180.

⁵¹ Richards Heuer, "The Evolution of Structured Analytic Techniques." Presentation to the National Academy of Science, National Research Council Committee on Behavioral and Social Science Research to Improve Intelligence Analysis for National Security, Washington, DC, December 8, 2009, <https://www.scribd.com/doc/24729291/The-Evolution-of-Structured-Analytic-Techniques-Richards-Heuer-8-DEC-2009>; see also: Zvi Lanir and Daniel Kahneman, "An Experiment in Decision Analysis in Israel in 1975," *Studies in Intelligence* Vol. 50 No. 4, 2006, <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol50no4/an-experiment-in-decision-analysis-in-israel-in-1975.html>.

⁵² Richards Heuer. Washington DC: Central Intelligence Agency, Center for the Study of Intelligence, <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/index.html>.

Yet failures persist. In a remarkable parallel to Israel's 1973 experience, one of the fundamental shortcomings identified by the 9/11 Commission was bias in intelligence analysis:

On the brink of war, and in front of the whole world, the United States government asserted that Saddam Hussein had reconstituted his nuclear weapons program, had biological weapons and mobile biological weapon production facilities, and had stockpiled and was producing chemical weapons. All of this was based on the assessments of the U.S. Intelligence Community. And not one bit of it could be confirmed when the war was over.⁵³

Yet, such bias continued to confound U.S. intelligence analysis and the debate goes on:

“In 2015 it was learned that Iraq's weapons of mass destruction had not been fully accounted for by UN inspections. Ten years after its inception, Operation Avarice was declassified and it was learned that there were stockpiles of warheads and rockets containing degraded chemical agents similar to those used in the Iran-Iraq War. From 2005 through 2006 military intelligence discovered that the weapons—many in poor condition, some empty or containing nonlethal liquid, but others containing sarin with unexpectedly high purity—were in the possession of one Iraqi individual who remained anonymous. Operation Avarice, headed by army intelligence and the CIA, involved the discreet purchase of the weapons from the unidentified individual to keep them off the black market.⁵⁴

Continued work by Heuer and others developed a sophisticated body of analytic practice, codifying the techniques into a tradecraft known as Structured Analytic Techniques (SATs): well-established procedures for reducing the frequency and severity of error in intelligence analysis.⁵⁵ Structured Analytic Techniques are methods of organizing and stimulating thinking about intelligence problems. These methods aim to make the analytic process conscious and transparent, rather than intuitive and subjective, thus reducing the probability of errors caused by cognitive biases that go unchallenged.

The methods fall into three broad categories: diagnostic techniques aim to make assumptions and logical arguments more transparent; contrarian techniques challenge current thinking; and imaginative thinking techniques encourage new perspectives, insights, and alternative scenarios. Among the many SATs in use today, the most common are structured brainstorming, analysis of competing hypotheses (ACH), confirmation bias, and mirror imaging. Each technique is

⁵³ Washington DC: U.S. Government. *Report to the President of the United States, The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction*, 31 March 2005, 3, <https://www.gpo.gov/fdsys/pkg/GPO-WMD/content-detail.html>.

⁵⁴ https://en.wikipedia.org/wiki/Iraq_and_weapons_of_mass_destruction.

⁵⁵ Richards J. Heuer, “Taxonomy of Structured Analytic Techniques,” International Studies Association 2008 Annual Convention March 26 – 29, 2008 San Francisco, CA, http://www.pherson.org/wp-content/uploads/2013/06/03.-Taxonomy-of-Structured-Analytic-Techniques_FINAL.pdf.

accompanied by detailed procedures and checklists for application to real-world intelligence analytic challenges.⁵⁶

The difficulties with applying SATs are that it takes training to develop the skills and the skills take time to apply.

In 2016, the Intelligence Community tasked the RAND Corporation with examining the application of SATs. In a pilot study, RAND examined a small sample of finished intelligence products to ascertain how many used SATs, how particular SATs did or did not contribute to analytic quality, and how papers that did not use SATs compared (on Intelligence Community tradecraft standards) with those that did. The sample includes a set of CIA Intelligence Assessments (IAs), National Intelligence Council (NIC) analytic products published in July 2014, and a random set of Defense Intelligence Agency and CIA papers published in 2013 on several selected intelligence issues.⁵⁷

RAND reviewed 29 CIA IAs posted on the World Intelligence Review electronic (WIRe) site during a two-week period in July 2014.

Of the CIA IAs in our sample, 23 showed no evidence of using SATs... In addition, we did not find any indirect evidence of SAT use in these IAs, such as detailed discussion of alternative hypotheses not explicitly linked to the use of an SAT. Six of the IAs in our sample made explicit and extensive use of SATs. Three of these IAs used structured alternative scenarios developed through facilitated brainstorming; one was constructed around an assumptions check; one presented a Team A/Team B analysis; and one created a detailed set of indicators to evaluate future developments.⁵⁸

We also reviewed a random sample of 20 DIA and CIA documents published in 2013 covering four selected intelligence issues. Of these, eight showed evidence of using at least one SAT: Five used alternative scenarios; one drew from a facilitated interagency brainstorming session; one included an indicators-based matrix as an appendix; and one used structured historical analogies.⁵⁹

The RAND researchers interviewed IC analysts who reported that the SATs add no value because they are unrealistic to use in the course of their work schedule or because their own expert estimates produce better results. Many analysts consider SATs too time consuming, and believe that they eliminate insight gained solely from expert intuition and lack flexibility to

⁵⁶ Central Intelligence Agency, "A Tradecraft Primer, Structured Analytic Techniques for Improving Intelligence Analysis," March 2009, <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/Tradecraft%20Primer-apr09.pdf>.

⁵⁷ Stephen Artner, Richard S. Girven, and James B. Bruce *Assessing the Value of Structured Analytic Techniques in the U.S. Intelligence Community*, Santa Monica CA: RAND Corporation 2016 RAND Report No. RR-1408-OSD, http://www.rand.org/pubs/research_reports/RR1408.html.

⁵⁸ *Ibid.*, 6-7.

⁵⁹ *Ibid.*, 9.

handle rapidly changing conditions, or cannot account for all the variables present in complex problems.⁶⁰

Here we have another well-established body of practice often neglected in the development of grand strategy.

Method #4. Build a Cross-Species Team

Strategic genius is rare. Perhaps once a millennium, a Julius Caesar, a Napoleon Bonaparte, or a Bismarck appears. And, although Sir Francis Galton discovered that, in a contest to guess the weight of a “dressed” ox, the mean of the guesses was a number more accurate than any of the 800-some individual entries, following the wisdom of the crowd is not a prescription for good strategy in the 21st century.⁶¹

Not every grand strategist will be an expert in grand strategy. But great grand strategy can emerge from a competition of ideas. The grand strategist must be careful and deliberate in selecting the experts who will have influence in developing and implementing the grand strategy, because not all experts are equally capable of providing sound judgments. The empirical evidence on experts suggests that it’s not so much *what you know* that counts, it’s *how you think* that matters. And disciplined, rigorous thinking about grand strategy can be cultivated.

An expert is a professional who makes a livelihood by commenting or offering advice on trends of significance to the well-being of the state or the international system as a whole.⁶² According to Philip Tetlock, there are two basic types of experts. The *hedgehog* knows one big thing, toils devotedly within one tradition, and reaches for formulaic solutions to ill-defined problems. The *fox* knows many little things, draws from an eclectic array of traditions, and accepts ambiguity and contradiction as inevitable features of life. The eclectic fox is quick, cunning, and sly in pursuing multiple paths to victory; the persistent hedgehog single-mindedly pursues ways and means to the end. The fox is skeptical of deductive approaches to explanation and prediction and is disposed to qualifying tempting analogies by disconfirming evidence. Hedgehogs resist distractions in environments with unfavorable signal-to-noise ratios and take tough negotiating postures to protect themselves from exploitation by competitive adversaries.

The fox is reluctant to make extreme predictions, worries about hindsight bias that might cause us to judge those in the past too harshly, and is prone to a detached, ironic view of life. The hedgehog is willing to take responsibility for controversial decisions guaranteed to make them enemies but is determined to stay the course with sound policies when they run into temporary difficulties. The fox may weave together conflicting arguments on foundational issues in the study of politics, even reaching to core issues such as the role of human agency or the rationality

⁶⁰ Ibid., 3.

⁶¹ Francis Galton, “Vox Populi,” *Nature* Vol 75 No. 1949, March 7, 1907, 450-451, <http://wisdomofcrowds.blogspot.com/2009/12/vox-populi-sir-francis-galton.html>.

⁶² Philip E. Tetlock. *Expert Political Judgment: How Good Is It? How Can We Know?* Princeton NJ: Princeton University Press, 2005, 239.

of decision making. The hedgehog has the capacity to inspire confidence by projecting a decisive, can-do presence. For Tetlock, Dante was the consummate hedgehog, Shakespeare the paragon of the fox.

In a decade-long study that attempted to assess just how accurate the “experts” have been, Philip Tetlock and his research sponsors built a sample of 284 professionals who made their livelihood by commenting or offering advice on political and economic trends of significance to the well-being of particular states, regional clusters of states, or the international system as a whole. The sample included a range of demographic attributes across educational and disciplinary backgrounds and employment, including experts who provided their analysis in the media, and those who had participated in major forecasting exercises. The experts were given a “possible futures” questionnaire to elicit their subjective predictions on a probability scale ranging from 0 – Impossible, to 1.0 – Certainty. Because the study lasted for more than two decades, experts’ responses could be assessed against what really happened; for example, their forecast of how defense spending as a percent of government spending would rise, fall, or stay the same.

Along the way, the researchers conducted a number of additional assessments among the sample experts, including both free-flowing and structured interviews that were subsequently coded for conceptual integration and evaluative differentiation, whether and how the experts updated their beliefs and assessments, and exercises in hypothetical counterfactual scenarios to assess the experts’ cognitive style.

Tetlock and his associates then approached the data with two fundamental questions:

- *Correspondence*: Does the forecast happen in the manner predicted?
- *Coherence*: Is the forecast internally consistent and does the analyst update in response to evidence?

Tetlock and his research team spent 20 years asking large numbers of experts large numbers of questions about large numbers of cases in international affairs to produce a composite statistical portrait of good judgment. By 2003, they had accumulated 82,361 forecasts, providing them with a database to evaluate. They then evaluated experts’ predictions against outcomes, and against various alternate predictions that they derived from simple statistical procedures, from uninformed non-experts, and from well-informed non-experts. The results proved to be robust across an impressive range of scoring adjustments, with the conditional likelihood of such patterns emerging by chance well under five in one hundred.⁶³

It made virtually no difference whether participants had doctorates, whether they were economists, political scientists, journalists, or historians, whether they had policy experience or access to classified information, or whether they had logged many or few years of experience in their chosen line of work. Quantitative and qualitative methods converge on a common conclusion: foxes have better judgment than hedgehogs.

⁶³ Adrian E. Tschoegl and J. Scott Armstrong, “Review of: Philip E. Tetlock. 2005. *Expert Political Judgment: How Good Is It? How can We Know?* (Princeton University Press)” *International Journal of Forecasting*, 2007, 339-342.

However, better judgment does not mean great judgment. Foxes are not awe-inspiring forecasters: most of them should be happy to tie simple extrapolation models and none of them can hold a candle to formal statistical models. But foxes do avoid the big mistakes that drive down the probability scores of hedgehogs to approximate parity with dart-throwing chimps. And this accomplishment is rooted in foxes' more balanced style of thinking about the world – a style of thought that elevates no thought above criticism.⁶⁴

One of the more disconcerting results of this project has been the discovery of an inverse relationship between how well experts do on scientific indicators of good judgment and how attractive these experts are to the media and other consumers of expertise. The only consistent predictor was fame – those more likely to be feted by the media were less well calibrated than their lower profile colleagues.⁶⁵

When it comes to the issue of war and peace, we ought to apply Tetlock's methodology to the work of anyone who would offer a grand strategy.

We suggest that the grand strategy team be composed of a mix of foxes and hedgehogs. They should be skeptical of media pundits. The foxes should avoid looking at so many "what ifs" that they lose any signal in all the noise. Their hedgehogs must avoid becoming target-fixated and missing something coming in from the periphery. All the experts must recognize their own and their colleagues' strengths and limitations and be tolerant of other species. As one Tetlock-ian investment fund advisor suggests to his clients, "Talk to four foxes, one pessimistic hedgehog and one optimistic hedgehog. Add the forecasts, divide by six to get the mean, and then use the mean and the six forecasts to calculate the standard deviation."⁶⁶

More recently, Tetlock has advanced his work into the emergent art of superforecasting. Tetlock and his associates formed a team that was selected by the Intelligence Advanced Research Projects Agency (IARPA) to participate in a competitive exercise in political forecasting. For three years, 2011-2014, Tetlock's team from the University of Pennsylvania and the University of California at Berkeley competed against teams from Massachusetts Institute of Technology, Michigan, Maryland, and others. All teams elicited geopolitical forecasts of various types and tracked the performance of those doing the forecasts. Unlike the long-term forecasting in his previous work, the IARPA competition was focused on near-term predictions that could be examined for accuracy within the one-year time horizon of each year's forecasts.

Tetlock assessed the performance of his forecasters in terms of a statistical method that he had developed in his earlier research. The judging system rewards those who tend to pick the best odds. If an event indeed happens within the specified time frame, contestants get more credit for predicting it with 90 percent odds than they would have with 60 percent, but they lose more

⁶⁴ Tetlock, 118.

⁶⁵ *Ibid.*, 217.

⁶⁶ Adrian E. Tschoegl and J. Scott Armstrong, "Review of: Philip E. Tetlock. 2005. *Expert Political Judgment: How Good Is It? How Can We Know?* *International Journal of Forecasting*, Volume 23 Issue 2 2007, 339-342, http://repository.upenn.edu/cgi/viewcontent.cgi?article=1056&context=marketing_papers.

credit with the 90 percent call if the event fails to happen.⁶⁷ His team won the first year's competition easily. In the second year of the tournament, Tetlock identified his top 60 forecasters, all foxes rather than hedgehogs, who exceeded the first year's winning performance.⁶⁸ Along with a co-author, Dan Gardner, he turned this research into another best-selling book, *Superforecasting: The Art and Science of Prediction* (New York: Broadway Books, 2015.)

Those persons charged with the task of formulating U.S. grand strategy will be responsible for both short-term and longer-term assessments of the strategic environment within which they will be responsible for determining ends, ways, and means for protecting U.S. national security. We recommend that they apply the techniques discovered by Philip Tetlock:

- Select a team of experts comprised mostly of those with a well-developed *fox*-like cognitive style, supplemented by a few *hedgehogs* who reflect the strategic philosophy of the administration but who have demonstrated some propensity for adaptive learning.
- Have the experts articulate their grand strategy in terms of clear and unequivocal propositions distinguishing among facts, assumptions, and predictions.
- Force experts to articulate their forecasts in quantitative, probabilistic terms and allow them to adjust their estimates as events proceed and as facts become available. Keep track of these estimates, recording them continuously over time, and maintain a capacity to take readings of the aggregate central tendencies, as well as variance among the experts.

We turn now to how to assess risk in a rigorous grand strategy process.

Method #5. Make Risk Assessment Explicit & Calibrated – IRAMM

The most neglected dimension in the formulation of grand strategy is risk. Often, strategists in the world of conflict, diplomacy, and conquest believe that national security is a subjective matter of intuitive assessment. But in the real world, risk assessment asks the fundamental questions of the likelihood of an adverse event happening and the potential consequences of that adversity. As Ken Krieg and David Chu put it in their introduction to the 2005 edition of Alain Enthoven and Wayne Smith's classic book, *How Much Is Enough?*, "How much risk are we willing to take? The problem facing future secretaries will be to decide what is best, not just how much is enough – and to defend those decisions."⁶⁹ Our final recommendation on methods is for the use of a highly effective risk-assessment tool.

We really do not do well at assessing risk. Michael Mazarr has argued:

⁶⁷ Faye Flam, "How 'Superforecasters' Think About the Future," *BloombergView*, September 14, 2016, <https://www.bloomberg.com/view/articles/2016-09-14/how-superforecasters-think-about-the-future>.

⁶⁸ David Brooks, "Forecasting Fox," *New York Times*, March 21, 2013, https://www.edge.org/conversation/philip_tetlock-a-short-course-in-superforecasting.

⁶⁹ Kenneth J. Krieg and David S.C. Chu, June 27, 2005, Foreword to the New Edition of: Alain C. Enthoven and K. Wayne Smith, *How Much Is Enough?: Shaping the Defense Program 1961-1969*. New York: Harper & Row 1971, Santa Monica CA: the RAND Corporation, 2005, xvi, http://www.rand.org/pubs/commercial_books/CB403.html.

“Too often, risk frameworks generate ambiguous, color-coded assessments grounded in subjective analyses.⁷⁰ ... “...complex strategic judgments”: Should we invade Syria? Should we close the nuclear deal with Iran? Can we move from a nuclear triad to a dyad? These are questions on which information is imperfect, dozens of variables interact in nonlinear ways, and human choice and agency generate unpredictable patterns.”⁷¹ ... Good risk management should force decision-makers captivated by overconfident wishful thinking to pause, take seriously what could go wrong, and spend time putting in place mitigating actions.⁷²

Good analysis helps, but it is not, and should not be, the sole basis for a decision. Good decisions consider non-quantifiable factors, such as the value structure and experiences of the decision makers and advisors. The risk structure we propose introduces a structured strategic risk assessment process. The method developed at the Institute for Defense Analyses (IDA) systematically captures these informed personal views to help decision makers better understand their own values on national strategy and where their views fit among those of others. It has proven immensely valuable to those who have applied it across the U.S. national security enterprise over the past decade. The Integrated Risk Assessment and Management Model (IRAMM) is a highly effective tool for improving the strategy building process.

IRAMM’s risk-based metrics are rigorous enough to support sound comparisons of alternative programs, postures, and policies that have clear links to guiding strategic principles and priorities. The model enables subjectively informed risk-based assessments of the adequacy of current, midterm, and longer-term forces to address scenarios of concern to national leadership. IRAMM’s national-level perspective makes it a useful tool for supporting the development, coordination, and implementation of a grand strategy.

How It Works

IRAMM is a multistep process that begins with the senior leader identifying the participants, usually senior staff members; the major “challenge areas” the nation may face in the future, such as major combat operations (MCOs), irregular warfare, cyber warfare, homeland defense, etc.; and any special topics to be addressed in the interviews. The product of participant interviews is a series of risk profiles with rationales, ideas for mitigating risk in the challenge areas, and insights on special topics. This is followed by a participant group discussion where differences are debated, promising solutions are evaluated, and, potentially, new perspectives are generated. Finally, these refined results are provided to the senior leader, who uses them to inform future activities.

Step 1: Preparing for and conducting the interview

⁷⁰ Michael J. Mazarr, “Fixes for Risk Assessment in Defense,” *War on the Rocks*, April 22, 2015, 1.

⁷¹ Ibid.

⁷² Ibid.

IRAMM is a structured process that elicits consistent responses from those being interviewed by using a common definition of risk, a common and detailed consequence scale, and a numerical calibration scale. The methodology defines the risk associated with a single future event as the *likelihood* of the event occurring times the predicted political, economic, and military losses facing the U.S. if the event does occur *given* a U.S. capability, such as the programmed force (or a postulated alternative). Thus, risk involves predicting events (scenarios) and how consequential they will be if they do happen, assuming a program and set of policies. Strategic risk is the aggregation of risks associated with a challenge area, such as major combat operations, homeland defense, irregular warfare, etc.

Consequence scale: A detailed consequence scale was developed to promote consistency across respondents in three areas: economic, military, and political. It is based in part on the findings from a 2000 study co-chaired by General Andrew Goodpaster⁷³ that defined a hierarchy of U.S. strategic interests, with “vital” (threatening the survival of the U.S. as a sovereign nation) as the highest category.

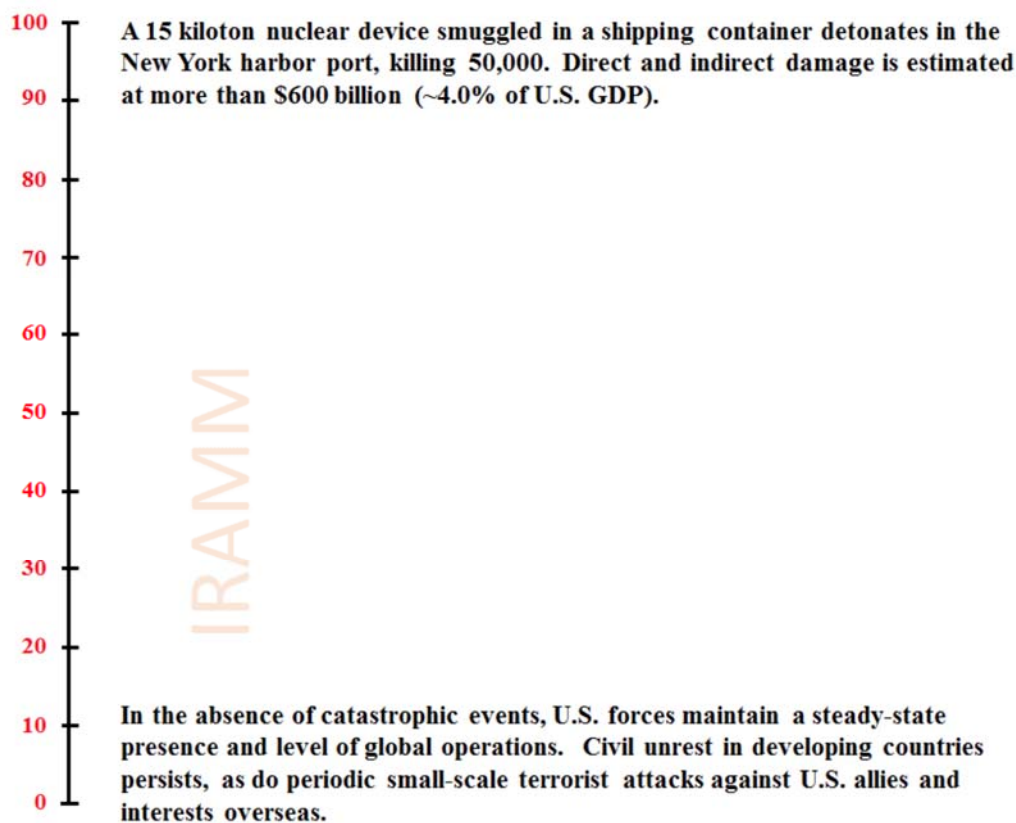
Economic	Military	Political	
<ul style="list-style-type: none"> • 4% or greater cumulative loss in GDP • Extreme, semi-permanent structural and economic costs. • Capital flows massively degraded and/or dollar collapses jeopardizing U.S. economic foundation. • Alliances and economic agreements terminated. 	<ul style="list-style-type: none"> • Loss of more than 10% of overall military force capability; <u>recovery longer than 4 years</u>. • Covering worldwide mission areas adequately is impossible. • Deterrence severely compromised in key areas. • Potential international condemnation due to high non-combatant casualties. • Loss of confidence in military, internally and externally. 	<ul style="list-style-type: none"> • The U.S. seen as unreliable by multiple allies or coalition partners and new regional security orders emerge. • Loss of credibility as guarantor of global security. • Allies and friends create their own nuclear arsenals to guarantee their security • Competitors become increasingly aggressive and adversarial. 	Most Severe
<ul style="list-style-type: none"> • 3% cumulative loss in GDP • Severe economic costs resulting from trade disruptions, operational factors, or property damage. • Capital flows seriously degraded and/or substantial devaluation of dollar. • Global economy stalled. • Recovery eventually. 	<ul style="list-style-type: none"> • Loss of 5-10% of overall military force capability; <u>recovery within 4 yrs</u> • Reduced worldwide mission areas commitment. • Deterrence weak in key areas. • Critical U.S. vulnerability revealed to all from military surprise. • International criticism due to high non-combatant casualties. 	<ul style="list-style-type: none"> • U.S. strategic influence severely degraded. • U.S. loses credibility in one or more key regions of the world. • One or more competitors takes advantage of perceived U.S. weakness. • Some coalitions fail; some allies turn away from the U.S. 	
<ul style="list-style-type: none"> • 2% cumulative loss in GDP • Serious economic costs due to trade disruptions, operational factors, or property damage. • Capital flows degraded and/or value of dollar weakens. • Economic disruptions possible, but no recession follows. • Reconstruction of key economic capabilities could take months. 	<ul style="list-style-type: none"> • Loss of 1-5% of military force capability; <u>recovery within 18 months</u>. • Worldwide mission areas still covered. • Overall mission success not questioned. • Deterrence weaker, but still strong. • High non-combatant casualties. 	<ul style="list-style-type: none"> • U.S. weakened as major global political broker. • International cooperation with U.S. put at risk. • U.S. credibility weakened with one or more competitors. • U.S. partners doubt U.S. commitment and begin to forge separate security arrangements or seek unilateral measures to guarantee their security. 	
<ul style="list-style-type: none"> • 1% cumulative loss in GDP • Some economic costs due to trade disruptions, operational factors, or property damage. • Confidence quickly restored domestically and internationally. 	<ul style="list-style-type: none"> • Loss of <u>less than 1% of military force capability</u>. • Worldwide mission areas covered adequately. • Low or predicted non-combatant casualties. 	<ul style="list-style-type: none"> • Some political opposition to and suspicion of U.S. intentions in previously friendly countries. • Reduced willingness of allies and friends to cooperate with U.S. on other international security goals. 	
<ul style="list-style-type: none"> • Negligible effect on GDP 	<ul style="list-style-type: none"> • No major loss of military force capability overall. • Worldwide mission areas covered adequately. • Low or predicted non-combatant casualties. 	<ul style="list-style-type: none"> • Some minor political opposition to and suspicion of U.S. intentions in previously friendly countries. 	Least Severe

IRAMM Consequence Scale Aid

⁷³ The Commission on America’s National Interests, *America’s National Interests*, Cambridge, MA: Belfer Center for Science and International Affairs, Harvard University, July 2000.

The scale is constructed so that the criteria in the three cells in a row have roughly equal consequences relative to other events in their category. The events with the smallest consequences are at the bottom and the most severe consequences are at the top. Some past respondents have assigned consequence scores in five equal bins (0–20, 20–40, 40–60, 60–80, and 80–100). However, respondents are not bound by the values in the scale and are free to assign consequence scores in accordance with their value systems. As a result, the scale is referred to as an “aid.”

Consequence Calibration: Calibration scenarios are used to further support consistency. Short scenario descriptions are used as calibration points for the top and bottom of a 100-point scale.



3

Calibration Scenarios

Respondents are asked to compare their consequence estimates to those in the calibration scenarios and adjust their scores as needed. The IRAMM calibration scenarios are (1) a nuclear attack on the U.S. homeland with a consequence value of 100 and (2) one with no significant

military events over the decade with a consequence score of “zero.” Pairwise comparisons⁷⁴ of the respondent’s score (a weighted average of the political, military, and economic consequences) with the calibration points help ensure internal consistency and consistency with other respondents. Most respondents consider the scenarios they identified to be less consequential than the high-end calibration scenario; however, nothing prohibits respondents from estimating consequences greater than 100.

Preparation for the Interview

The process begins with a meeting with the senior leader (sponsor) where objectives are established; participants are identified; major “challenge areas” that the nation or security organization may face in the future, such as major combat operations (MCOs), are defined; and special topics to be addressed in the interviews are specified. Correspondence is prepared and sent to each respondent, introducing them to the IRAMM process and the team conducting the interview. Finally, the senior interviewer reviews recent analyses and policies to ensure that they are prepared to engage in dialogue with the respondents.

Meeting with the senior leader to:

- a. Establish objectives: The senior leader may use the IRAMM protocols for many reasons, such as to help inform a difficult decision, to help build a program, to foster greater teamwork among the staff, to better understand the views of the staff, etc. Another objective may be insights on a special topic (problem), as was the case in the 2015 IRAMM support to the National Commission on the Future of the U.S. Army, where the commissioners needed to develop pros and cons associated with the transfer of AH-64 Apache aircraft from the Army National Guard to the regular Army.
- b. Identify challenge areas: The challenge areas define major concerns to the organization. Executing the IRAMM protocol will produce respondent risk scores, with rationale, for each challenge area. The number and content of the challenge areas may vary depending on the objectives of the senior leader. Other applications split cyber and weapons of mass destruction (WMDs) from homeland defense, or combine global peacetime operations with irregular warfare (IW). Finally, the scenarios associated with each challenge area may be identified by the respondent or specified by the senior leader.

⁷⁴ Using pairwise comparisons to induce consistency among responses is discussed in Edwards, Ward, “How to use Multi-attribute Utility Measurement for Social Decision Making,” *IEEE Transactions on Systems, Man, and Cybernetics*, Vol. SMC-7 No. 5, May, 1977, 326–340.

Challenge Areas	Definitions
Major Combat	Operations conducted against a state or non-state actor that possesses significant military capability. This area should account for risk related to the use of WMD during the course of major combat. <i>e.g., China, North Korea, Iran, Libya</i>
Irregular Warfare	Stability operations, counterinsurgency, peacekeeping, or counterterrorism operations involving significant participation of U.S. forces in combat or prospective combat. <i>e.g., Iraq, Afghanistan, Bosnia, Somalia</i>
Homeland Defense	Protection of U.S. sovereignty, territory, population, and critical infrastructure against external threats. This area should delineate among risks from WMD, cyber attack, and all other forms of external attack (except those directly related to Major Combat). <i>e.g., 9/11, missile attack, WMD attack, cyber attack, other terrorist attack</i>
Global Peacetime Operations	Operations conducted to influence partners and adversaries. This area should account for risks related to changes in allied or adversary military capabilities, weapons proliferation, or political instability that are contrary to U.S. peacetime military objectives but do not result in U.S. combat operations. <i>e.g., presence, deterrence, building partnership capacity, counter-proliferation, freedom of navigation, humanitarian and disaster response.</i>

Example Challenge Areas

- c. Select respondents: Respondents are often the senior leader’s direct reports and/or peers. General Pace, Chairman, Joints Chief of Staff, sought the views of all of his commanders, but excused the Central Command Commander from participating, due to the two wars in his theater. Sometimes the perspectives of recent retirees are included. The content of the letter or email that the respondent receives prior to the interview may include a schedule of interviews, senior leader objectives, an overview of the IRAMM process, definitions of the challenge areas, suggested background material that the respondent may want to review prior to the interview, etc.

The senior interviewer may “gently” challenge the respondent during the interview to more fully defend a response. This often involves providing some background that the respondent may not know, such as results from recent studies, intelligence assessments, etc. The senior interviewer prepares for these discussions by reviewing recent documents associated with each challenge area.

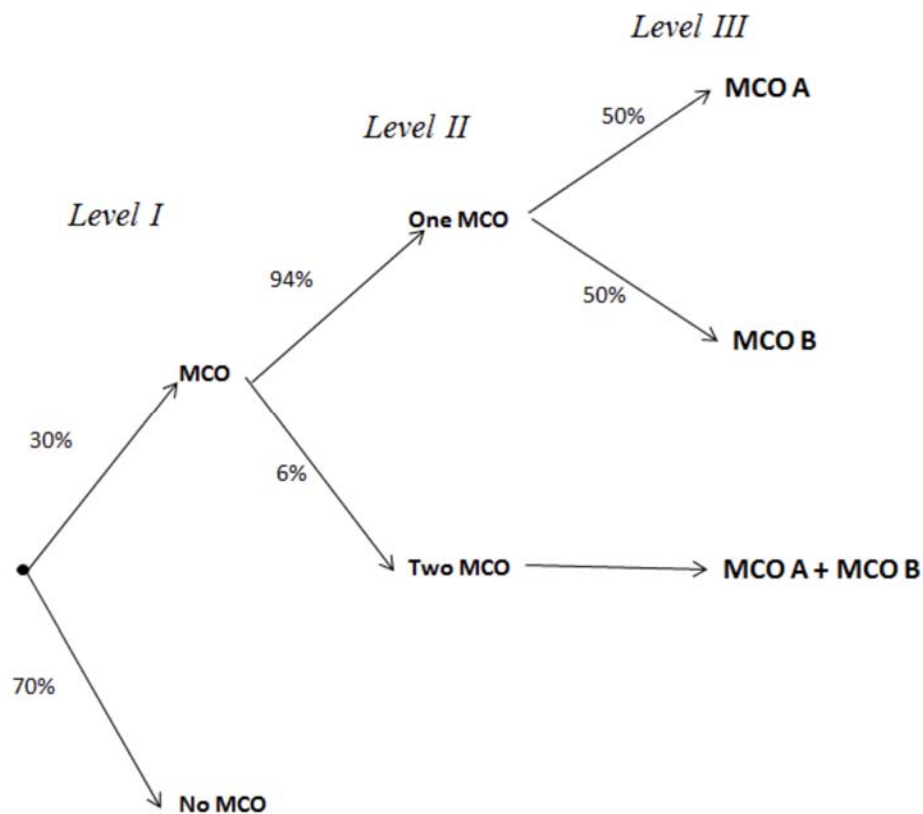
The Interview (1.5-2 hours)

The interviewer begins with a statement of the objectives, an overview of the IRAMM process, definitions of the challenge areas, a summary of the U.S. and allied forces that may be available to respond to an adversary, an introduction to the consequence tools, and additional background on the first challenge area. This usually takes about 10-15 minutes. Next, the interviewer asks the respondent to identify the scenarios of highest concern to them in the first challenge area. For

each scenario, the respondent is asked to indicate who the players are, how it starts, key events that may occur (including conflicts), how it may end, etc. A recorder documents the answers, which will become part of a report provided to the respondent later.

The respondent estimates probabilities and begins building an event tree. The interviewer accomplishes this by asking the respondent to (assuming the first challenge area is MCOs):

- a. Specify the probability that one or more MCOs (as identified in the preceding step) will occur within the risk time period (usually a decade) and confirm the response by answering: “Does this mean there is a $1.0 - p$ probability that there will be no MCO in the period?” This is displayed in the illustration with an estimate of 70% that no MCOs will occur during the risk time period.



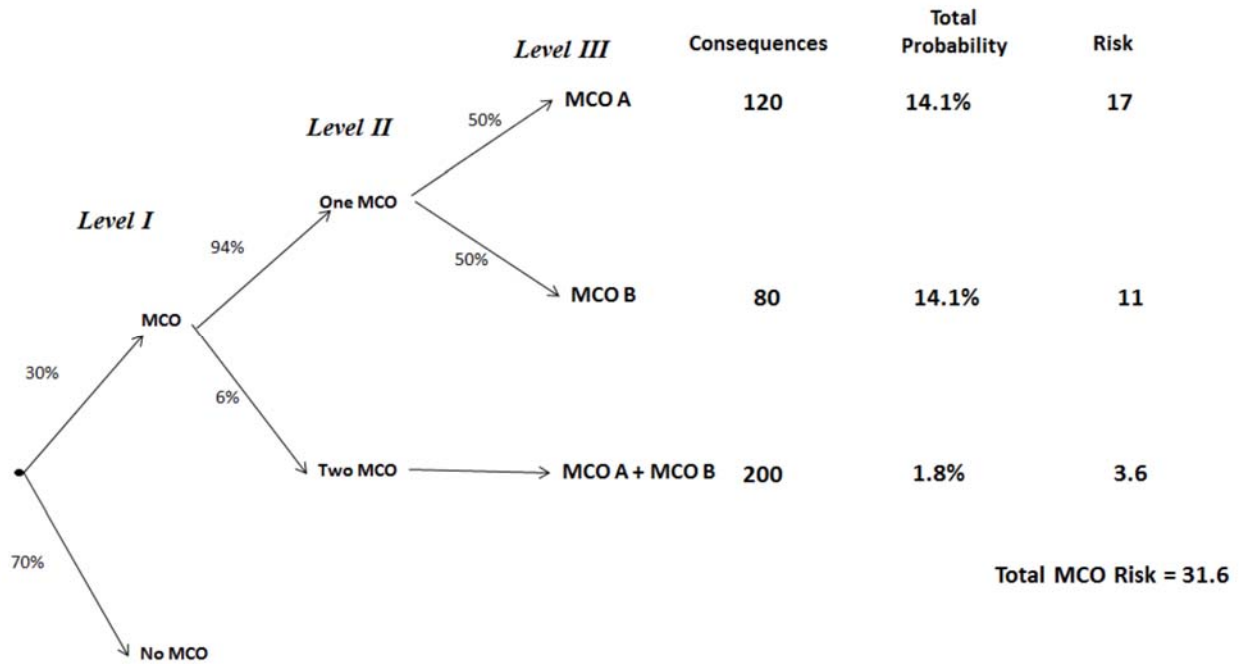
Partial Event Tree for MCOs

- b. Specify the probability that exactly one MCO occurs, given that at least one scenario occurs. Level II in the illustration shows a 94% chance that exactly one MCO will occur in the time period given that at least one MCO occurs. The complement is the probability that two or more MCOs will occur.

- c. Specify the probabilities that each of the scenarios occur if exactly one MCO occurs during the time period. These probabilities must sum to 1. Level III displays an example for two MCOs, with each occurring 50% of the time.

The respondent then needs to estimate consequences for MCO A, MCO B, and MCO A + MCO B in the example. The respondent usually uses the consequence scale aid to estimate economic, military, and political consequences. Next, the respondent is asked to use a weighted average to combine the three scores into an overall score for each of the terminal branches. Finally, the respondent is asked to compare their score to the calibration scenarios with questions like, “You provided a consequence score of 50 for MCO A which means you feel it is “½” as consequential as the calibration scenario. Is this true?” The respondent may adjust their scores based on these pairwise comparisons.

The interviewer next calculates the risk for the challenge area. This is accomplished by calculating the probabilities for each branch, multiplying the probabilities by the consequence score, and then summing the results to obtain the risk score for the challenge area. A software program is often used to do the calculations, as the respondent frequently specifies several scenarios and combinations of scenarios, complicating the risk calculation. Again, respondents are free to adjust their risk score when it does not reflect their beliefs.



Example Event Tree

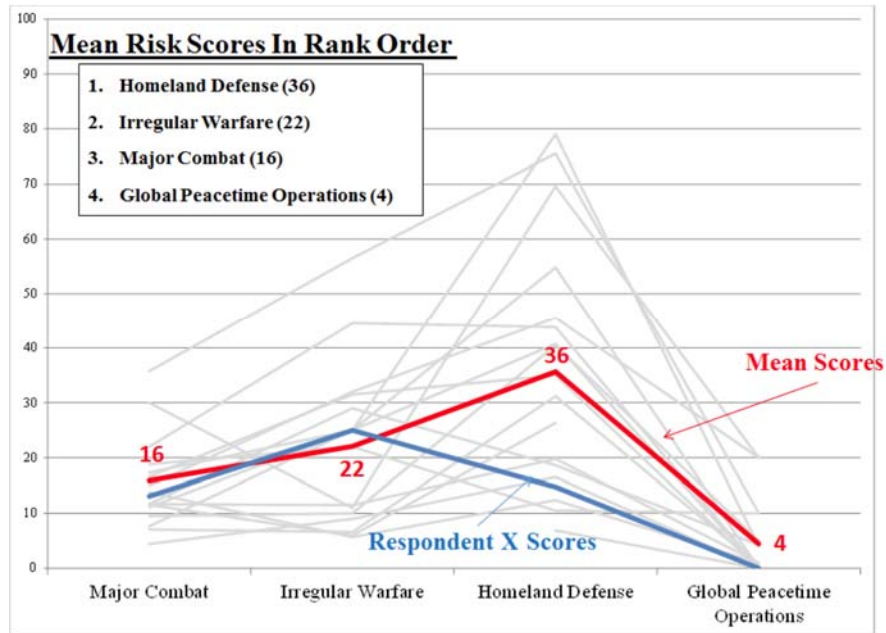
Next, the respondent repeats the process for the other challenge areas. Subsequent challenge areas typically take less time, as the respondent now understands the process and specifies fewer

scenarios. At the end of each challenge area, pairwise comparisons are used to ensure consistency *across* challenge areas. The respondent is asked to compare the total risk estimate for a just-completed challenge area to previously completed ones. For example, after specifying a risk score of 30 for the IW Challenge Area and 10 for the MCO Challenge Area, the respondent could be asked to confirm that the threat associated with the IW Challenge Area is “three times more risky” to U.S. vital national interests than that posed by the MCO Challenge Area. As before, the respondent is given the opportunity to change estimates. In addition, risk-averse participants sometimes increase their risk scores for very high consequence and very low probability events.

Finally, respondents are offered the opportunity to add to the rationale they have provided during the interview and asked to suggest risk-mitigating solutions. They are also asked to comment on how risk may change over time and on special topics designated by the sponsor.

The IRAMM interview team usually includes a recorder who prepares a summary of results that includes scenario descriptions, tree diagrams, risk scores, and rationales for each challenge area. The summary may also contain comments on risk trends, force adequacy, and risk-mitigating suggestions.

Step 2: The group meeting



Example IRAMM Strategic Risk Profile

The group meeting begins with the respondents being given a copy of their interview results, including a display of their risk scores in relation to those of the other respondents and their rationales.

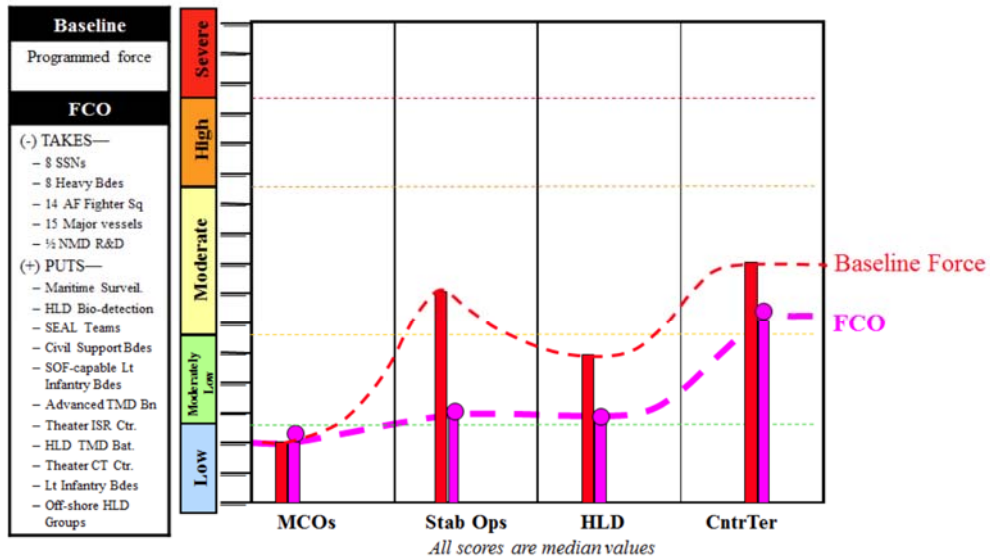
A senior facilitator then presents not-for-attribution results that include graphical displays, tables containing comparisons of rationale, and a summary of creative approaches to challenging problems. The ensuing discussion often leads to lively, productive debate of basic concepts and the generation of additional promising program and policy options for mitigating strategic risks. The meeting can also encourage respondents to modify their views and adjust initial scores and rationales before they are provided to the senior leader.

Another way of displaying results is to identify the percentage of respondents that rank each of the challenge areas first, second, or third. For example, 85% may rank HLD first, 10% may rank MCOs first, and 5% may rank IW as the challenge area of greatest risk. In addition, sometimes measures of dispersion are shown (e.g., standard deviations, minimum and maximum individual scores). There are several ways in IRAMM to display shared and divergent rationales among the respondents. Shared views may be expressed with a statement like, “almost all respondents felt that the irregular warfare area is low risk,” followed by statements made in the interviews that supported this view. Differing views may be expressed in a table.

Alternative Viewpoints: Homeland WMD Attack

	Greater Risk Viewpoint	Lesser Risk Viewpoint
1	An individual or organization with intent to attack the U.S. with a nuclear, biological, or radiological weapon could succeed and there could be significant psychological effects. The resultant domestic <i>political consequences</i> could threaten the federal structure of our government.	There is a “negligible chance” that a Radiological or Chemical attack would occur and, in the event one did, the consequences would be “negligible”.
2	The consequences of a significant terrorist-initiated biological event had the potential to be “surprisingly” close to those of a nuclear detonation as the result of the disruption of our way of life and the suppression of the <i>economy</i> following the breakout of a vector-borne illness. The probability of a radiological attack is much higher than that of a nuclear attack but the consequences would be almost as severe.	A biological attack would most likely be conducted by a disgruntled domestic who is not particularly sophisticated. The consequences would be small and contained consisting of possibly “giving up some liberties.”
3	There is an 80% chance that a nuclear weapon is detonated in the U.S. in the coming decade. With regard to a nuclear attack, there is a serious threat e.g., emanating from Pakistan, of proliferation to small groups, and insufficient capacity to detect devices coming into the U.S.	Nuclear attack would require a lot of things to have to come together. It is too difficult for someone to detonate a nuclear device on the homeland. Our enemies are not sophisticated enough to obtain, create, or deliver such weapons.

Displays comparing risk-mitigating solutions differ in format depending on the topic. For example, comparing the risk associated with two force structures, the baseline and a Force Capability Option (FCO), as shown in the figure below.



Example of a Comparison of Risk for Two Force Capability Options

A second interview is used to generate the risk associated with the FCO, with ideas for the content for the FCO coming from risk mitigations identified in the first interview. The “puts” specify what is added to the baseline force and the “takes” stipulate what is removed from the baseline force to create the equal cost alternative. Finally, note that the risk scores are median values (vice mean values).

Step 3: Providing results to the senior leader

The senior leader may be briefed by the IRAMM team and/or receive a written report. All products are provided on a not-for-attribution basis, with results by name closely guarded. This is an important feature of the process, as some respondents may not express their true views otherwise. The senior leader’s deeper understanding of the issues and how their views compare to the views of their peers and staff often lead to requests for additional research, new programs, and changes in policies. In addition, the rationales that respondents use to support their IRAMM inputs are frequently appropriate for use in official organization publications.

IRAMM has been applied extensively by various senior leaders, including the Director of Program Analysis and Evaluation, Vice Chairman of the Joint Chiefs of Staff, and the National Commission on the Future of the Army. In total, more than 75 senior leaders in the U.S. national security community have used and participated in the IRAMM assessment process. IRAMM provides a proven structure that senior leaders can use to think strategically and gain a clearer nationwide perspective of key challenges. Its risk-based approach produces both quantitative assessments and supporting rationales. Comparisons across respondents, enabled by strong consequence scales, enrich group discussions, strengthen understanding of issues, facilitate

agreements among the staff, and help establish priorities. IRAMM is a decision-support aid that strengthens subjective decisions required by the senior leadership. Its approach brings an enterprise-wide perspective by efficiently summarizing the views of senior advisors while ensuring that they take advantage of the best available objective evidence from analyses and intelligence reports when articulating their views. These risk-based views can help senior leadership build a case for their decisions. The methodology also helps build and sustain strong teamwork among the senior staff in a manner that often generates creative solutions to problems, enhances understanding of priorities, and results in more consistent application of policy. It helps leaders do a better job of building a grand strategy.

Summary on Methods

Williamson Murray alleges that today's strategy documents are "...tasteless mushrooms in an overheated dark room."⁷⁵ He concludes:

The problem lies in the fact that these so-called strategic documents are the product of bureaucratic processes that aim to remove contentious issues, while insuring that those issues near and dear to the hearts of the participants receive the highlighting. Written by groups of the unimaginative, they pass up the chain of command to insure there is nothing daring or controversial that might upset the conventional wisdom with its comfortable assumptions.⁷⁶

Eliot Cohen recently asserted:

Containment, end state, and exit strategy are a kind of strategic pixie dust, the sprinkling of which over the complex problems of contemporary policy problems may seem to make them manageable. In fact they do not manage them. They oversimplify them....timid or unimaginative politicians and generals, will thrash about, hoping for pat formulas that will relieve them of the burden of sizing up particular circumstances.⁷⁷

These five methods provide strategists with techniques for building a grand strategy that can go beyond bureaucratic comfort and pixie dust:

- Be Agile in Leveraging the Elements of America's Power
 - Understand the Strategic Environment
 - Exploit Our Sources of Power

⁷⁵ Williamson Murray, "Introduction," Williamson Murray and Richard Hart Sinnreich, editors, *Successful Strategies: Triumphant in War and Peace from Antiquity to the Present*, Cambridge: Cambridge University Press, 2014, loc. 108.

⁷⁶ Ibid.

⁷⁷ Eliot A. Cohen, *The Big Stick: The Limits of Soft Power & the Necessity of Military Force*, New York: Basic Books, 2016, 203.

- Apply History Expertly – Thinking in Time
 - Distinguish Among Facts: Known, Unclear, Presumed
 - Apply the Goldberg Rule
 - Quantify Estimates of Likelihood and Reliability
 - Ask Alexander’s Question
 - Practice Placement
- Counter the Propensity for Analytic Bias
 - Employ Diagnostics
 - Apply Contrarian Tradecraft
 - Enable Imaginative Thinking
 - Conduct Analysis of Competing Hypotheses
- Build A Cross-Species Team
 - Maximize Utility of Foxes
 - Leverage a Few Hedgehogs
- Assess Risk Systematically
 - Select Contributors & Scenarios
 - Identify Sources of Risk & Approaches to Mitigation
 - Integrate Individual Assessments into Central Tendencies & Variances
 - Compare & Contrast Alternative Capability & Resource Options

The Ends of America’s Grand Strategy: Traits

We do not need to start from nothingness in creating a grand strategy for the 21st century. The Chairman of the Joint Chiefs of Staff created an effective starting point for grand strategy in his “4 + 1” framework:

...last year...as we were trying to assess the risk that we currently had in meeting our national security objectives, we came upon looking at the four state threats...Russia, China, Iran and North Korea and violent extremism...when I look at those challenges, each of those five, it tells me a couple things about character of war in the 21st century. One is that virtually any conflict we’d be involved with would be in all domains: sea, space, air, land, cyberspace. The second is that it would be trans-regional, meaning it would cut across multiple...geographic combatant commands...when we look at...our path of capability development...at the end of the day it’s all about ensuring that we maintain a competitive advantage that will allow us to advance our interest.⁷⁸

⁷⁸ General Joseph Dunford, Chairman Joint Chiefs of Staff, “Global Threats and American National Security Priorities,” Washington D.C.: The Brookings Institution, February 23, 2017, <http://www.cq.com/doc/newsmakertranscripts-5048925?0>.

At this time in its development of a new grand strategy, the White House may feel tempted to rush headlong into a BOGGSAT, codify a few “big ideas,” and call it a strategy. Or, there may emerge a dominant personality – a 21st century Kissinger – who would dictate the terms of the next strategy. We counsel a more deliberate approach that need not take an inordinate amount of time. There is plenty of time to apply the rigor and discipline we believe are necessary.

We suggest a number of broad guidelines within which to get started. The strategy should be focused on all important aspects of the **HEART**:

- Begin at **Home**, including cyberspace, preventing attacks on the homeland from within and from elsewhere. Build the U.S. as a strong core to promote our interests and values worldwide.
- Protect our **Embassies** all around the world. We need to be ready to protect, defend, and support these outposts of American sovereignty.
- Defend the global **Arteries** of commerce and prosperity across the global commons by conducting Freedom of Navigation Operations across all domains (air, land, sea space, and cyber) while promoting opportunities for true growth for ourselves and others who share our economic interests in using these arteries.
- Protect and advance **Regional** interests and commitments of special importance – high-priority regionally based vital interests; commitments to allies in regions around the world – honoring those commitments and building on them for mutual security.
- Manage **Transnational** threats, chiefly terrorism. We will defeat ISIS and Al Qaeda. But terrorism as a way of achieving a political end is a timeless tactic of the weak. It is especially useful to non-state actors motivated by religious, ideological, criminal, and political intent. The methods and means we have mastered in the early 21st century will continue to serve as a starting point for dealing with the next inevitable historical cycle of terrorism.

Indeed, our grand strategy must be **GLOBAL**:

First, America’s grand strategy must cover the entire **Globe** in scale. Our interests are threatened, not just in a few regions or exclusively by a few groups.

Second, we must **Leverage** the comparative advantages we already possess, that our adversaries are not likely to catch up to, and that complement, not duplicate, the capabilities of our allies.

Third, the U.S. should continue and redouble our efforts to **Overmatch** our foes, both in hard and soft power, in carrots and in sticks. We should not be content with just enough or just in time strength. We should never deliberately send our men and women into a fair fight; we should always give them an unfair advantage. And while we should never show weakness or a reluctance to use armed force when necessary, we should seek to find, develop and use superior negotiating and leveraging skills to promote and achieve our goals with as little bloodshed as is prudent.

Fourth, we can continue to exploit the exceptional American capacity in the cognitive domain of war to discover and employ **Brilliant Alternatives** to traditional strategic approaches that will become stale and anticipated. Having at least a Plan A and a Plan B, plans that will usually both combine carrots and sticks, is essential, at least because “Murphy Lurks” and very often as a hedge against adversary surprises. Consider the big reason for a nuclear Triad -- as a hedge against something going wrong with just one or even two strategic nuclear capabilities. Efficiencies and minimum cost approaches are not always the best from a strategic standpoint, when the consequences of failure can be catastrophic.

Finally, we must not produce a strategy just good enough for the next four years. We must take, as did the Romans for 700 years and the English for 500 years, a **Long Term Perspective**.

GLOBAL grand strategy would go a long way toward securing the blessings of liberty to ourselves and our posterity. There will be several critical choices ahead, both in developing a grand strategy and in the course of human events. Long-standing alliances may continue to prove their worth for some time to come, others may shift, some may no longer be relevant, and new ones may present themselves. The complex 21st century will challenge us on how best to build strong international partnerships to advance shared interests and values, and how to decide what conditions should be present before the U.S. intervenes overseas unilaterally, to name a few. The traits and methods we advocate here should guide how we make such choices.

What Works and What Doesn't?

Good traits and sound methods are necessary in developing a grand strategy. Understanding what works and what doesn't work in carrying out a grand strategy are also essential to adapting the grand strategy to changing conditions. Both the global strategic environment and the character of the conduct of war are eternally changing. We are convinced that rigor and discipline are also required to adapt grand strategy as conditions change. For example, what is the next conventional military confrontation going to look like? It will not be a repeat of the 1991 Persian Gulf War. So how should we prepare for such potential conflicts as a Russian invasion of the Baltic NATO Allies, or North Korean use of a nuclear weapon?

For starters, we must get the facts straight. This involves unbiased collection of information and intelligence. The process of intelligence collection must be diligent and thorough. A significant reason for the intelligence failure at Pearl Harbor in 1941 was the lack of good intelligence on what the Japanese were doing. As David Kahn has pointed out in rebutting Roberta Wohlstetter's assertion that the failure was the result of not being able to detect the “signal” among all the “noise,” “There was a dearth of intelligence materials. Not one intercept, not one datum of intelligence ever said a thing about an attack on Pearl Harbor. There was, in Wohlstetter's terms, no signal to be picked out.”⁷⁹

⁷⁹ David Kahn, “The Intelligence Failure of Pearl Harbor,” *Foreign Affairs*, Vol 70 No 5, Winter 1991, 147-148.

In any challenge to our strategy, we must be conscious of our human propensity to apply shortcuts to perception and decision-making, and take the time and effort necessary to overcome our biases against thinking in time. Understanding the perceptions of our adversaries can be just as important to this process as understanding our own interests and capabilities. Caitlin Talmadge has recently pointed out how we may be missing this crucial aspect of a potential future conflict with China. In her recent analysis of how the Chinese are likely to perceive a future conflict with the U.S., Talmadge is concerned that most U.S.-China analysts dismiss any likelihood that China might change its nuclear no-first-use policy: “Chinese leaders might see limited nuclear escalation as their least bad option, using nuclear weapons for purposes of military advantage or coercive leverage or both...”⁸⁰

Getting the facts right also means applying the rigorous analysis we already have access to in order to understand the particulars of a current event in strategic context. As Paul Huth found in his 58 cases, what we can do is not limited to the military domain; indeed, deterrence by military means has worked best when integrated with a diplomatic approach tailored to the situation.⁸¹ And we must approach any challenge to our strategy with an intent to overmatch our adversaries, not only with military power but in the context of effective strategy and policy. Blechman and Kaplan remind us, from their analysis of 215 cases “...it should be recognized that these military operations cannot substitute for more fundamental policies and actions – diplomacy, close economic and cultural relations, an affinity of mutual interests – which can form the basis either for sound and successful alliances or for stable adversary relations.”⁸²

We have learned much about how to integrate diplomatic and economic elements into strategy over more than a decade of experience. A recent study by the American Academy of Diplomacy found:

Experience in Afghanistan and Iraq has sent a powerful message about the need for more parts of U.S. government to be involved in foreign interventions in order to maximize the effectiveness of the U.S. power and influence projected into conflict situations. The U.S. military has usually taken the lead. The U. S. Department of State and U.S. Agency for International Development (USAID) often have been less involved than needed to ensure maximum effect, in major part because of lack of resources. Other elements of the U.S. government have been largely absent. For example, only a handful of personnel from the U.S. Department of Agriculture are deployed in Afghanistan. In many cases, USAID will be best placed to undertake and integrate activities that fall under the rubric of development—provided that it is sufficiently funded and staffed. Where USAID falls short, expertise should be drawn from the Departments of Justice, Health and Human Services, and Education; the Drug Enforcement Administration; and the National Institutes of Health. However, all of these agencies have other missions, budgets, and domestic political constituencies that inhibit foreign deployment and make them reluctant

⁸⁰ Caitlin Talmadge, “Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States” *International Security* Vol 41 No 4, Spring 2017, 51.

⁸¹ James S. Thomason, et. al., *Transforming US Overseas Military Presence: Evidence and Options for DoD*, Volume 1: Main Report, Alexandria VA: Institute for Defense Analyses, July 2002, IDA Paper P-3707, iv-4.

⁸² Blechman and Kaplan, 517-518.

to take part in such operations. There needs to be an expeditionary capacity in these critical civilian areas to enable overall mission success; this will only happen if required by the President and Congress.⁸³

In developing and adapting a grand strategy, we need to do at the strategic level what we have become so proficient at doing at the operational level and with technical and programming alternatives: Course of Action Analysis. Armed with unbiased comprehension of facts, objective assessments of their meaning, and guided by the basic principles of HEART and GLOBAL, we must create pathways to achieving our objectives, not with blinders to all other considerations, but with a rigorous understanding of the branches and sequels that may present themselves to the path ahead.

In this concluding section, we address a number of elements of the current situation that are undergoing change and we offer examples of rigorous analysis that provide a basis for adapting grand strategy accordingly.

Counterinsurgency

After more than 15 years of counterinsurgency (COIN) and counter terrorism operations, what have we learned about what works and what does not work in such campaigns? Our doctrine re-discovered how to apply timeless tenets to 21st century insurgencies and counterinsurgency operations: “The primary objective of any counterinsurgent is to foster the development of effective governance by a legitimate government.”⁸⁴

But our strategy should be informed by new lessons we have learned regarding what works in COIN as a result of recent empirical analysis. In his dissertation, Michael Fitzsimmons examined the questions of whether good governance, legitimacy, and local security were still the essential keys to successfully defeating an insurgency. Fitzsimmons challenges the presumption that legitimacy through good governance is the primary key to success in COIN. He suggests a related but quite different proposition: “...claims to legitimacy may rest primarily on the identity of *who* governs, rather than on *how* whoever governs governs.”⁸⁵

His field research involved extensive interviews and eyewitness accounts of U.S. COIN operations in Tal Afar 2005-2006 and in Ramadi 2004-2005. “The cases examined yield ample evidence that ethno-religious identity politics do shape counterinsurgency outcomes in important ways, and also offer qualified support for the hypothesis about the relative importance to counterinsurgent success of identity politics versus good governance.”⁸⁶ In other words,

⁸³ Robert E. Hunter, Edward Gnehm, and George Joulwan, eds., *Integrating Instruments of Power and Influence: Lessons Learned and Best Practices* 2008 Santa Monica CA: The RAND Corporation, ix-x.

http://www.rand.org/pubs/conf_proceedings/CF251.html

⁸⁴ Headquarters Department of the Army 2006. Field Manual 3-24. 2006 Counterinsurgency, 1-21.

<http://usacac.army.mil/cac2/Repository/Materials/COIN-FM3-24.pdf>.

⁸⁵ Michael F. Fitzsimmons, “Governance, Identity, and Counterinsurgency Strategy,” PhD diss., University of Maryland, 2009, 3.

⁸⁶ *Ibid.*, Abstract.

legitimacy and security are necessary but not sufficient strategic ends in the kind of counterinsurgency experienced in Iraq. “What this research adds to our understanding of counterinsurgency is an appreciation for identity-based sources of legitimacy which can rival and even eclipse the legitimacy that flows from good governance.”⁸⁷ What works in the kind of counterinsurgency we have experienced in Iraq is to focus on both identity politics and good governance.

Force Without War

How do compellance and coercion work now? How should we conduct military operations in support of foreign policy such that the signal of our messaging is received above all the noise that crowds the expanded 21st century media? Does sending an aircraft carrier convey the same signal today as it did in the Gulf of Tonkin in 1965 or in the Taiwan Straits in 1996?

Strategists often refer to the engineering metaphor of “signal-to-noise ratio” in assessing how a state communicates its message to others by use of military, diplomatic, economic, and informational means. It is an imperfect but useful analogy, especially in a world of new communications mechanisms. Such signaling now must power through vastly more complicated means: internet, dark web, social networking, ubiquitous broadcast and cable media, tweet/chat, “fake news,” and the cypherpunk underworld. Nevertheless, there has been empirical research into what works and what does not work in this cognitive domain of war.

Daryl Press conducted case studies into instances of a country communicating deterrent threats to an opponent to prevent the outbreak of war among great powers.⁸⁸ He looked at German assessments of British and French threats in 1938–39, British and U.S. assessments of Soviet threats in the Berlin crises of 1958–61, and U.S. assessments of Soviet threats in the Cuban missile crisis of 1962. Press found that deterrence works when a country makes threats that the opponent believes it is capable of carrying out and when the opponent believes its adversary has a strategic interest in doing so. In other words, the prerequisite for deterrence has less to do with rational calculations of risk and intent, even if the adversary has a reputation for bluff, bluster, and subterfuge. The success or failure of deterrence in those cases had more to do with perceptions of capability and willingness; what matters most is the here and now, not past behavior.

Press also suggests several ways to assess intent. He asserts that “[t]he evidence for credibility is in the adversary’s private communications about their perceptions of our capabilities and intentions and their reasoning behind their own policies.” In his four case studies, Press found strong support for the conclusion that there are two primary sources of evidence about the credibility of a deterrent threat in the mind of the adversary. First, we can turn to the opposing decision makers’ statements about their adversary’s credibility. They often make statements about their expectation of the explicit likelihood that we will carry out our threats and promises.

⁸⁷ Ibid., 278.

⁸⁸ Daryl G. Press, *Calculating Credibility: How Leaders Assess Military Threats*, Ithaca, NY: Cornell University Press, 2005.

Second, Press says to look at the very policies that decision makers advocate during crisis. Credible threats generate more calls for concessions than threats that are not credible. If the opponent decision makers advocate a hardline policy, they do not believe our threat is credible. If they argue for caution, they assign higher credibility to our threat.

Press reached these conclusions by examining the archives of the countries and persons involved in historical crises. Today, we should be able to exploit national technical means to collect and listen in on such deliberations by our adversaries in near real time.

Extending the previous work of Blechman and Kaplan, other recent research has examined broader forms of U.S. attempts to exert its influence and push its signal-to-noise ratio to higher levels,⁸⁹ considering any use of U.S. military assets in overseas areas that are engaged in routine, regular non-combat activities or functions, including training foreign militaries, exercises with friends and allies, positioning US C3I systems, facilities access by visiting U.S. forces, official visits, port calls, public affairs events (such as air shows) and foreign military personnel training in the U.S., co-production of military systems, and pre-positioning of military equipment abroad. This recent research supports Blechman and Kaplan's conclusion that such operations often produce successful outcomes, and there is some credible analysis applicable to the formulation of grand strategy.

The most comprehensive historically based analysis of factors that promote successful deterrence of state-level attacks upon friends and allies of a major power was published by Paul Huth in 1988.⁹⁰ He conducted an empirical examination of all known historical cases of extended deterrence over the preceding century through 1984 – efforts by a major power to deter another state from launching a military attack upon a friend or ally. Huth demonstrated unequivocally that forward presence, over-the-horizon power projection capability, and several very specific military and diplomatic strategies have systematically and positively affected the success that the U.S. is likely to have in deterring other nations from attacking its friends and interests overseas. Huth was able to estimate the respective strengths for such factors in promoting the successful extended-immediate deterrence of a challenger.

Overall, Huth's findings imply that if the U.S. applies historically effective military and diplomatic strategies and maintains its current power projection capabilities, it can provide a high (90%-95%) degree of U.S. confidence of successful deterrence in these threat contexts, even after drawing down routine troop levels in these regions by 25 percent or more. Thus, the grand strategist pursuing Huth's approach should adhere to the following guidelines, both before and during future crises:

⁸⁹ James S. Thomason, et. al., *Transforming US Overseas Military Presence: Evidence and Options for DoD*, Volume 1: Main Report, Alexandria VA: Institute for Defense Analyses, July 2002, IDA Paper P-3707.

⁹⁰ Paul Huth, *Extended Deterrence and the Prevention of War*. New Haven: Yale University Press, 1988. See also: Paul Huth and Bruce Russett, "What Makes Deterrence Work? Cases from 1900 to 1980." *World Politics*. July 1984.

- Maintain a decisive favorable military balance over potential adversaries through some combination of U.S. power projection capability and routinely present forces, as well as those of our protégés.
- Adopt a “best strategy” approach wherever possible (i.e., use a Firm-but-Flexible diplomatic strategy in combination with a Proportional Response military strategy).
- Under no circumstances should the potential use of ground troops be taken off the table, publicly or privately, in devising the defender’s military counter-threat to a challenger in an extended-immediate deterrence attempt. A ground/strike mix may be best; it hedges against the possibility that the challenger’s assessment of the defender’s resolve may be high, and it may also be hardest for the challenger to “design around.”⁹¹

Such empirical analysis will not settle the debate between grand strategies of restraint versus predominance, but it can provide a basis for applying what works, and avoiding what doesn’t work. It demonstrates that “presence” of military forces can be an effective means, regardless of the ends of the strategy.

Industrial Strategy

We live in an information age, but our national strategy must also integrate industrial age dimensions, such as critical materials. No state is an autarky in an increasingly globalized economy. The U.S. is dependent on about 76 strategic and critical materials (e.g., aluminum oxide, beryllium metal, gallium, silicon carbide, tungsten, etc., inter alia) and the grand strategy must develop ways and means of providing for those materials in peacetime and war.⁹²

In the past, the only solution to the problem of wartime shortfalls was stockpiling in peace and rationing during war. But grand strategy must balance ways and means with ends, and that means weighing risks and costs associated with various approaches to maintaining access to critical and strategic materials. Buying and storing excess quantities in case you might need them in the future can be expensive. There are alternatives, such as paying vendors just a little bit more for what you need right now and having them manage their on-hand stocks at some calculated level above normal supply and demand. Substitute materials could be more readily available and perhaps foreign suppliers could be depended on for wartime purchases.

The Department of Defense has moved beyond the traditional National Stockpile planning methods and now employs a risk-based process of evaluating stockpiling versus other cost-effective approaches. Stockpile managers employ certain quantitative techniques – modeling based on both linear and non-linear methods – to identify optimal mitigation options within a budget constraint. In using this technique, modelers can adjust the parameters of the model – probability of a war happening, planning time horizon, consequences of shortfall, etc. – and can adjust the overall budget constraints, as well as the risk tolerance. Analysts (mostly hedgehogs)

⁹¹ Thomason, *Ibid.*, pp. IV-18 – IV-19.

⁹² Under Secretary of Defense for Acquisition, Technology and Logistics, *Strategic and Critical Materials 2013 Report on Stockpile Requirements*. Washington DC: U.S. Department of Defense, 2013.

design, maintain, and operate the model to provide strategists with policy options to hedge against the risk of coming up short of a particular strategic or critical material:

- Stockpiles (which can be sold and initial costs recouped once no longer needed)
- Buffer stocks (for which the government would pay a rental cost to the vendor)
- Reduced government guarantees of materials for use in export goods (which, during a wartime planning scenario, would yield more materials available for government consumption)
- Substitutions (which in wartime would be required of manufacturers for non-military production)
- Extra government buys of foreign materials (at potentially higher wartime prices)

What the modeling methods bring to bear on this strategic choice is the ability to vary many more parameters and variables than a single strategist could manipulate in the human brain. Linear and non-linear programming enables optimal choices of options among materials under cost and risk constraints that are not otherwise practical when dealing with even modest numbers of materials and options.⁹³

Critical Infrastructure

And what about this new domain – cyber? Current doctrine stipulates:

Most aspects of joint operations rely in part on cyberspace, the global domain within the information environment consisting of the interdependent network of information technology infrastructures and resident data, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers. Developments in cyberspace provide the means for the U.S. military, its allies, and partner nations to gain and maintain a strategic, continuing advantage in the operational environment (OE), and can be leveraged to ensure the nation's economic and physical security. Access to the Internet provides adversaries the capability to compromise the integrity of U.S. critical infrastructures in direct and indirect ways.⁹⁴

Here, too, empirical approaches are necessary to support an effective grand strategy. For example, the nation's dams are vulnerable to cyber attack and the US Army Corps of Engineers is responsible for mitigating such risk. The Common Risk Model for Dams (CRM-D), developed by the U.S. Army Corps of Engineers (USACE) in collaboration with the Institute for Defense Analyses and the U.S. Department of Homeland Security, is a consistent, mathematically rigorous, and easy to implement method for security risk assessment of dams, navigation locks, hydropower projects, and appurtenant structures. The methodology provides a systematic approach for independently evaluating physical and cyber security risks across a portfolio of

⁹³ James S. Thomason, et. al., "Strategic Material Shortfall Risk Mitigation Optimization Model," *Military Operations Research* V20 N4 2015, doi 10.5711/1082598320405.

⁹⁴ Chairman Joint Chiefs of Staff, *Joint Publication 3-12 Cyberspace Operations* p.v., 5 February 2013, http://www.dtic.mil/doctrine/new_pubs/jp3_12R.pdf.

dams, and informing decisions on how to mitigate those risks. The CRM-D can effectively quantify the benefits of implementing a particular risk mitigation strategy and, consequently, enable return-on-investment analyses for multiple physical and cyber security risk mitigation alternatives and facilitate their implementation across a portfolio of dams.⁹⁵

21st Century Nuclear Deterrence

There seems to be an uncommon consensus, both in Congress and within the Executive Branch, that the U.S. nuclear triad should be modernized. But this element of our grand strategy has uncovered a number of issues that have involved the kind of empirical analysis we call for here. For example, the Global Zero Commission had argued that the triad could be replaced with a much less costly and less risky dyad.⁹⁶

Such calls for moving away from the triad can overlook the issue of how to hedge against future risks of technical failure. The 2010 Strategic Posture Commission recognized the need to maintain numbers and types of nuclear weapons to mitigate the risk of technical failure:

A technical surprise, meaning for example a sudden discovery of a technical problem that results in the decertification of an entire class of warheads, might drive the United States to replace one warhead type with another. To hedge against technical surprise, the United States currently retains two warhead types for each major delivery system. This approach to hedging requires retention of seven different types of warheads and a significant number of non-deployed warheads. As the reductions have proceeded over the period since the end of the Cold War, the potential to deal with technical surprise has been reduced, as the diversity of types of weapons in the stockpile has shrunk.⁹⁷

The Department of Defense has examined the cost-effectiveness of potential dyads versus the triad in light of the need to maintain a technical hedge. Such analysis explores alternative ways that the U.S. strategic nuclear posture could evolve over the next several decades, taking into account (1) the need to hedge against events that might make the future U.S. nuclear posture an inadequate deterrent, (2) the posture's essential capability attributes, (3) threats to the survivability or effectiveness of the U.S. strategic nuclear posture, and (4) the costs to re-capitalize and maintain alternative triads and dyads. Conclusions include the following: (1) In order to be adequately hedged, dyads need to have all the essential capability attributes of the U.S. strategic deterrent posture in both legs, while triads require each of these attributes in only

⁹⁵ Yazmin Seda-Senabria, James D. Morgeson, and Jason A. Dechant, PhD, "An Integrated Approach for Physical and Cyber Security Risk Assessment: The USACE Common Risk Model for Dams," presented at 2016 Association of State Dam Safety Officials (ASDSO) Conference, Philadelphia, PA, September 11-15, 2016.

<http://www.proceedings.com/32100.html>.

⁹⁶ General (USMC Ret.) James Cartwright, Chair, *Global Zero: A World Without Nuclear Weapons Global Zero U.S. Nuclear Policy Commission Report Modernizing U.S. Nuclear Strategy, Force Structure and Posture* Washington DC: Global Zero Commission 2012, 6-7.

⁹⁷ William J. Perry, Chairman and James R. Schlesinger, Vice Chairman, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States* Washington DC: United States Institute of Peace Press, 2009, 39.

two of their three legs. This extra flexibility makes triads much easier to keep adequately hedged than dyads. (2) Current and potential future threats call for planning and possibly implementing countermeasures to protect all three legs of the U.S. strategic nuclear posture. (3) At a constant 1,500 assigned weapons, dropping the Inter Continental Ballistic Missile leg of the triad could raise costs of the resulting dyad, especially when the resulting requirements to hedge the remaining two legs are taken into account.⁹⁸

Conclusion

Counterinsurgency, force without war, industrial base resilience, cyber protection of critical infrastructure, and nuclear deterrence are examples of analytic challenges that our grand strategy must address. The traits we have described should provide the azimuth to pursue in meeting these challenges. The five methods we have described should guide how to apply our resources to our strategic ends in line with those traits. Our experience in applying empirical methods to understanding what works and what doesn't provides examples of the kind of rigor that is needed in forming and adapting our grand strategy. Empirical analytic methods can and should inform grand strategy.

Knowledge is powerful, but it is not enough in developing grand strategy. Knowledge must empower action. Every state performs basic functions: defend its territory and people, administer the law, collect taxes, protect trade, and provide for commerce. In conducting such affairs, states inevitably come into conflict. When war comes, winning is always better than losing, as Claremont Professor Harold W. Rood taught to a generation of students who went on to admirable public service as strategists.⁹⁹

Understanding and asserting our values must form the origin of our strategy and policy. Not all of our choices, indeed likely very few of them, can be based on rigorous evidence alone as to what should be done. But, wherever possible, U.S. strategists should seek to ground their ways and means in empirical evidence and the most rigorous analysis as to what the critical facts and intelligence estimates are, what works and what doesn't. Toward that end, this article offers a small set of methods and techniques for helping decision makers to get at what is likely to work and what is not as efficiently and effectively as possible. We should focus on the most critical elements of all – what we call the HEART – and ensure that the strategy is a GLOBAL one.

⁹⁸ Victor A. Utgoff and Brad Roberts, *Beyond the Moscow Treaty: Alternative Perspectives on the Future Roles and Utility of Nuclear Weapons* Alexandria, VA: Institute for Defense Analyses, March 2008, IDA Document D-3561, II-4.

⁹⁹ Stephen Cambone, "There Will Be War," Book Review of J.D. Crouch II and Patrick J. Garrity, *You Run the Show or the Show Runs You: Capturing Professor Harold W. Rood's Strategic Thought for a New Generation*, (Lanham MD: Rowman and Littlefield 2015) in *Claremont Review of Books* Fall 2015, 22-24.

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14. ABSTRACT There are of course many very important choices to be made in developing a great grand strategy, such as what alliances to honor, how to honor them, how best to build strong international partnerships to advance shared interests and values, and how to decide what conditions should be in place before the United States (U.S.) intervenes overseas unilaterally, to name a few. Not all of these choices, indeed likely very few of them, can be based on rigorous evidence alone. But the overriding theme of this article is that – wherever possible – U.S. strategists should seek to ground their ways and means in the most rigorous evidence. We have confidence in our government's ability to develop facts using rigorous methods in test and evaluation processes for many national security technologies (such as radar, stealth, precision-guidance systems, etc.), and DoD has demonstrated remarkable (though hardly perfect) acuity at developing and adapting courses of action for military campaigns. However, we believe we need to work harder to do as well at the art of developing and adapting grand strategy. Toward that end, this article offers some proven methods and techniques for helping decision makers to determine as efficiently and effectively as possible what the critical facts are as well as what is likely to work and what is not to promote our strategic ends. We then offer several prescriptions for centering the development of an enduring American Grand Strategy: focus incessantly on the most critical elements of all – what we call the HEART – and ensure that the strategy is a GLOBAL one. Such ends are timeless American ideals, and they should transcend, synthesize, and rise above political, economic, social, and cultural special interests.					
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