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White Paper on
Influence in an Age of Rising Connectedness

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Preface – Brig. Gen. Alexus G. Grynkewich, Deputy Director, Global Operations, Joint Staff

In the pluralized, multipolar world, in which military and economic sources of power are widely distributed and technologies are making nation states increasingly more porous, the US and its partners face significant challenges on how best to adapt and thrive in a period of revolutionary changes. These factors may change the way US analysts, planners, and operators evaluate approaches in order to affect and direct the outcomes of military operations. To date, such courses of actions to a large extend have focused on compelling adversaries through the threat or application of force to achieve victory (i.e., "control"). In this changing geopolitical/technical landscape, it is increasingly clear that the DOD needs complement "control" with an explicit focus upon "influence" factors and forces that produce desired behavioral outcomes across complex and intermeshed human and technical systems.

The articles in this white paper explore and present possible implications for how such changing geopolitical and technical factors may necessitate an explicit focus upon "influence," and how influence could exert effects on national, regional, and global levels over the next several decades. It assesses these revolutionary changes from political, sociological, biological, cognitive, and technical perspectives. The articles make inferences that have clear implications to the operational and planning communities. There are some key observations derived from these white papers that have clear implications for operational planning, namely:

- Today's national and military leaders have grown up in an environment where the objective was to defeat the adversary. In today's environment, preserving stability may be an even more important subject. Our competitors understand our desire to win, and—as in a game of chess—can use that knowledge to maneuver us into a stalemate situation. We need to set objectives that allow the United States to win in a situation that appears to be a draw.

- Strategy is inherently about changing the behavior of relevant actors in support of national interests. This means information must be a primary planning consideration for the joint force rather than an enabling capability. To better link tactics to strategy, the joint force must change both its operational art and its cultural mindset to focus on behavioral outcomes.

- Capabilities to inform, influence, and persuade are necessary both for national security success and as a cost-effective toolset relative to physical military power.

- Influence and control are two ways to exert power over others' decisions, where control removes an actor's ability to choose. Influence is critical in conflicts such as those in the Gray Zone, whose limited nature leaves adversaries and allies able to choose. Influence requires planners to focus on three key aspects: (1) using more realistic accounts of human motivation; (2) focusing on areas of particular human cognitive bias as a source of low-hanging fruit for performance improvement; and finally (3) using tried and tested tools and techniques from other fields to make evidence available in usable forms for operators.

- Control is dependent on actual or at least perceived power—political, economic, military, demographic, and other. Influence is the product of an even more varied and changing set of variables. The criteria that define the probability of success in exerting or countering influence must include two factors: accuracy in assessing the possible steps of an adversary and shaping persuasive communications so as to advance one's own position and reduce the power of the opponent's.

- Neurocognitive science is providing increasingly more detailed understanding of processes of influence, decision-making, and behavioral action. Understanding these mechanisms enables greater capacity to develop techniques and tools that can be used to access, assess, and target the ways and extent that thought and emotion can elicit and/or mitigate certain types of behavior.

- Combating misinformation and disinformation online will require a scientific approach grounded in empirically validated theory. It is necessarily interdisciplinary, requiring insights from decision science, computer science, the social sciences, and systems integration.

- Military commanders and senior leaders must have a basic understanding of cognitive influence in order to make decisions affecting the Gray Zone and human populations in areas of ongoing military operations. Success during Gray Zone operations requires commanders to understand influence and employ models of behavioral change in the same manner that they understand the elements of patrolling and employ kinetic power.

The white paper is a compilation of contributions on this topic that have been synthesized to reflect and build off the insights of one another.

Executive Summary: White Paper on Influence in an Age of Rising Connectedness – Dr. Hriar S. Cabayan, Joint Staff J-39

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A strong argument can be made that we are moving toward a pluralized, multipolar world, in which military and economic sources of power are widely distributed. Technologies (e.g., the Internet and rapid means of mass migration) are making nation states increasingly more porous, and a resurgence of nationalism and other forms of ethnic or religious identity politics has solidified some states and weakened others. Given these properties of human development, the question remains as to how nations and societies position themselves to ride these revolutionary changes with some degree of confidence. The continuance of these factors may change the way that the US, its partners, and its adversaries consider and prioritize influence, both within the state and across interstate borders. The DOD is evolving in ways that demand a more synergistic approach than we have traditionally taken across the human and technical dimensions. To date, military operations have characteristically focused on compelling adversaries through the threat or application of force to achieve victory (i.e. "control"). Changing environmental factors, increased activism by non-state actors, technology, and recent lessons learned suggest that the DOD will be challenged to adopt revised, if not entirely new approaches, to affect and direct the outcomes of military operations. Toward such ends, the DOD will need to focus upon the factors and forces that exert the necessary influence to produce desired behavioral outcomes across complex and intermeshed human and technical systems.

This white paper examines these trends and explores and presents possible implications for how such factors may necessitate an explicit focus upon "influence" rather than "control," and how influence could exert effects on national, regional, and global levels over the next several decades. It assesses these revolutionary changes from political, sociological, biological, and technical perspectives.

In her opening chapter, Ms. Regina Joseph (NYU) examines the coming tests of preserving national security through influence. She reviews the domestic information environment, where corporate interests generate a confluence of content and access barriers, and observes the global influence efforts that will continue to buffet society. While difficult, resilience may be cultivated through an offset that harnesses Western attitudes towards information, education, and cultivation of super-synthesizers. She goes on to say that to envision the future, a forecaster may first look to the past in an effort to find signals and detect patterns.

In the following chapter entitled "From Concepts to Capabilities: Implications for the OPS Community," Lt General (Ret) Robert J. Elder (George Mason University) examines the implications of the changes in our security environment, considers the ways that different international actors are capitalizing on these changes, and reflects on their implications for the United States and our partners. He notes that today's national and military leaders have grown up in an environment where the strategic military objective has been to defeat the adversary, but in today's environment, restoring or preserving stability has often become the primary strategic objective. Competitors understand the U.S. desire to win, and leverage that against us by employing a "don't lose" strategy. They consider a draw to be a win because they have prevented the U.S. from winning, and like Tic-Tac-Toe, they just wait for the U.S. to make a

mistake. This suggests that employing whole of government and partner capabilities to advance overall U.S. national interests, even if it does not lead to a military "win," may be a preferable strategy, and one that national security leaders should promote. Draws are not in our nature--winning is the American Way-- but if a competitor is playing for a military draw, then defeating the competitor's strategy by employing a comprehensive approach to promote stability may be in our national interest.

In the following article entitled “Net Assessment: Implications for Homeland Security,” Dr. Gina Ligon (University of Nebraska Omaha), Ms. Gia Harrigan (Department of Homeland Security, Science and Technology Directorate, Office of University Programs), Dr. Erik Dahl (Naval Postgraduate School), Mr. Timothy N. Moughon (National Counterterrorism Center), Colonel Bill Edwards (Special Operations Northern Command), and Nawar Shora (Transportation Security Administration) examine implications from a homeland security perspective. They address the issue of how net assessment—the practice of considering how strategic interactions between the United States, adversaries, and the environment may play out in the future—may be adopted to advance homeland security (especially as related to threats that emerge outside the homeland). In this chapter with contributors from government and academia, implications of using a net assessment approach to understand influence is discussed. They detail the overarching framework for net assessments. They then review the approach from NCTC on measuring power and the criticality of assessing “Green Actors.” They conclude by highlighting some of the challenges faced by Blue Network, as well as how net assessments can provide greater shared understanding of emerging threats to homeland security by incorporating planning for *threats, capabilities,* and *legitimacy.*

Next in a chapter entitled "From Failure to Success: Information Power and Paradigmatic Shifts in Strategy and Operational Art," LTC Scott Thomson (Office of the Secretary of Defense (Policy), Information Operations Directorate) takes the argument to the next step and examines the underlying assumptions about war, warfare, and other military operations within the DOD, which traditionally focuses on lethal dominance. He makes the argument that strategy is inherently about changing the behavior of relevant actors in support of national interests. This means information must be a primary planning consideration for the joint force rather than an enabling capability. To better link tactics to strategy, the joint force must change both its operational art and its cultural mindset to focus on behavioral outcomes. He concludes by stating that to shift our dominant paradigm will take a concerted effort and direction by senior leaders within the department. The department must realize that while it looks to improve informational capabilities, it is more important to first modify the operating system of the joint force so that it can realize the full power of information to achieve strategy.

Next in their chapter entitled “Rethinking Control and Influence in the Age of Complex Geopolitical Systems,” Dr. Val Sitterle (GTRI), COL (ret) Chuck Eassa (Strategic Capability Office), Dr. Robert Toguchi (USASOC), and Dr. Nick Wright (Univ. of Birmingham) in line with LTC Scott Thompson’s chapter make the case that the future of conflict facing the DOD is evolving in ways that demand a more synergistic approach than we have traditionally taken across the human and technical dimensions. To date, military operations have characteristically focused on compelling adversaries through the threat or application of force to achieve victory (i.e., “control”). Changing environmental factors, increased activism by nonstate actors, technology, and recent lessons learned suggest that the DOD will be challenged to adopt revised, if not entirely new approaches to affect and direct the outcomes of military operations. Toward such ends, the DOD will need to focus upon the factors and forces that exert the necessary influence to produce desired behavioral outcomes across complex and intermeshed human and technical systems.

In the following chapter entitled "Metaphor for a New Age: Emergence, Co-evolution, Complexity, or Something Else?" Dr. Val Sitterle (GTRI), Dr. Allison Astorino-Courtois (NSI), Dr. Corey Lofdahl (System of Systems Analytics), and CAPT (ret) Todd Veazie locate these challenges in the context of complex adaptive systems paradigm. They ask, as globalization and sociotechnical convergence collide with the continuing evolution of the post-Cold War security environment, do we know the appropriate metaphors to describe our world? Our environment is now characterized by non-uniformity and starts, stops, and leaps across orders of magnitude and across geographical areas and socio-economic- political sectors. They ask how the lenses through which we view and draw conclusions about various aspects of the world and the behaviors within it change and what can we perceive and, hence, act upon? Understanding the nature of paradigms and how we use them to provide insight in the US Defense community is critical to how well we may face future security challenges.

In his chapter entitled "Don't Shortchange Defense Efforts to Inform, Influence, and Persuade," Dr. Christopher Paul (RAND) argues that capabilities to inform, influence, and persuade are necessary both for national security success and as a cost-effective toolset relative to physical military power. He discusses shortfalls and deficiencies in this area and concludes with recommendations to increase resources for manning and tools for informing, influencing, and persuading, as well as efforts to inculcate *communication mindedness* in commanders and senior leaders.

In his chapter entitled "Operationalizing the Social Battlefield," Dr. Spencer Meredith III (National Defense University) argues the diffusion of influence from traditional elites to broader and more diverse sources has raised challenges for the United States, but not inherent risks by itself. The tools used to mobilize individuals and groups within society have for some time existed across a spectrum of industries, academic disciplines, and ultimately, government actions. As such, while the ubiquity of influence has ratcheted up in recent years, it has not fundamentally altered who can be influenced or the means of doing so. Evaluating how these phenomena affect the Joint Force Commander's range of options and, more importantly, strategic paradigms on ways, means, and ends, must include several elements. These include governance, mobilization potential, and narrative landscapes.

In the subsequent several chapters, the reader is exposed to the neuro-cognitive aspects of control and influence. In the first two Chapters, Dr. Nick Wright (University of Birmingham) encourages the reader to rethink control and influence. He states at the outset that influence and control are two ways to exert power over others' decisions, where control removes an audience's ability to choose. Influence is critical in conflicts such as those in the Gray Zone, whose limited nature leaves adversaries and allies able to choose. He concludes by stating many aspects of influence and control do not need rethinking. He goes on to encourage the reader to focus on three key aspects of influence: (1) using more realistic accounts of human motivation, (2) focusing on areas of particular human cognitive bias as a source of low-hanging fruit for performance improvement, and finally (3) using tried and tested tools and techniques from other fields (e.g., medicine) to make evidence available in usable forms for operators.

In the following chapter entitled "Evidence Based Principles of Influence," Dr. Wright stresses the need for scientific approaches (i.e., what do we know, and how can we know it?). He advances three key considerations: First, the reader should be aware of the replication crisis in the scientific literature in this area. Second, in order to accumulate robust scientific knowledge about the factors that influence people, the reader needs to focus on empirical findings. Finally, there is a level-of-analysis problem. To consider influence and persuasion, you have to think about multiple levels simultaneously.

In the following chapter, Dr. James Giordano (Georgetown) in an article titled “Neuroscience and Technology as Weapons on the Twenty-First Century World Stage” makes the case that neuroscience and neurotechnologies (neuroS/T) can be used as (1) “soft” weapons to foster power, which can be leveraged through exertion of effects upon global markets to impact nation states and people as well as to provide information and tools to more capably affect human psychology in engagements of and between agents and actors; and (2) “hard” (e.g., chemical, biological, and/or technological) weapons: including pharmacological and microbiological agents, organic toxins, devices that alter functions of the nervous system to affect thought, emotion and behaviors, and use of small scale neurotechnologies to remotely control movements of insects and small mammals to create “cyborg drones” for surveillance or infiltration operations. He goes on to say that brain sciences can also be employed to mitigate or prevent aggression, violence, and warfare by supplementing HUMINT, SIGINT, and COMINT (in an approach termed “neuro-cognitive intel”: NEURINT). Such possible applications generate two core questions: (1) to what extent can these technologies be developed and used to exert power? And, (2) how should research and use of the neurosciences be best engaged, guided, and governed? He goes on to address following issues: (1) the current capabilities of neuroS/T for operational use in intelligence, military, and warfighting operations; (2) potential benefits, burdens, and risks incurred; (3) key ethical issues and questions, and (4) possible paths toward resolution of these questions to enable technically right and ethically sound use toward maintaining international security.

Dr. Christophe Morin (Fielding Graduate University) in his chapter argues it is crucial that we recognize the urgency of using better persuasion models to create and evaluate both propaganda and counter-propaganda campaigns. Also, the dynamic and implicit nature of the effect of media content on adolescent minds highlights the necessity of conducting experiments that reveal the neurophysiological effect of messages on young brains. Subjects cannot competently and objectively report how messages work on their minds. However, new research tools used by neuromarkers can reveal critical insights by safely and ethically monitoring different subsystems in the nervous systems while participants view persuasive messages.

Drs. David A. Broniatowski (The George Washington University) and Valerie F. Reyna Cornell University) in their article entitled “A Scientific Approach to Combating Misinformation and Disinformation Online,” argue for a scientific approach to combating online misinformation and disinformation. Such an approach must be grounded in empirically validated theory, and is necessarily interdisciplinary, requiring insights from decision science, computer science, the social sciences, and systems integration. Relevant research has been conducted on the psychology of online narratives, providing a foundation for understanding why some messages are compelling and spread through social media networks, but this research must be integrated with research from other disciplines.

In his article entilted “Neural Influence and Behavior Change,” Dr. Ian McCulloh (Johns Hopkins University), argues that military commanders and senior leaders must have a basic understanding of cognitive influence in order to make decisions affecting the Gray Zone and human populations in areas of ongoing military operations. Influence is counter-intuitive. This has led to poor decisions that may have adversely affected the success of US operations. He provides a primer of cognitive influence, set in tactical military terms. The intent is to inform commanders and senior leaders to enable them to make better decisions regarding inform-influence operations in support of US objectives. Success during Gray Zone operations requires commanders to understand influence and employ models of behavior change in the same manner that they understand the elements of patrolling and employ kinetic power.

In his article entitled “The Role of Integrative Complexity in Forecasting and Influence,” Dr. Peter Suedfeld and Mr. Bradford H. Morrison (The University of British Columbia) argue that If control is dependent on actual or at least perceived power—political, economic, military, demographic, and other—influence is the product of an even more varied and changing set of variables. The criteria that define the probability of success in exerting or countering influence must include two factors: accuracy in assessing the possible steps of an adversary and shaping persuasive communications so as to advance one’s own position and reduce the power of the opponent’s. The former aspect, anticipatory intelligence, has been a major research focus to date. They briefly look at what may be a fruitful approach to the latter. In short, besides being a tool for anticipatory intelligence analysis, Integrative Complexity may also be used to help shape persuasive communications as well as responses to adversarial attempts at persuasion.

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Chapter 1: A Peek Into the Future: A Stealth Revolution by Influence's New Masters - Ms. Regina Joseph, New York University

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Abstract

This chapter examines the coming tests of preserving national security through influence. It reviews the domestic information environment, where corporate interests generate a confluence of content and access barriers and observes the global influence efforts that will continue to buffet society. While difficult, resilience may be cultivated through an offset, which harnesses Western attitudes towards information, education, and cultivation of super-synthesizers.

To envision the future, a forecaster may first look to the past in an effort to find signals and detect patterns.

If we want to understand the information environment of the next five years, we should consider a prescient warning from Aldous Huxley, the author of the 1932 novel Brave New World. In a speech delivered at the Berkeley Language Center at the University of California in 1962, Huxley laid out the prospect of what he called the "ultimate revolution, the final revolution, where man can act directly on the mind-body of his fellows…that we are in process of developing a whole series of techniques which will enable the controlling oligarchy who have always existed and presumably will always exist to get people to love their servitude."

The Domestic Information Landscape: the Huxley Paradigm of Influence Through Desire

Now consider the information environment of the present: the business models of at least two of the world's ten largest corporations according to market capitalization, Facebook and Alphabet, rely on user engagement—how long or frequently a user interacts with a product. This is known more colloquially as "brain hacking:" compelling users of digital media to repeatedly return to their products through the neurotransmitter-charged experience of pleasure received via "likes," Snapchat streaks, new texts, emojis, and more (Anderson, 2017). As of the first quarter of 2017, Facebook had 1.94 billion monthly active users; in May 2017, Google surpassed 2 billion monthly active Android platform users (Matney, 2017). A 2015 Deloitte consumer study found mobile phone users in the US check their phones an average of 46 times a day, up from 33 times in 2014, with users between the ages of 18 and 24 looking the most often with 74 checks per day (Eadicicco, 2015). According to comScore, in 2016, Facebook use constituted 14% of total time spent online by Americans (Adler, 2016). Algorithmic filtering and network effects devised by digital media companies intentionally induce user desire bordering on addiction, a phenomenon Cornell Information Science researchers call "social media reversion" (Baumer et al, 2015).

Users of social media willingly forfeit their personal data in exchange for the use of these systems, even when the costs of privacy and security are not to their individual advantage. Huxley's ultimate revolution has been achieved stealthily by corporations that many trust and revere. Inattentional blindness, a cognitive inability to perceive stimuli directly in our view, blocks us from seeing change (Neisser, 1979; Mack and Rock, 1998; Moore and Egeth, 1998; Simons and Chabris, 1999; Most et al, 2000); the

condition serves as a worthy lens through which to view how digital media and telecommunications companies have transformed the way our society is open to influence. The Internet's exponential increase in noise and signals exacerbates this barrier to perception. The apocryphal "invisible ships" phenomenon associated with the arrival of European vessels to shores in which natives of Australia, Central and South America, and various other countries—depending on the re-telling—were unable to see these unrecognizable foreign objects may remain the target of skeptical debunkers (Evans, 2009), but the reality of perception blindness to the growing complexity in our information environment fosters a scenario in which—minus a sea-change in awareness, training, and tools—neither control nor influence may be effectively achieved through the state apparatus of national security.

At the most malign end of its utility spectrum, the Internet's one-to-many broadcasting facilitates influence and recruitment efforts of both lone wolf and networked insurgents. It also sorts users into factions oriented around political and social biases. Such biases are notoriously difficult to correct even in the face of factual opposition (Mercier and Sperber, 2017). Digital networks thus become useful targets for allowing disinformation to flourish. "Fake news" may be a reductive meme used for political ends, but that should not discount the increasing polarization threat posed by varieties of ideologically slanted news, misinformation, propaganda, lazy journalism, and opinion masquerading as fact.

The network externality of social media systems like Facebook and Twitter entrenches these effects to the extent that any inherent security risk ought to be viewed in relation to how people seek information. According to a 2016 Pew Research study, while 57% of Americans got their news through television in 2016, 38%, or four-in-ten, got their news online—with the study's authors expecting that digital trend will increase at the expense of TV, print, and radio given younger adults' projected online habits (Mitchell et al, 2016). A 2017 Pew Research study examining online news habits observed that 26% of news retrieval was through social media, more than through news websites or apps, search engines or any other single pathway. (Mitchell et al, 2017). Absent the veracity checks built into traditional news resources like TV and print outlets, the agnostic information provision of social media platforms has already demonstrated the potential for annealing bias, partisan mob-rule aggression and bot manipulation. Corporate attempts at correcting adverse effects from clickbait and extremist come-ons have been halfhearted because habit-forming engagement is the core of digital media's ad revenue-supported business model. Ads comprised 97% of Facebook's revenue and 87% of Alphabet's revenue in 2016 (Ingram, 2017). Instead of becoming distribution partners to credible news providers, digital platforms have become organs of influence.

Current projections suggest further weakening of reliable public information sources. Despite a temporary bump in circulation post the 2016 US election, total US newspaper revenue is forecasted to decline by 2021 at an average rate of -4.1%, with digital revenue plateauing to the world's slowest rate of digital news revenue growth and the world's third-fastest rate of print advertising revenue loss (Bothun et al, 2017). Add to this an ongoing media convergence. In the West, the last decade of media consolidation has, through acquisitions and shutdowns, progressively concentrated control over the largest share of global mass media among less than 15 conglomerates worldwide, thereby creating powerful oligopolies. Short of regulatory intervention along the lines of anti-trust measures, access to credible news and information in the next five years will be further Balkanized as a result of corporate revenue maximizing and information diversity minimizing.

This pertains to both the content as well as the access to it. In 2017, the Federal Communications Commission overturned broadcast station ownership restrictions to pave the way for activity like the

proposed Sinclair Broadcast Group's $3.9 billion acquisition of Tribune Media's TV stations. The deal's aim is the creation of a hardline conservative rival to Fox News that would reach approximately 72% of American households (Johnson, 2017). Efforts to overturn net neutrality rules by those who own the "pipes," e.g., cable companies and telecoms carriers, will allow them to charge for Internet access as they see fit. As costs go up, information economizing can result among Internet users, reducing their intake of premium news. Should the Open Internet Act of 2015 be overturned, short of any major countermeasures, the end result may be analogous to food environments found in economically challenged neighborhoods: a rejection of nutrition in the form of costly-to-produce quality news in favor of cheap and instantly gratifying informational junk food.

Net neutrality is not a panacea. The Internet-enabled information environment has demonstrated the capacity to destabilize democratic order via its vulnerability to manipulation. "Attention hacking" has increased the visibility of once-marginal extremist and populist groups through bots and memes. Groups like the alt right, white nationalists, Identitarianists, men's rights activists, and others disseminate false stories through Internet communities (Marwick and Lewis, 2017). Consequently, both conservative and progressive constituencies wind up mistrusting media sources no matter how reputable. However, a study led by Yochai Benkler suggests a current right-wing asymmetry in both the propagation of and attention to disinformation (Benkler et al, 2017).

The next five years may yet force a reckoning with the paradox of Silicon Valley's gains: we have more information and tools, but less informed people. Browsers and platforms will continue to shape our communications away from information-rich semantic systems to information-minimized visual ones, further eroding our ability to detect and express nuance. We will continue to desire systems that sell our personal data, while remaining suspicious of the state apparatus of governance. Actors with sophisticated methods can leverage the public's attention deficit and distrust and exert sufficient damaging influence before being detected.

The Global Information Landscape: the Orwell Paradigm of Influence Through Control

Russia is just one such actor with an evolved, hybridized information strategy. Among the many facets of its ingenuity is the aiming of phishing and propaganda at a vulnerable US domestic target: veterans and active service members. Ratcheting up pro-Vladimir Putin rhetoric among an armed military population is ostensibly one way to facilitate the Russian president's preference for covert Western destabilization through implosion (Schreckinger, 2017). By enflaming targeted populations with trolls, malware, and propaganda amplification through professional-looking media outlets like RT and Sputnik, the Russian Federation has made visible progress towards Putin's goals. Fanning partisan anti-government sentiment in the US while the government focuses its attention on foreign terrorists has consequences: consider the 2015 study finding Islam-inspired terror attacks accounted for 50 deaths since 9/11, but "right-wing extremists averaged 337 attacks per year in the decade after 9/11, causing a total of 254 fatalities" (Kurzman and Schanzer, 2015). Russia's influence hacking does not stop once elections are over, but rather aims for metastasis over time; given the constraints of the domestic information environment, we should expect a hardening of fact-challenged belief among the most suggestible.

The fall of the Soviet Union deceived some US pundits into believing in the Cold War's end. With such thinking came reduced vigilance in the West over how information could be weaponized (Pomerantsev and Weiss, 2015).

But the Russian Federation, as did other states, saw an important opportunity to control influence by opposing Western views on Internet governance. Whereas Western states see the Internet as an unfettered utility allied to freedom of information, Russia, China, Turkey, and several other countries view its control as a sovereign right. This Orwellian archetype of a 1984-style Big Brother state, which keeps its population in line through fear of arrest and retribution, stands in stark contrast to the Huxleyian paradigm of voluntary submission to control. The former is state-led; the latter is the domain of corporations and non-state actors. These positions outline the contours of the modern Cold War, dividing ideological camps along East and West and North and South axes. While tactics and goals remain diverse among such global actors, state-led policies on Internet-driven influence combine with the US's own domestic influence trap to pose a running risk for American national security and for Western liberal-order democracies in general.

While state-led influence campaigns seek to subvert foreign audiences, they also require keeping their own citizens quiescent. China's new Cybersecurity Law, which went into effect on 1 June 2017, not only cedes to the state almost complete control over news and online activities, it also requires businesses and citizens to report on any violators. Iran's Islamic Revolutionary Guard Corps owns large swaths of the country's telecommunications sector, enabling the IRGC to have eyes and ears constantly trained on Iran's citizens; and now the IRGC's companies will reconstruct Syria's mobile phone network with an eye to expand into Iraq ("Iran To Build," 2017).

Information dominance is not restricted to state actors: international non-state actors, ranging from ISIS to Anonymous, have catapulted to prominence by leveraging online influence. Waging information warfare can be as simple as tweeting or posting a video. False flag operations and mass panics designed to overwhelm law enforcement and first responders can be propagated through social media pranks and hoax claims with relative ease. If public mistrust is sufficient, conducting crisis management becomes constrained, exposing vulnerability to exploitation.

Whether led by state or non-state actors, influence campaigns invariably involve controversial levels of surveillance either as a companion requirement, or as a consequence. That is where we find ourselves today. Without real evolution in US strategy, tactics, and policy, the next five years could entrench adversarial gains—and Huxley's revolution—to American democracy's detriment.

The Opportunity: Offsets, Cognitive Prosethics, and Super-Synthesizers

While the pernicious effects of modern influence measures will be difficult to erode at this stage, a sea-change in how the US can address hybridized information warfare is still possible. The third offset, which emphasizes manufactured technologies like unmanned vehicles and robotics, yields little that cannot ultimately be copied by determined adversaries over time. But the freedom of information privileged by the US and the West—and how citizens can harness this in aggregate to form a powerful human resource—offers a true asymmetric advantage, which authoritarian adversaries cannot effectively replicate (Joseph, 2015).

Anticipatory intelligence systems that train and crowdsource human forecasters (whether working in combination with machine models or not) to predict outcomes rely on an unconstrained information landscape. The diversity of information sources in the public domain is central to the predictive accuracy observed in the best displays of forecasting, like the "superforecasting" observed during IARPA's ACE program (Tetlock and Gardner, 2015). With training to mitigate the biases and noise today's information environment imparts to the public, we can boost analytical prowess to achieve an edge.

Training in cognitive de-biasing, probabilistic reasoning and critical thinking to develop our human offset will not be enough however. The nature of our information environment requires tools and cognitive prosthetics, like structured analytic techniques and machine learning-enhanced platforms, to help humans apply networked creativity and thought to complex information environments. They will need to learn how to undo the cognitive damage our screen servitude exerts—principally how to ask the right questions, recognize veracity in thickets of disinformation, and develop an evidence-based understanding in spite of distractions.

Finding the best candidates for this kind of work is the first step. My research suggests following theory of mind studies and observing difference in neuro-atypical behavior offers a clue. Superforecasters are a good start, but what I call super-synthesizers—a small subset of individuals who demonstrate not only high emotional and verbal intelligence, but also high systemizing capacity to the extent that they can process and communicate more effectively—may provide the kind of human skills offset repressive regimes will struggle to cultivate.

Add to this human factor the dominance the US maintains in media development and narrative generation. Whether in the form of advertising or Marvel super-hero myths, American media creativity exerts a potent influence that compels imitation from even our fiercest adversaries. The US Media & Entertainment market is the largest market worldwide and represents a third of the global industry, reaching $771 billion by 2019 (Bothun et al, 2017). Entertainment media can have geopolitical effects—Turkish soap operas for example (Yusuf, 2013) have been both praised and criticized for their ability to influence. Yet for all our emphasis on defense innovations, it is worth asking whether American creative narrative power has been adequately integrated into how we view our information strategy.

Bringing together the quantitative in human forecasting aptitude and the qualitative in narrative that can command mindshare is now paramount if we wish to seize what remaining opportunity lies in the information environment of the present and future. We may not have avoided Huxley's nightmare, but revolutions can still be resisted and overturned.

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Chapter 2: From Concepts to Capabilities: Implications for the OPS Community - Lt General (Ret) Dr. Robert J. Elder

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Regional Perspectives

The purpose of this chapter is to examine the implications of the changes in our security environment, consider the ways that different international actors are capitalizing on these changes, and reflect on their implications for the United States and our partners. We begin by examining regional perspectives of operators from across the globe.

From a SOCOM perspective, even when we have all of the best information, we still end up making bad decisions. Thus, we should not overestimate what we can accomplish, and should begin by defining a strategy. Unlike strategies of the past, we should transition away from the idea of perfect end states because in our current environment, we are in a constant state of battle. Furthermore, the term "nation building" no longer seems relevant and, as a result, we now increasingly encounter non-traditional and adaptive partnerships.

From a EUCOM view, Russia is arguably the best nation state at executing what it defines as a strategy of indirect action and the United States has failed to develop an effective counter-strategy. It was just a few years ago that the US began to look at Russia as a strategic partner, but the relationship was not mutual. The US is not properly organized to effectively execute a whole of government response to Russian activities. While there are efforts such as the Russian Engagement Group, the Global Engagement Center, and the Russia Strategic Initiative, the situation may require a completely different approach, perhaps on the order of an inter-agency task force.

A CENTCOM perspective notes that we have more information than ever before, but we need to get better at properly analyzing the information so we can use it to make better decisions. In this sense, we face a number of notable challenges, but perhaps most significantly, we can sense far more information than we can actually analyze, the analysis takes too long, we do not always know who needs the information, and there is not a good feedback mechanism to enable improvements. Pure data needs to be transformed into recognizable information. The information then needs to be used to create knowledge. The knowledge then must be used to create understanding. The understanding will help to make better decisions, which then helps to create wisdom. The people with wisdom will be the most likely to make the best decisions.

From a STRATCOM perspective, the focus is on strategic deterrence, decisive response, and having a combat ready force. To properly operationalize, commanders need to properly measure. First, it is essential that we clearly define what measurement is. Second, we need to clearly define what we are

trying to measure. Things like strategic deterrence, decisive response, and having a combat ready force are difficult to define—often times these things are contextual. Therefore, we need a very flexible toolset to help appropriately address measurements of this type.

Another special ops view suggests that the US needs both control and influence—these two concepts are not necessarily competing with each other. The DOD is very good at physical maneuver, but not as good at cognitive maneuver—where influence truly resides. US competitors are mastering this space while the US is not really competing at all. Cognitive objectives in many cases should be the centerpiece of the future military campaign, from which both physical activities and cognitive activities are orchestrated to achieve US policy outcomes.

USNORTHCOM has a different problem set than the other COCOMs—while other COCOMs are trying to contain problems in their AOR, USNORTHCOM provides homeland defense and works to keep bad things out of its AOR. USNORTHCOM does perform a lot of influencing activities, primarily through military-to-military cooperation with partners. USNORTHCOM also spends a lot of time working with the Interagency to provide homeland security and homeland defense, and have developed a number of models for interagency cooperation and collaboration that could be applied to situations OCONUS.

From an AFRICOM perspective, the US will continue to trail behind our competitors in the region until it builds trust with local populations and can convince locals to willingly fight for their country. The US must help push change in ways that do not create problems or inadvertently become part of the problem in Africa. Change must begin at the local level, and the proper civilian-military balance requires a whole-of-government approach. China, in particular, is putting noticeable effort into gaining influence on the continent. Consider that roughly 70% of US aid in Africa goes to Special Ops Force activities, while about 80% of Chinese investment in Africa goes to infrastructure. This difference is quite significant. Chinese investment in African infrastructure is paving the way for prolonged Chinese influence over the long-term, and this gives China a noticeable advantage over the US in the competition for African influence. One solid opportunity is to leverage relationships with US partners—as an example, France has strong relationships in West Africa that the US lacks.

Operational Impact

How has this affected the approach to operations the COCOMs conduct? USCENTCOM noted that it now has one of the largest Information Ops (IO) forces in the Department of Defense. Their IO WebOPS Team gets information from an array of sources as a means of gauging sentiment in the AOR, which then develops insights that can be folded into the planning process to help USCENTCOM make better plans and preparations. USCENTCOM's IO force operates 24/7 and continually polls USCENTCOM's AOR to help inform USCENTCOM decision-making.

USASOC highlighted that they are working to address the need to properly share data. The current data sharing process is stove-piped and needs to be improved. Additionally, given the importance of Information Ops, there is a critical need to measure information ops activities.

EUCOM noted that COCOM collaboration is important, particularly for dealing with global issues (such as Russia). USECUOM is also focused on providing security cooperation assistance to countries that are most susceptible to Russia influence to increase their resiliency and preparedness. STRATCOM highlighted the importance of timely, proactive message shaping.

A notable US challenge is its requirement to "play by the rules" due to adherence to international rule of law, democratic principles, and bureaucratic constraints when US competitors are not similarly constrained. How should the United States deal with this problem?

Recognizing that our competitors are extremely responsive and able to act much more rapidly than the US, USEUCOM has learned that its greatest strength is its European allies. Whereas the US has restrictions with respect to authority and authorization, its European allies are uniquely equipped to respond in certain ways that are not available to the United States.

CENTCOM argued that we have the capability to avoid being surprised—we will be able to predict when a change in environment might happen and take action to shape the situation and be prepared to respond. STRATCOM noted that this problem is not specific just to government, and that DOD could learn a great deal from the way civilian entities handle problems such as these.

From USASOC, we learned of the need to build resilience so that we can be prepared to deal with surprise when it does occur. Resilience is more than just controlling the narrative—it is also gained through building capacity to address challenges as they are presented. There is also a need to look more closely at non-traditional indicators and warnings that an adversary like Russia will not expect the United States to monitor.

Control of the information environment has become an increasingly important element of US national security. SOCOM noted that DOD likes to control information: It vastly overvalues classified information and goes out of its way to maintain separate proprietary pools of information, which cannot connect with one another. At the same time, we put a premium on classified information, and ignore a "huge ocean" of unclassified information that could be of benefit to our operations. To a large extent, the US suffers from an information problem, and the problem requires a paradigm shift to be solved.

CENTCOM suggested that we might not need to control the information environment, provided that the US can leverage the information environment in an efficient and useful manner to generate understanding and knowledge. USASOC added that we should also listen to our allies and learn how they are leveraging the information environment because we are not the only ones exploring this space.

Opportunities

Looking to opportunities to address the current environmental challenges differently, there is consensus that the US simply cannot compete in activities short of conflict with our adversaries by using the DOD on its own. Operating in this space requires an inter-agency approach. What we seem to lack is a focal point short of the President who has the authority to deal with whole of government responses to competition short of armed conflict.

One suggestion is that the US should revamp the educational processes used for military members as they come up through the ranks and start making plans and decisions. Information operations and influence operations need to be inculcated into US military education processes.

Another problem is that our partners have high expectations for the US ability to fulfill promises, particularly in competitive places such as Africa, but US acquisition processes undermine our ability to compete with countries and organizations which are much more agile. The US has argued that its

acquisition processes need to be made faster and more efficient for the benefit of the taxpayer, but there are also national security implications of this lack of responsiveness.

SOCOM has two core functions: working with locals and direct action. However, roughly 90% of USSOCOM's effort goes into direct action—we have created the world's best killing machine, but we have not put the proper effort into working with locals, which is ultimately where the US will find long-term benefit.

The cyber realm has become a real challenge because constraints on US operations in this domain are causing it to fall far behind the capabilities of US competitors. It is also clear that the United States needs a synchronized global COCOM plan. For example, when looking at the influence that Russia has in the Arctic, the US needs to also know how this influence affects other things such as trade routes and homeland defense.

To summarize, today's national and military leaders have grown up in an environment where the objective was to defeat the adversary. In today's environment, preserving stability may be an even more important subject. Our competitors understand our desire to win, and like tic-tac-toe, understand it as a minimum, they can force to a draw. We need to set objectives that allow the United States to win in a situation that appears to be a draw. It is not in our nature, but it is in our interest. The good news is that we really do understand how to do this, but the problem is that we would much rather win—it is the American way.

Chapter 3: Net Assessment: Implications for Homeland Security – Dr. Gina Ligon, University of Nebraska, Omaha

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Abstract

This chapter addresses the issue of how net assessment—the practice of considering how strategic interactions between the United States, adversaries, and the environment may play out in the future—may be adopted to advance homeland security (especially as related to threats that emerge outside the homeland). In a panel of contributors from government and academia, implications of using a net assessment approach to understand influence were shared. In the following sections, we detail the overarching framework for net assessments. Next, we review the approach from NCTC on measuring power and the criticality of assessing "Green Actors." We conclude by highlighting some of the challenges faced by Blue Network, as well as how net assessments can provide greater shared understanding of emerging threats to Homeland Security by incorporating planning for *threats, capabilities,* and *legitimacy.*

Overview of Net Assessments

The concept of net assessment is widely regarded as integral in security planning.[1] The Pentagon's Office of Net Assessments (ONA) and the Congressionally-mandated Net Assessment Branch within NCTC activities are outside the scope and legal authority to plan for domestic threats, but do offer roadmaps of how to incorporate this strategic process into Homeland Security planning. The DOD defines net assessment as "the comparative analysis of military, technological, political, economic, and other factors governing the relative military capabilities of nations. Its purpose is to identify problems and opportunities that deserve the attention of senior defense officials."[2] Net assessment is linked with its founder Andrew Marshall, who wrote that net assessments "are intended to provide insight for policy makers at the highest levels by discovering and illuminating the nature of major national security problems."[3]

[1] Erik J. Dahl is an associate professor of national security affairs at the Naval Postgraduate School and wrote, "A Homeland Security Net assessment is Needed Now!" in the Winter 2015 Issue of *Strategic Studies Quarterly.*
[2] Department of Defense Directive 5111.11, Director of Net assessment, 23 December 2009, 1.
[3] Andrew W. Marshall, "National Net assessment," memorandum for the record, 10 April 1973, 2. Available from the Digital National Security Archive, file no. 01198.

Required Elements in Net Assessment Planning

For example, while most planning efforts involve a detailed understanding of external threats, net assessments focus on two factors: the enemy and one's own capabilities. However, in the panel at the SMA 2017 Conference, NCTC's Moughon discussed the importance of also assessing Green Actors, or the actors and factors that affect the interaction between a protagonist (i.e., Blue) and an antagonist (i.e., Red). In this sense, Green could include individuals (e.g., family members, onlookers) and collections of individuals (e.g., NGOs, corporations, community groups, third-party governments), as well as factors that are not directly associated with individuals (e.g., norms, geography, technology). For DOD planning efforts, likely actions of elites in a given region may be included to understand the market-share of total influence. It follows then that identifying critical Green Actors for homeland net assessment inclusion could account for private enterprise such as social networking sites that are not part of DHS, but can directly enhance or mitigate the efficacy of DHS planning efforts. Thus, one important factor for DHS to consider in standing up a net assessment office is to not only plan for red/external threats, but to include a forecast of downstream consequences of emerging Blue and Green capabilities and likely actions.

We also argue for an expanded definition of "capability" in the net assessment process. While "capability" traditionally is measured by Hard Power, such as assets and technologies likely to emerge, Ligon argued that leadership capability and other organizational considerations should also be captured and contemplated in the net assessment process. Moreover, identifying emerging technologies likely to be adopted by a Nonstate Adversary (e.g., Da'esh) may also depend on the types of individuals who have been recruited by leadership messaging from abroad. Without understanding leader intent, it is difficult to forecast what Hard Power capability may emerge. Relatedly, Moughon recommended an expanded measurement of "Power" to include elements of Soft Power. In addition to considering implications for emerging technology as a capability, the panel recommended considering the organizational aspects and an expanded concept in general of Power when forecasting capabilities of Blue, Red, and Green Actors. In areas of homeland security, particularly, it is especially important to understand external threats with a balanced perspective of our own internal capabilities.

Considerations in Application to Homeland Security

While NCTC has the responsibility for producing net assessments focusing on terrorist threats, there is no central office within Homeland Security focusing on threats to the Homeland specifically. Some elements of DHS, such as the Domestic Nuclear Detection Office (DNDO), do appear to conduct net assessments,[4] as a practice for their own areas. However, the panel called for DHS to stand up a broader office for net assessments to plan for long-term challenges and infuse more "imagination" versus reactively responding to threats after they emerge.[5] Because net assessment requires an examination of a threat relative to internal capabilities to counter that threat, a DHS net assessment would require an internal look at US counterterrorism capabilities as they compare to emerging and future threats. It is also important to note that counterterrorism is certainly not the only emerging threat for DHS to plan against. The upcoming *2018 Quadrennial Homeland Security Review (QHSR)* is a capstone strategy

[4] Dahl, E. (2015). A Homeland Security Net assessment Needed Now! *Strategic Studies Quarterly*, Winter 2015 Issue, pp. 67.

[5] James Jay Carafano, Frank J. Cilluffo, Richard Weitz, and Jan Lane, "Stopping Surprise Attacks: Thinking Smarter about Homeland Security," Backgrounder no. 2016, Heritage Foundation, 23 April 2007, http://www.heritage.org/research/reports/2007/04/stopping-surprise -attacks-thinking-smarter-about-homeland-security.

document that outlines a plan to safeguard the Homeland, and this document could be a roadmap against which threats to plan. For example, in the 2014 *QHSR*, five strategic priorities were identified: 1) securing against the evolving terrorism threat, 2) safeguarding and securing cyberspace, 3) countering biological threats and hazards, 4) securing flow of people and goods (e.g., border security and trade law), 5) executing public-private partnerships to secure critical infrastructure.[6] Accordingly, a DHS Net Assessment Office could facilitate planning for Blue, Red, and Green capabilities in each of these areas to inform DHS strategy and allocation of resources.

One panel member, Colonel Bill Edwards of Special Operations Northern Command (SOCNORTH), described the challenges of understanding the Blue Network, specifically. For example, he described issues faced in his relatively new organization, which operates in a complex environment across multiple title authorities and areas of responsibilities. One issue to consider when implementing a net assessment in DHS is to understand the true information sharing environment across stakeholders, bridge cultural gaps associated with different services and professional norms, and build lasting relationships that transcend assignment cycles. Given this complexity, it is even more critical to establish a net assessment branch to gain a perspective of the collaborative distance that exists among partners in our Blue Network and across to the Green network.[7]

Focusing on strategic threats, our capabilities to counter them, and the network process that facilitate them is not enough for a DHS net assessment, however. Erik Dahl, who has done a great deal of academic work on these issues, suggested that a net assessment process for DHS might consider the effects of homeland security capabilities on the population it protects—the American people. In his 2015 article he wrote, "If a national-security net assessment is the appraisal of military balances, then a homeland security net assessment should be the appraisal of other, equally important balances, such as the balance between security and liberty…"[8] Thus, Dahl adds that in addition to capabilities of Red, Blue, and Green Actors, a DHS net assessment might have the requirement of understanding the effects of such efforts on the American people. He argues that this additional requirement be captured in the concept of *legitimacy*: are the capabilities our government has developed to keep us safe seen as legitimate in the eyes of the people they are designed to serve? Thus, evaluating Blue and Green capabilities such as those afforded under the Patriot Act or the more recent Travel Ban may also shed light on the Net efficacy of our capabilities.

In summary, the panel's proposed DHS net assessment would involve at least three requirements: *threats, capabilities,* and *legitimacy.* The process would examine emerging *threats* outlined in the *QHSR,* including the Red and Green Actors that affect them. In addition, it would examine Blue Actors' *capabilities* to counter specific threats, including a network analysis of how agencies in the Homeland Security enterprise collaborate to solve complex problems. And finally, for each threat, a net assessment would identify whether the *capabilities* developed to counter them are seen by the American people as *legitimate* or are seen as risking civil liberties or other democratic values.

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[6] Jeh Johnson, The 2014 Quadrennial Homeland Security Review (Washington, DC, DHS, 2014), 5, http://www.dhs.gov/sites/default/files/publications/2014-qhsr-final-508.pdf.

[7] Ligon, G.S., Derrick, D.C., and Tousley, S.T. (2017) presented a framework called "Collaborative Distance" at the 10th Annual Homeland Defense/Security Education Summit as a way-ahead for understanding collaboration in multi-agency partnerships.

[8] Dahl, 2015. pp. 70

Chapter 4: From Failure to Success: Information Power and Paradigmatic Shifts in Strategy and Operational Art - LTC(P) Scott K. Thomson, OSD (Policy)

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"The nation that will insist upon drawing a broad line of demarcation between the fighting man and the thinking man is liable to find its fighting done by fools and its thinking by cowards."
-Sir William Francis Butler

"Capturing the perceptions of foreign audiences will replace seizing terrain as the new high ground for the future joint force."
-General (Ret.) James Mattis

Abstract

Strategy is inherently about changing the behavior of relevant actors in support of national interests. These actors choose certain behaviors based upon information they perceive in their environment. This means information must be a primary planning consideration for the joint force rather than an enabling capability. Failures to achieve campaign goals are largely due to the joint force's poor understanding of the importance and nature of information. To better link tactics to strategy, the joint force must change both its operational art and its cultural mindset to focus on behavioral outcomes.

The Department of Defense is struggling with two important contemporary challenges—gray zone warfare and the related areas of counterterrorism, counterinsurgency, and post-war stabilization. In the first case, state actors displace the utility of physical power by operating in ways that restrict options for the US to resort to force. In the second case, force is necessary, but insufficient to destroy or dismantle loosely networked organizations. Both cases highlight critical flaws in military thinking and the vulnerabilities of a department organized almost exclusively for major combat operations. Both cases also highlight the ascendancy of information as a primary consideration, rather than an enabling capability, for the planning and conduct of military operations.

To effectively compete, the joint force must adjust its approach to operational art (the way it plans and operates) in a way that preserves our ability to fight, but allows us to achieve enduring strategic outcomes—in other words, to more predictably influence the behavior of relevant actors. Simultaneously, through education and training, we must change service and joint culture to reduce biases that inhibit quality strategic thinking about influence (with information and physical actions both being components of influence). Until DOD adopts this new paradigm—planning toward behavioral outcomes—and makes the necessary changes to its core operating system, no capability-based solution will yield the needed results.

In today's world, if success were primarily a question of resources, no other nation or group could mount a credible threat to the interests of the US. The core problem we face is our institutional thinking—how we use our military in pursuit of strategic outcomes. The way our leaders look at problems layers on top of the planning systems they use to produce a finite range of options much in

the way software and hardware interact toward specific purposes. Theoretically, there are no boundaries to using current operational art to generate information power and guide the behavior of relevant actors. However, the reality is that a regression to mean planning outcomes still exists (Simpson, 2013).

To question military culture and planning processes is bold, and neither the joint force nor the services are likely to accept easily the premise that the larger system is to blame for strategic failures of information power. We are adept at the planning processes we use, and we accept them as sufficient—perhaps even as excellent. And they are excellent for the purposes of battle, but they appear to fail in strategic applications. Yet, to my knowledge, we have not systematically tested our ways of thinking against alternatives, but have simply sharpened the dagger we inherited from our predecessors.

As with all systems, DOD is getting exactly the results it has designed its system to yield. Processes such as Joint Intelligence Preparation of the Environment, the Joint Planning Process, and targeting are excellent for "solving the visible part of the problem," but they fall short of being appropriate when influence is more important than war.[9] This statement will likely cause most leaders some form of cognitive dissonance, as it is simpler to place blame elsewhere than to question things we hold sacred, such as theories of war, views on strategy, planning processes, and even concepts of power. To solve the problem we face with influence and strategy, we must focus first on systemic problems rather than symptomatic capabilities. Many who read this white paper will think that information operations (IO) are the problem, but "failing at IO" is a *symptom* of the problem. The problem is the context within which IO and other manifestations of information power sit.

As Lieutenant General Ken Tovo, the United States Army Special Operations Command (USASOC) commander articulated at an April Senior Leader Forum hosted by USASOC, "the problem is *like* IO, but it's bigger." Significantly, Tovo also lamented that our planning systems tilt us toward battle (clearly implying battle is often an insufficient or inappropriate solution to strategic problems), and that we do win the fights in which we engage, but we still fail to achieve campaign objectives (conference discussion, Expanding Maneuver Senior Leader Forum, Tyson's Corner, VA, April 5, 2017). The solution he and other leaders seek is informational, but our culture and planning systems are blind to the proper importance and placement of information in all levels of planning.

Strategy and Power

To follow this argument, we must start by looking at the concepts of strategy and power themselves. Traditionally, strategy is articulated in a taxonomy of ends, ways, means, and risk. In its simplest manifestation, a strategy (often in the form of a campaign) is a plan to cause relevant actors to behave in ways that support US national interests. The US engages strategically—including military campaigns—to change or maintain human behaviors in some desired way that supports its national interests.

Military officers traditionally think of power as the ability to dominate in battle. This "victory bias" is a dangerously restricted way of thinking. While the ability to dominate an opponent is an indispensable component of power and an unquestionable mandate for DOD, physical dominance is not power in its purest form, and the "victory bias" reveals a predominantly tactical view of operations.

[9] Credit for "the visible part of the problem" goes to Mr. Jesse Bourque in the Office of the Secretary of Defense's Information Operations Directorate. He occasionally lends a phrase that begs to be borrowed.

During negotiations to end the Vietnam War at the 1973 Paris Peace Accords, Colonel Harry Summers remarked to a Vietnamese officer that the US never lost a battle in that war. The Vietnamese officer agreed that while Summers' observation may have been true, it was "also irrelevant" (Wood, 2011). Indeed, *Army Doctrinal Publication 1: The Army* acknowledges "lethality, by itself, is not enough. If Army forces do not address the requirements of noncombatants in the joint operational area before, during, and after battle, then the tactical victories achieved by our firepower only lead to strategic failure and world condemnation" (p. 1-7). Forty-five years after COL Summers' conversation, leaders are still struggling with the same frustrations in trying to link tactics and strategy.

What COL Summers' engagement reveals is that, ultimately, power is an actor's ability to achieve their desired strategic outcomes or states. Strategic success—not tactical victory—is the purest form of power. The Vietnam War exposed one situation where physical power could not yield political results. Victory can also be irrelevant when an adversary displaces the utility of physical might by operating below the threshold of war (e.g., gray zone operations) or operates in loosely networked organizations that easily reorganize and are therefore immune to systemic collapse when its members are killed or captured (e.g., violent extremist organizations).

An important corollary to strategy and power revolves around views of the purpose of the joint force. The Department of Defense (2013) states that it is the mission of the US military to fight and win the nation's wars (p. I-13). While the ability to fight and win wars is unquestionably critical, leaders must broaden their view and accept that the purpose of the joint force is to achieve whatever ends political leaders ask of it. More often than not, this is not war, but some other task such as preventing war, consolidating gains following a war, providing humanitarian assistance or disaster relief, or some other political purpose. Madeline Albright's view of the military has proven historically valid.

The reason this view of strategy, power, and the role of the joint force is important is that when DOD explicitly articulates clear thinking on these topics, it will find it needs to adjust the way it plans operations, develops leaders, and invests in capabilities. Commanders will view the purpose of campaigns and operations as approaches to modify human behavior and will understand that it is always the cumulative effect of emergent social behavior that defines progress toward strategic outcomes.

Behavior, Information, and Strategy

Whatever the purpose of a strategy or operation, it is always ultimately tied to a set of human behaviors, and it is essential that we explicitly state this fact as it changes the way commanders and planners think. When one steps back from the daily planning activities of the joint force, whether in the form of global campaign plans being written by the Joint Staff or in the context of Joint Task Force operations in Afghanistan, they will see that enumerated behavioral outcomes are typically absent. Plans routinely miss a unifying logic that only behavioral analysis and outcomes can provide. The result is that we often confuse activities with progress. General (Ret.) Stanley McChrystal observed that:

> An inability to understand our surroundings often left a burned-out building or a cratered road—a stark symbol of our shortcomings—and wasted precious time in the overall campaign. Waging such campaigns, *designed to persuade people to behave in a certain way* [emphasis added], is complex (Mackay and Tatham, 2011, p. V).

The reason this problem exists is that our planning systems are optimized to quickly and efficiently coordinate the application physical force. Current systems do in fact *synchronize* the application of firepower for the purpose of battle. However, the logic of these systems bends to the breaking point when applied to the behavioral outcomes that define strategy. Outside of battle or major war, what often emerges is a collection of activities that are merely *simultaneous* rather than *synchronized*. This is the difference between drowning and swimming. Our essential task is to retool operational art so that it answers both the needs of strategy and battle. The joint force cannot continue to apply industrial age thinking to information age challenges.

Gharajedaghi (2011), a systems theorist, states that complex adaptive systems (i.e., social systems such as populations, violent extremist organizations, and militaries) are "information-bonded" (p. 12). In other words, information drives human behavior. People make decisions and take actions based on environmental observation, culture, history, and a myriad of other complex considerations. If people behave based on the information that they observe in all its forms, and strategy is the pursuit of behavioral outcomes in support of national interests, then strategy is actually an approach to manipulate the environment of relevant actors in ways that cue information that drives them to display desired behaviors. Information must become the pinnacle focus of operational art. As Gharajedaghi (2011) also stipulates, "A social system has to be understood on its own terms" (p. 12). Understanding human behavior is a critical capability that the intelligence community must provide at all levels of operations. In other words, the intelligence community must conduct analysis from the point of view of relevant actors and understand the information that drives the behavior of relevant actors, and commanders must base operations on this intelligence.

Throughout the duration of an operation, planners must diagnose which groups or key individuals they wish to influence, similar to identifying named areas of interest in traditional combat operations. They must then understand why they are exhibiting their current behaviors that differ from strategic goals. Finally, Paul et al. (2015), recommend that planners must form "theories of change" (p. 9), for how to favorably change these behaviors. Importantly, behaviorally focused operational art will make measuring effectiveness of efforts and progress toward campaign success much easier. However ironic it may be, intangible factors yield tangible results. When we know what we want people to do, we can count the instances of these behaviors and measure progress toward strategic goals.

The Informational Aspects of Military Power

When discussing influence, the default reaction of military leaders is to think of IO or its subordinate information related capabilities (IRCs – see *Joint Publication 3-13: Information operations*). They tend to think of activities to influence in a vacuum that is separate from other operations, such as combat. Further, when leaders do consider IO (and most do), they almost always integrate IO with other operations. In other words, IO is a supporting capability and routinely a separate staff function.

But influence, and therefore IO, rarely exists in a vacuum. The exception is when there is no means to interact with a target audience, and IO (or related activities such as public affairs) must be conducted separately and at a distance from the relevant actors the joint force seeks to influence.

In most cases, applications of information meant to persuade relevant actors is conducted in the same operational environment with other physical activities, such as battles or air strikes. These physical activities carry their own message. Tanaka argues, "actions are used as the principal 'language of communication (as cited in Manheim, 2011, p. 215)'." They modify the environment from which

relevant actors draw the information that drives their subsequent behaviors. These are the "informational aspects of military power." These physical actions almost always generate a higher volume of information than any communication that is produced via IRCs. If commanders do not specifically plan these operations to produce information that drives the behaviors desired by relevant actors, operations will be at risk of producing the proverbial "say-do gap." Worse, operations will often be conducted in isolation from strategy. Again, this purpose is not well served by current operational art and military culture.

Slaying the Straw Men

One must acknowledge that when making an argument that elevates the importance of information and behavior several routine, though easily disproved, objections surface:

- "This is not our job."
- "This cannot be done."
- "We already do this."
- "This will cost the services combat capability."

"This is not our job." This statement usually arises when one mentions the word "influence." But even traditional combat has a purpose larger than destruction. There, the purpose is to defeat the will of the enemy in traditional Clausewitzian terms. But "will" is incomplete by itself. It is *the will to do something*, and that means will is actually a behavior. Influence is the purpose of the joint force. Further, since we cannot typically isolate "influence" from other activities, to include diplomacy, it must be everybody's job, or it suffers from a tragedy of the commons.

"This cannot be done." If planning toward behavioral outcomes cannot be done, then the joint force should shed capabilities such as military deception, military information support operations (MISO), civil affairs, and public affairs. Each of these capabilities are inherently linked to molding behaviors, and each requires planning toward those outcomes. Even types of missions, such as counterinsurgency, are aimed at changing a select group of behaviors. Planning toward behavioral outcomes is not only possible, it is routine. MISO already has a planning process called target audience analysis (TAA) focused on behavioral outcomes, but it is not used doctrinally to guide unit operations, only MISO (which routinely includes physical actions as well as communication [*Special text 33-01: Military information support operations process*, 2014, p. 2-1]). If one wants to see how possible it is to plan toward behavioral outcomes, they need only look at the rich body of literature documenting the use of social psychology and behavioral economics to see the dramatic and scientifically valid behavioral planning approaches. That the joint force has yet to adopt these methods makes them no less valid.

"We already do this." This statement usually refers to either operations in general, or IO in particular. We do plan operations toward a commander's intended end state. However, the behavioral component is typically absent, and so planning toward behavioral outcomes that support strategy is implied, rather than specified. Further, the best routes to persuasion are assumed, rather than planned using valid behavioral analysis and informed by knowledge of behavioral science. It is true that units do execute IO, but in the current doctrinal construct, IO is a largely separate and supporting staff activity. IO almost never plays a dominant role in operations. To be effective, IO needs to be done in a context of a system designed for influencing human behaviors.

"This will cost the services combat capability." At some minor level, this is possibly true. For example, the Army does not have the MISO forces it needs to support long-term stability operations such as it did

during the heights of operations in Iraq and Afghanistan, and the intelligence community is simply not yet resourced to support this paradigmatic shift. However, two facts stand out. The first is that great tactics and physical capability are irrelevant if they do not achieve strategic aims, and success is defined by collective social behaviors. Second, this simply is not an argument for new large-scale investment in influence capabilities. While new capabilities and capacity are likely necessary, the first and most effective approach is to better employ the force at hand by improving the way the force employs its current assets. Adopting this new paradigm is about clearer thinking.

The Way Ahead

The Joint Staff is in varying stages of three separate, but related, joint concepts that will help make this new paradigm a reality. Though there are debates over which concept is supported by the other two, they are all necessary. The first is the Joint Concept for Operations in the Information Environment (JCOIE). This concept explores how to combine physical and informational activities toward a goal of changing the behavior of relevant actors. The second is the Joint Concept for Integrated Campaigning (JCIC), which mentions behaviors in a number of places, and is designed to better harness the potential of whole of government approaches to campaigning. The third is the Joint Concept – Human Aspects of Military Operations (JC-HAMO), which will help the joint force better understand the drivers of human behavior. Finally, the Joint Staff is moving to make "information" the only new joint function in over twenty years.

Which concept is the "lead" concept among the three is irrelevant. What all three concepts and a joint function for information imply is that we must boldly question our planning processes and ensure that they support strategic outcomes while preserving tactical capabilities. Through training and education, we can develop leaders who think differently in the future than they have in the past. COL Summers shared his vignette because of his revelation that something in our thinking needed to change if we were to achieve strategic successes. He was struck with how limited our thinking was over the entire duration of the Vietnam War. That thinking is still largely embedded in contemporary military culture.

To shift our dominant paradigm will take a concerted effort and direction by senior leaders within the department. We must modify policy, doctrine, training, and education, and must build stronger links with partners within the US government and between partner nations. Strategy, in the form of campaign plans, is inherently informational because relevant actors behave based on the information they perceive. The department must realize that while it looks to improve informational capabilities, it is more important to first modify the operating system of the joint force so that it can realize the full power of information to achieve strategy.

Note: The views expressed in this paper are LTC(P) Thomson's, and do not represent the views of the Office of the Secretary of Defense.

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Chapter 5: Rethinking Control and Influence in the Age of Complex Geopolitical Systems - COL (R) Charles Eassa, SCO, Dr. Valerie Sitterle, GTRI, Dr. Robert Toguchi, USASOC, Dr. Nicholas Wright, University of Birmingham

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Abstract

The future of conflict facing the DOD is evolving in ways that demand a more synergistic approach than we have traditionally taken across the human and technical dimensions. To date, military operations have characteristically focused on compelling adversaries through the threat or application of force to achieve victory (i.e., "control"). Changing environmental factors, increased activism by non-state actors, technology, and recent lessons learned suggest that the DOD will be challenged to adopt revised, if not entirely new approaches to affect and direct the outcomes of military operations. Toward such ends, the DOD will need to focus upon the factors and forces that exert the necessary influence to produce desired behavioral outcomes across complex and intermeshed human and technical systems.

Control and the Changing Character of Warfare

Advances in society have always directly influenced the evolutionary development of the methods by which warfare is waged. For example, the advent of both the American and French Revolutions in the 1700s led to the large-scale mobilizations of populations during the Napoleonic wars. Some call this the democratization of warfare. Later, the technological advances prevalent in the First Industrial Revolution involving railroads, telegraphs, steam ships, and rifling of gunpower weapons contributed to the methods in which World War I was waged. Next, the Second Industrial Revolution brought advances in mechanization, transportation, bombers, precision tools, radar, sonar, and large-scale production of munitions to affect the prosecution of World War II. Similarly, the advent of the atomic and thermonuclear bombs following WWII led to a period of Pentomic Warfare reflecting these advances. Later, in the 1970s, the digitization of society contributed to the shift toward precision guided munitions, GPS, digital communications, and the impact of micro-electronics on the character of warfare.

During the World War II era, our US Defense focus was entirely on military power, specifically personnel and weapons. Those were our vectors of control, and they formed the basis for materiel and capability development. As the world order evolved, defense structures and the sociopolitical dynamics that shaped them changed. By the mid 1980s, the US Defense focus consequently shifted to the number of soldiers in the NATO consortium and levels of dedication to nation states with clear ideas about defense

of territory. Capability and capacity-level attention extended toward technology, space, and communication frontiers. Today, however, if you ask a member of our community (whether military officer, analyst, or subject matter expert scientist) about control, the responses you receive are as different as the individual lenses.

Notions of control today bleed into those of influence: neither is separable from the other though they are distinctly different in their implications and any operational realization. In the present, research is driven by multi-national corporations charging ahead on new technology development and a proliferation of Nongovernmental Organizations (NGOs) shaping their own operational spheres of influence around the globe. Nation states and affiliated, or even rogue, groups have joined the fray to intentionally add "noise" to targeted sub-spheres of cacophony, exploiting human nature, technological advance, and socio-dynamics simultaneously to achieve disruptive effect. Whereas national and ethnic boundaries previously provided a constraining force on our conception of conflict, adversaries today and the influences they wield are frequently non-kinetic and amorphous—even in spatially sensitive regions.

What is Influence?

The terms control and influence are often used interchangeably, but in the context of military and diplomatic actions, represent distinct functions. Control implies a greater exertion of specific effort, usually requiring sustained levels of force with associated resources to obtain a specific outcome. By traditional military definition, control is the regulation of forces and battlefield operating systems to accomplish the mission in accordance with the commander's intent. This has very Newtonian (i.e., linear) implications of connectedness. The specificity of control also usually includes temporal and sequential constraints, where tactics are necessarily interdependent.

Influence, on the other hand, implies a more relaxed and unspecific structure, recognizing the dynamic nature of the environment. This dynamism is due to the complexity of the target and the subtler (and unpredictable) effects of influence operations. Influence is affecting the behaviors, attitudes, or perceptions of others (e.g., deterrence and escalation management). In this respect, influence is more subjective, fluid, and more likely to require resources and authorities beyond the traditional military domain. Control and influence are often visualized as opposing states at either end of the control-compel-coerce-influence spectrum. They are, however, interacting dynamic states with a highly non-linear relationship.

To effectively influence, we need to be able to anticipate how a given audience is going to decide; what we know about decision-making is critical to understanding influence. For example, people tend to think only one to two steps ahead and do not anticipate the entire process when making decisions. We need to listen better to those we seek to influence and improve how we present evidence to properly capitalize on that knowledge. The operational question we need to ask is "*How do we develop the capabilities to strategically influence environmental elements or dynamics to maintain behaviors within bounds we believe are necessary from a Defense perspective?*" Preserving these bounds, despite uncertainty within the bounds, allows for a better 'strategic control' as we can more predictably move within the space.

The Information Age

Another factor we face is the accelerating pace of change in the information age, which is directly affecting the character of war by harnessing the capabilities of super-empowered groups or individuals in the waging of conflict. The ubiquity of data and its exponential growth, created by humans and

machines, increasing connective access, and mobility is accelerating the pace of change and increasing the global ecosystem complexity, itself increasingly Gray. While human motivations underlying conflict are relatively static (e.g., desire to increase power), the environment and context surrounding human behavior moderates how that behavior manifests.

In the sociotechnical realm, control versus influence relates to many things, among them the role of media, rapid and overwhelming dissemination of falsehoods, truths, truths modified with falsehoods, and information thought protected and released without warning. "Spaces" in the information realm are abstract realizations of socio-dynamics through which ideas (drivers) and actors (people and, increasingly, machines) interact complexly. Emergent patterns of behavior are too chaotic to be explicitly predicted or directly controlled.

These factors are creating significant changes in capabilities for individuals, nonstate actors, and near peer competitors, which are changing the nature of power—power is diffusing. People and populations will quickly become a more decisive factor in warfare. This presents an awkward truth. "Influence," especially of "non-combatants," has very negative connotations to Western mores. Yet the need to develop influence as a strategic capability in spaces not customarily addressed by the Defense community is precisely the reality of Gray Zone conflict today and for the foreseeable future.

Adaptation

In the asymmetric warfare community, there is an adage from long ago that holds today: "*When does a threat adapt? When it has to.*" Having witnessed Desert Storm I and II, state adversaries have learned the US playbook and have found new ways in which to compete. The space between peace and war has become a new battle area, if not the main battle area, that our adversaries are targeting for operations. State adversaries recognize vulnerabilities in the time taken to gain international and public consensus on the need for intervention. By hiding the identification of combatants, leveraging the human terrain of dense populations, creating fake news, and contesting the authenticity of media reporting, state adversaries can exploit temporary decision paralysis to accomplish their policy objectives. We cannot expect to play the same wargames of the past and get the same results—our adversaries are adapting and so are our conflicts.

Modern warfare is becoming more about detection and deciding what to do with what was detected than about deploying mass as it was historically. Kinetic actions are not always straight forward, practical, or desirable. When they are not, and when the US Defense community faces ambiguous problems with diverse data sources and varied interpretations of that data, how do we make actionable decisions? We must extend our capability focus beyond an emphasis on 'observe' to improve the 'orient, decide, and act' parts of the problem space. As before, this is likely to require resources and authorities beyond the traditional military domain and the answers to the capability development we seek may be quite different at the strategic, operational, and tactical levels.

Technology and Scale

Materiel development is a perfect complement to discussions about the changing nature of what we need in terms of capability. Rapid development across an increasingly contextual operational environment, where widely available technology evolution changes what system capabilities are necessary, exacerbates the threat of hybrid warfare and confounds traditional superiority short of traditional war. Moreover, all too often, materiel developments are specific to realizing kinetic capabilities. Commanders in the field today find they need capabilities of a very different type to

integrate the complex interactions across kinetic and nonkinetic, military and civilian, state and nonstate, economics and ideology that together combine to influence an Area of Responsibility.

Present challenges in materiel solutions exemplify why the challenges we face in a global Gray Zone are so confounding. Consider a swarm of unmanned autonomous vehicles as a system where each vehicle constitutes a node and they are dependent on communications or data transfer between them to achieve a given operational effect. Each node can connect to any other node, and all connections are two-way. In a three-node system (nodes 1, 2, 3), for example, connections between nodes (A between 1-2, B between 2-3, and C between 1-3) can be on or off for any number of reasons. There are therefore eight possible states of the system: {} (no connections), {A} (only connection A is on), {B}, {C}, {A,B} (nodes 1-2 and 2-3 are connected), {A,C}, {B,C}, {A,B,C} (all connections on). The number of states scales with the number of nodes (n) as 2^(n*(n-1)/2). A 10-node system—just ten nodes—will have 45 possible connections and over 3.5E13 possible system states. The number of possible states for a 30-node system will exceed the estimated number of atoms in the known, observable universe (which is 10^{78}-10^{82}). We are simply not capable of testing every scenario and producing unambiguous performance bounds for such systems.

There are three important lessons to take from this discussion. Firstly, we need new approaches to capability development and validation and verification (V&V) when faced with intractable enumerations of possible outcomes. Secondly, control and autonomy are not the same thing. These systems cannot function using traditional control schemes and require strategically engineered autonomy to guide (influence) overall system behavior to be what we need and prefer. Thirdly, this relates directly to challenges we face in development of sociotechnical capabilities and operations in the information space. We need to develop sound capabilities, but we will be forced into new paradigms for vetting these capabilities because we cannot explicitly predict or bound the possible outcomes. We want to influence the outcomes to stay within performance or behavior bounds with which we are comfortable to support a certain spectrum of operations in strategic, operational, or tactical dimensions. Moreover, we must trade between complete self-determination (control, limited to self) versus influence (of other system elements) to shape circumstances in our environment.

Cognitive Maneuver

The US Defense focus on materiel capabilities over the years has ensured a degree of superiority in the physical domain. Just as we excel in the 'observe' space and falter in the 'orient, decide, and act' spaces, we similarly lag in the cognitive domain. We may control an area with mass and kinetic means (physical), but influence and cultural norms are established and maintained through relationships (cognitive) between the people and groups within and, thanks to technological advances, even outside of that physical space. Non-physical connections and the influence dynamics they support are vital to managing modern conflicts. Cognitive terrain is becoming increasingly vital to wielding influence—often with very substantial results—in the global Gray Zone of psychological, informational, and unconventional conflict operations. However, our excellence in kinetic force and mass do not help us take and hold that terrain at all.

At present, US conventional forces do not have proven and effective doctrine for the cognitive space despite widespread consensus that our adversaries are out-maneuvering us in this domain. We need to begin with becoming more knowledgeable about how others are maneuvering in the cognitive space and about how we can improve our capabilities and capacity in the area. Moreover, standardized DOD tools for cognitive visualization, cognitive modeling and simulations, and cognitive assessments are

lacking. This is in part because it is hard, it is a space we do not understand as well as the kinetic one and so are not as comfortable there, systems are too complex to be bounded using traditional analytical methods, and we have not yet considered what new approaches and paradigms it will take to *field* cognitive maneuver as a distinct capability. Yet, if the US military is going to be prepared and effective for future conflicts, this is a deficit we must address with a cogent strategy.

Conclusions – What is the Capability for the Future?

For the US Defense community, the world has become a gigantic Gray Zone. Transience—manifested by connectivity or action—is omnipresent. Organizations are frequently an instantiation of interactive process, and vulnerabilities are no more static than the system. Adversaries, some of which are ill-defined or not even identified as adversaries, operate with little regard for increasingly disappearing rules of Westphalian order. They exploit the nature of operating within a Gray Zone, engaging and advancing yet staying just short of the well-defined frames and criteria for declaring war. Adversaries both state and nonstate take advantage of technology-enabled asymmetries to adapt quickly, disguise intent through distributed tactics, and engage in a "strategy of influence." Their goals are not physical damage via kinetic means but rather disrupting the internal coherence of an enemy system. Increasingly, the US and its allies are that enemy system. If we try to address these problems from traditional approaches or simply mirror approaches already being undertaken by our adversaries, then we do not change the landscape. We do not create a disruptive influence that differentiates "us" from "them" or stress the capacity of our adversaries to adapt and thereby place ourselves in a better national security position.

The implications facing the US Defense community are profound. We need to control behaviors across systems not amenable to direct control. We need those system behaviors to stay within certain bounds—which may be entirely different across strategic, operational, and tactical domains—that enable the US military to either more effectively operate in conflict to "control" the mission outcomes or prevent larger-scale conflicts from developing altogether. We must develop influence as a strategic capability in a Gray Zone of varied scales, dimensions, and adversary types with the intent of "controlling" behaviors, largely operating there, and yet not lose the capability to enforce direct control via kinetic means if necessary for national security. That is not a trivial balance.

Analytically and cognitively speaking, our traditional view of structures and how we act on them (whether military, technological, social, political, etc.) is hierarchical and tree-like where physical and functional relationships are clearly delineated and understood. The global Gray Zone is not like that at all, but rather a hypergraph spreading across and through an amorphous medium. We cannot brute force its analysis or treat it as a tree and expect to achieve the outcomes we require. As a community, we must embrace a nontraditional view of what it means to have and field a capability: With the above characterizations in mind, we need to answer some key questions and challenges:

- What systems do we need to influence in strategic, operational, and tactical domains?
- Do we understand why, meaning how influencing them can affect overall system behaviors?
- To understand how, we need to (a) discover ways to describe an effective representation despite specific links and causal relationships being potentially hidden from explicit view and (b) find new approaches to evaluate systems and the impact of actions (ours and others').
- How do we implement these capabilities when their very nature and targets require resources and authorities beyond the traditional military domain?

This requires us to rationally develop influence as a strategic capability to impact decision making in targeted spheres of influence completely outside of traditional materiel development pathways, not leaving it to *ad hoc* implementation.

Five Bullet Points

- The changing nature of conflict requires us to address the distinctions between military control and influence as they apply to US military operations.

- Advances in technology are creating significant changes and asymmetries in capabilities for individuals, non-state actors, and near peer competitors that are, in turn, changing the nature of power.

- Our adversaries have adapted to using influence as a strategic capability, staying just short of the well-defined frames and criteria for declaring war and consequently confounding our traditional prowess in sheer mass and kinetic capacity.

- The US Defense community must rationally develop influence as a strategic capability to impact decision making in targeted spheres of influence completely outside of traditional materiel development pathways, not leaving it to *ad hoc* implementation.

- We must develop influence as a strategic capability in a Gray Zone of varied scales, dimensions, and adversary types with the intent of "controlling" behaviors, largely operating there, and yet not lose the capability to enforce direct control via kinetic means if necessary for national security.

Chapter 6: Metaphor for a New Age: Emergence, Co-evolution, Complexity, or Something Else? - Dr. Allison Astorino-Courtois, NSI, Dr. Valerie Sitterle, GTRI, Dr. Corey Lofdahl, SoSA, CAPT (Ret) Todd Veazie, NCTC

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Abstract

As globalization and sociotechnical convergence collide with the continuing evolution of the post-Cold War security environment, do we know the appropriate metaphors to describe our world? Our environment is now characterized by non-uniformity and starts, stops, and leaps across orders of magnitude, and across geographical areas and socio-economic- political sectors. How do the lenses through which we view and draw conclusions about various aspects of the world and the behaviors within it change? What we can perceive and hence act upon? Understanding the nature of paradigms and how we use them to provide insight in the US Defense community is critical to how well we may face future security challenges.

Paradigms and Metaphors – What's the Difference and What are They Good For?

A metaphor guides our understanding by drawing a parallel to phenomena we comprehend well, or at least feel we do. A paradigm, in contrast, is normative. As we apply them to study and analyze in the operational environment space, they shape our thought patterns, theories, research methods, and—consequently—our analytical conclusions. In his second edition of *The Structure of Scientific Revolutions*, Thomas Kuhn (Kuhn, 1970) defined a scientific paradigm as: "universally recognized scientific achievements that, for a time, provide model problems and solutions for a community of practitioners," namely as something that specifies:

- *what* is to be observed and scrutinized,
- the kind of *questions* that are supposed to be asked and probed for answers in relation to this subject,
- *how* these questions are to be structured,
- *what* predictions made by the primary theory within the discipline, and
- *how* the results of scientific investigations should be interpreted.

For Kuhn, a paradigm embodied preconceptions, and he developed his essays specifically for the natural and physical sciences. Social sciences, with their flair for openly embracing anomalies instead of seeking conformation, caused his great distress: "*Even more important, spending the year in a community composed predominantly of social scientists confronted me with unanticipated problems... Particularly, I was struck by the number and extent of the overt disagreements between social scientists about the*

nature of legitimate scientific problems and methods. … somehow, the practice of astronomy, physics, chemistry, or biology normally fails to evoke the controversies over fundamentals that today often seem endemic among, say, psychologists or sociologists" (Kuhn, 1970, Vol II, No. 2, p vii-viii).

Despite Kuhn's feelings, social scientists proceeded to adopt a Kuhnian view of paradigms and their descriptive role. "Dominant paradigms" describe the values and associated basis of thought that are most widely held in a society at a given time; "paradigms shifts" denote changes in how societies organize and understand their perceptions regarding the world. Paradigms matter a great deal with respect to how we draw and interpret information for operational purposes—even if social scientists wield them differently from Kuhn's intent. For the remainder of this chapter, we will briefly describe why paradigms matter to the US Defense community and the modern challenges we face in using them to produce tangible insights and actionable information.

Lenses and How the World Has Changed

We have for years applied a Westphalian lens to the world, where states are primary actors and purveyors. In the Cold War era, we had a very US-centric and bipolar view, which resulted in adopting a sentiment of coercive power as the motivator for our global actions. That world, however, has changed dramatically. Power has diffused over time, the very nature of what constitutes a threat and—critically—how that threat is realized have drifted seemingly far away from the understanding we thought was concrete. The world has changed. Yet, have we not heard that before? Why is this time different?

Certainly, the nature of power, connectivity, and even transience has changed considerably with the advent of technologies that empower state and nonstate actors alike. Future conflict will most likely involve a mixture of sovereign state and nonstate threats acting across competing and cooperating dimensions with varying degrees of asymmetry to produce a highly complex system. Terrorism is no longer spatially confined or built from shared experiences in battles as it was for the Afghan Mujahedeen. Today, affiliation with nearly any ideological group is as simple as an individual declaration. Global threats in general have become more impersonal to some and personal to others, but they are increasingly dispersed and amorphous. Regardless, the US Defense community must understand how to make sense of this world in ways that are informed (correctly) and actionable.

Today we still believe that the US exists in a world split between democratic and non-democratic regimes. We are still US-centric in our view, rational, and still focused on military coercive power. We see a stronger role for ideology in driving present conflict, however, and recognize that intra-state conflicts can produce a contagion effect quite relevant to our national interests. Because of these beliefs, we are more interested in evaluating the sources of conflicts, especially with respect to nationalism and grievances that may produce conflicts that could impact us considerably.

Perhaps then, our lenses through which we view the world and, consequently the paradigms we apply to understand and characterize its actors and their behaviors, have not changed significantly but rather simply expanded. To decipher the implications this may have for national security, we need to first understand how and where we use paradigms in support of US defense.

Why Do We Need Paradigms and What Can We Tangibly Do With Them?

We have used many metaphors over the years to explain the complexity inherent in the world. Some, such as ecosystems and co-evolutionary systems explain competitive, symbiotic behaviors but imply

both a continuous system and continuous change. Other metaphors, which were occasionally instantiated in executable models, like cell-cell interactions and other biologically inspired dynamic frameworks, sought instead to explain cooperation but still imply uniformity in space or time. Again, however, to capture one trait, we lost another.

The world today is both non-uniform and discontinuous. It is characterized by leaps across orders of magnitude and across geographical areas and socio-economic-political sectors. Technology, for example, does not just remove spatial barriers to produce enhanced connectivity and speed of dissemination but creates filters and echo chambers that serve as discrete percolation points influencing beliefs and behaviors.

In theory, we can always make an existing model agree with past observations by making it more complicated. While improving its applicability to capturing the past, however, this usually reduces the model's predictive abilities. So, what should we do? Everyone applies metaphors to enhance cultural, political, economic, organizational, and biological sense making. When rigorously applied—even if different versions are applied differently by different groups—these paradigms provide us with a mental structure that helps us frame and understand the operational environment and relate to the world. To the practitioner, they provide a scaffold to which we can tether our policy and planning assumptions and decisions. Their explanatory power ranges from tactical to strategic, and the greater the complexity of the environment, the greater the explanatory potential.

It seems reasonable to say that as we attempt to understand and cope with the global national security environment, we must also challenge our assumptions about legacy paradigms that are underperforming in the face of rising interactive complexity. How do we update our understanding of the rules of the system(s), however? If we need new paradigms, is there sufficient common ground to determine if a new one is better?

As a community, if we seek to apply and/or replace paradigms, we need to establish sufficient common standards of description and measures of comparison. We may never reconcile all the various lenses prevalent throughout the social, cultural, political, and other dimensions we seek to explain, but being able to tangibly explain their differences matters. It matters because we typically capture and use paradigms as tools to create actionable information about highly complex systems.

Challenges of Context and Execution

Complexity and System Dynamics

There is usually a mismatch between how real world complex systems work and how we think they work. Our models and the paradigms on which they are founded are imperfect representations of the real-world system. Despite the gap, there are different ways through which we can apply system rules simply and still derive a basic understanding of the complexity, expanse, and emergent possibilities of our system. The classic work of Friedrich von Hayek, Herbert Simon, and Jay Forrester continues to provide insights into the complex policy problems of today. Specifically, Jay Forrester's system dynamics (SD) simulation modeling (Forrester 1971; Sterman 2000) addresses three forms of complexity that continue to bedevil policy makers: (1) integrative, stock-flow causal relationships, (2) nonlinear causal relationships, and (3) and feedback causal relationships, both reinforcing (positive) and balancing (negative). Each of these causal relationships is confusing to the human cognition and makes the system behavior that features them hard to understand and predict. When all three are present, then the

system's behavior becomes impossible to predict. This complexity reveals itself in relationship to people's inability to predict even fairly simple system behavior—what Herbert Simon calls "bounded rationality" (Simon 1990). This inability to predict the behavior of complex social systems accurately reveals itself as policy resistance (Hayek 1964) and unintended consequences (Forrester 1971). SD leverages modern computation to address system complexity to help the human mind understand the working of and recognize the patterns within complex systems.

SD is also effective at integrating multiple types of systems and expertise, making it especially useful for synchronizing and choreographing the diplomatic, informational, military, and economic (DIME) elements of national power associated with whole of government solutions. These elements of national power can then be brought to bear on SD models that integrate natural and social systems and that can be comprised of hundreds of complex causal relationships. SD depicts such relationships using partial differential equations that are executed quickly and accurately with computation, something that the human mind is incapable of doing. Simulation provides the capability to performing scenario analysis as well as to evaluate and refine proposed policies to improve their probability of success is greater and reduce their cost in terms of time, money, and human lives.

The ability of system dynamics to address system complexity and support "whole of government" analysis was demonstrated by the DARPA Conflict Modeling, Planning and Outcomes Experimentation (COMPOEX) program in the mid-2000s (Kott and Corpac 2007). Plans that spanned both political and military (Pol-Mil) features were depicted in a suite of 14 simulation models, 11 of which were SD models. Traditionally political and military operations were treated as separate "lanes" and pursued individually, but COMPOEX showed that simulation could integrate and test various combinations of political and military policies. The importance of this capability became apparent in Afghanistan and Iraq as both theatres featured combined political and military operations, but in neither theater did these operations achieve their intended policy goals. The United States Government appears to have recognized this shortcoming and is now funding a range of research programs to better understand complex social systems as well as how to achieve desired policy outcomes within them.

Transforming Bodies of Knowledge into Executable Tools

A completely different type of model derives from semantically expressed knowledge. The US Defense community frequently requests insights, discussion, or other characterizing analyses on specific subjects or relating to certain regions of the world. SMA's historical body of analytical products is a prime example. How do we capture this knowledge in ways that are more rapidly digestible and explore-able for decision makers? Converting our bodies of knowledge that include textual analyses, exemplary models, geographically referenced characterizations, etc. into executable analytical products that convey the proper context for effective interpretation is a massive challenge.

Scientists used many paradigm-based assumptions to create the knowledge base, frequently (as Kuhn noted for social scientists) working from completely different paradigms or sets of assumptions, each referenced to a specific contextual understanding. Due to the nature of the field, reconciling these anomalies and the distinctly disparate conclusions they may produce would be a mistake. In a complex system, there are many possible outcomes and hence interpretations associated with those outcomes. There are no explicit, uncontested answers.

To produce an executable, searchable form, we apply more paradigms to create, characterize, explain, and extrapolate from our knowledge base for any given problem. The computational paradigms we

apply slot the dimensions of that problem into some pattern that in turn guides and constrains what we look for, how we look for it, and what we expect to find. We apply still more computational paradigms (e.g., assumptions that craft the framework for simple query rules or adaptive artificial intelligence techniques) to sculpt our now digitally captured ontological framework into an executable product that can convey proper context for effective interpretation.

Part of the challenge is that decision makers in the military operations space do not want a search engine for semantically expressed analytical products; they want a contextually relevant answer to a query that uses the analytical knowledge base to derive that answer. That will require us to know what gaps in the knowledge base were created or existed but were unrecognized during the computational implementation. Similarly, we need to determine how to treat these gaps—not to mention conflicts that arise when the analytical products offer more than one answer, answers we should not force down to a single view—when constructing insightful responses for users. Much like for system dynamics, we will need a considerable presence of humans in the loop to guide semantic conversion and contextual extraction.

Conclusions: What to Do with Paradigms?

With the world transitioning from an Industrial to Information basis where the relational rule sets are transforming fundamentally, we must challenge the persistent paradigms and metaphors that drive our intellectual framing and anchor our decisions because they increasingly no longer fit. For example, to see the locus of power and leverage points in the geostrategic landscape as the exclusive provenance of nation states is increasingly flawed. Further, it is also wholly inadequate to simply treat violent non-state actors as if they were nation states simply because we have not found a more appropriate paradigm. It requires us to rethink the nature and derivation of power to account for “movements” and stateless networks.

As before, if we need new paradigms, is there sufficient common ground to determine if a new one is better? We regularly utilize paradigms in our analytical products, whether an executable tool that seeks either to model a system or extract actionable insights from a semantic corpus or simply the corpus itself. We must develop a better understanding with respect to what we need from these tools to inform decisions across the strategic, operational, and tactical domains and how we can use them to act on the security challenges in each. Further, we must establish an evaluation methodology before relying on any new tool too completely that, in trying to create new strengths, we do not instead create false-insights that leave us exposed to massive new risks.

We use paradigms to guide how we structure, digest, and express our analytical thoughts. We use metaphors, in turn, to explain thoughts and what they tell us tangibly and visually to make them intuitively digestible to others. In the process, we should remember that there is a distinction between exchanging information and the mobilization of knowledge. The former embodies the literal exchange of data or information derived from data. The latter entails purposefully pushing that information out of one’s own control in a form and way it can accessed, augmented, and acted upon by others. We need to rethink how we wield tools than can unabashedly provide multiple, disparate views of our problem to effectively the paradigms we develop and evolve to mobilize knowledge to the US Defense operational community.

"*A paradigm can, for that matter, even insulate the community from those socially important problems that are not reducible to the puzzle form, because they cannot be stated in terms of the conceptual and instrumental tools the paradigm supplies*" (Kuhn, 1970, Vol II, No. 2, p 37).

Five Bullet Points

- We apply paradigms to study and analyze in the operational environment space; they shape our thought patterns, theories, research methods, and – consequently – our analytical conclusions.
- Many of our current paradigms are wholly inadequate to describe State and non-State actors and their behaviors.
- Before rushing to embrace new paradigms, however, we must establish sufficient common ground to determine if a new one is better.
- Understanding the nature of paradigms and how we use them to provide insight in the US Defense community is critical to how well we may face future security challenges.
- We need to rethink how we wield tools than can unabashedly provide multiple, disparate views of our problem to effectively the paradigms we develop and evolve to mobilize knowledge to the US Defense operational community.

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Chapter 7: Don't Shortchange Defense Efforts to Inform, Influence, and Persuade - Dr. Christopher Paul, RAND

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This chapter has been adapted from a publication produced for RAND called "Don't Shortchange Defense Efforts to Inform, Influence, and Persuade."

The ability to inform, influence, and persuade are necessary both for the success of national security as well as a cost-effective toolset relative to physical military power. This has become increasingly relevant and brutally obvious in US military engagements in Iraq and Afghanistan and is indicative of the shifting sands of warfare the world over. Capabilities to inform, influence, and persuade are also evolving with the advancement of technology; correspondingly, the historical theme of propaganda no longer accurately captures the magnitude of this domain. Every action, utterance, message, image, and movement of a nation's military forces influences the perceptions and opinions of the populations that witness them—both first hand in the area of operations and second or third hand elsewhere in the world. Despite the scope and intricacy of informing, influencing, and persuading, these tools are undeniably cheaper than overt military intervention and can be used as a supplemental device in all national defense operations.

There are two arguments to support these capabilities: 1) the preventative argument where informing, influencing, and persuading efforts help avoid the need for deploying more expensive capabilities because an ounce of prevention is worth a pound of cure and 2) the enabling argument where the combined arms application of information power along with other forms of power makes it easier, and thus less expensive, to accomplish missions. By decreasing or even eliminating the pursuit of terrorists and the associated collateral damage in counterterrorism efforts, the preventative argument demonstrates the potential for diminish support for violent extremism. Following the same logic, even if prevention is not possible, efforts to inform, influence, and persuade can modestly decrease the costs of, or threats to, other efforts by making an operating environment more permissive and conducive to desired end states before operations begin. In addition to shaping the battlespace or preventing the need for full-fledged operations, a second argument insists the synergies from informing, influencing, and persuading alongside other military capabilities can reduce costs. A stronger statement of this argument asserts some operations require the support of indigenous constituencies in order to succeed and that winning support strictly through physical force and without employing influence capabilities is impossible or at least extremely costly. Occurring more often than we would like to think, this situation is one of the main drivers behind winning all the battles but losing the war.

The benefits of a sophisticated and viable strategy to inform, influence, and persuade can easily be imagined, but making concrete cost-benefit calculations and generating causal evidence of success is much more difficult. In an article in IO Sphere, Mark Ochoa used notional data to illustrate the possible cost savings from influence operations during military operations under a number of different scenarios and assumptions. He concluded that the increased use of information operations in phase 0, phase 1, and phase 2 "should be worth the investment to avoid or delay the significantly higher costs of the

remaining phases," where the application of conventional forces costs orders of magnitude more than information operations.[10] The push for reform has also been demonstrated in the past decade through a host of white papers, reports, articles, and commentaries suggesting reforms and improvements for US strategic communication and public diplomacy, two prominent categories of US efforts to inform, influence, and persuade.

A synthesis of analytical literature from a 2009 RAND study that examined 36 reports on US strategic communication and public diplomacy present four commonly repeated themes: (1) demand for increased resources, (2) a call for leadership, (3) a call for a clear definition of overall strategy, and (4) the need for better coordination. The call for more resources was the single most frequent recommendation, appearing in more than half of the 36 reports reviewed, and agencies and departments across the DOD broadly agreed on the need for both increased personnel and for more programmatic resources.[11] Roughly one quarter of the 36 strategic communication and public diplomacy documents reviewed make an explicit call for leadership, which referred to at least four different things: 1) presidential attention (a desire of proponents in any issue area), 2) authority; 3) good choices (bad policies cannot be well communicated), and 4) clear direction. Often related to calls for leadership, almost one-third of the strategic communication reports reviewed make a call for clear strategic direction. According to one commentator, without a clear strategy, "the leaders of each department, agency and office are left to decide what is important."[12] Lastly, an admonition to coordinate better in the US government (many sources lament the lack of coordination of US government efforts to inform, influence, and persuade),[13] was also recommended in more than half of the reviewed strategic communication and public diplomacy documents.

Recognizing the critical importance of informing, influencing, and persuading will necessitate additional force structure, including personnel and formations and staff billets in the Department of Defense and the Department of State, as well as investment in specialized tools. A less tangible measure, but not less important one is changing internal culture to inculcate communication mindedness in commanders and senior leaders; this will take time and effort but is cheap and very possible. Training leadership elements within the DOD will filter the message of communication mindedness across the board and shift the US security establishment to be more sensitive to informing, influence, and persuading. This may take a generation for a change in culture to occur; however, the effect will be ubiquitous and will infiltrate the more stubborn dynamics and processes in the DOD. If leaders begin to ask questions about effects in and through the information environment, then subordinates will have to try to answer them. This accountability will lead to at least three further positive developments: first, subordinates will ask these questions earlier in the planning process to be able to answer their leadership's queries. Second, subordinates will begin to seek out and consult with those who have relevant expertise in information operations and information-related capabilities rather than such specialists having to fight to try to

[10] Mark A. Ochoa, "Conventional Operations Must Be Less Expensive than Information Operations," *IO Sphere* (June 2011), 43.
[11] Christopher Paul, *Whither Strategic Communication? A Survey of Current Proposals and Recommendations* (Santa Monica, CA: Rand Corporation, 2009).
[12] Lindsey J. Borg, "Communicating with Intent: DoD and Strategic Communication" (graduate studies report, Air University, April 2007), 23.
[13] See, for example, *A Smarter, More Secure America* (Washington, DC: Center for Strategic and International Studies Commission on Smart Power, 2007); Defense Science Board, *Task Force on Strategic Communication*; Kristin M. Lord, *Voices of America: U.S. Public Diplomacy for the 21st Century*, (Washington, DC: Brookings Institution, 2008); and *Quadrennial Defense Review Report* (Washington, DC: US Department of Defense, 2006).

somehow insert themselves into the planning process (which happens far too often at the moment). Third, the answers to these questions will inevitably align with broader goals and lead to changes in operations or execution.

Distribution of the capability to inform, influence, and persuade between the DOD and other civil agencies (namely the Department of State) is a balance that deserves examination. The DOD has prominence in the capability to inform, influence, and persuade and a shift to the Department of State will require substantial changes in terms of orientation, priorities, funding, and capabilities available for public diplomacy and strategic communication. Given the complexity of shifting capability from the DOD to the DOS as well that inherent problems such as the DOS lacking surge capacity and expeditionary capability, the DOD will need retain significant capability. Both Departments will benefit from a general review and by emphasizing assessment and evaluation to continuously calibrate efforts to inform, influence, and persuade. One method of introducing capabilities to inform, influence, and persuade can begin with Military Information Support Operations (MISO) personnel who currently supplement US Special Operations Command. Proliferating MISO awareness throughout the DOD, DOS, civil affair forces and civil military operations will benefit all concerned parties and this can be done in the cyber domain. MISO personnel operating in the public sphere are ideal candidates to instill capabilities to inform, influence, and persuade across the US government. Particularly relevant, a possible relationship between cyber operations and information operations could give rise to cyber-enabled MISO, which would fill an important operational seam. As an example, cyber forces can potentially access and exploit adversary networks and systems, to include electronic communications—email, for example—however, just because offensive cyber operations or computer network exploitation experts might be able to send messages to adversaries or potential adversaries, cyber experts are not necessarily expert in the composition of effective personal influence messages. That expertise lies elsewhere—namely in military information support operation. Even more important in this context, funds dedicated to the cyber mission area can and should be used to support these improvements to both cyber and inform, influence, and persuade capabilities.

Chapter 8: Operationalizing the Social Battlefield – Dr. Spencer Meredith III

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Abstract:

The diffusion of influence from traditional elites to broader and more diverse sources has raised challenges for the United States, but not inherent risks by itself. The tools used to mobilize individuals and groups within society have for some time existed across a spectrum of industries, academic disciplines, and ultimately, government actions. As such, while the ubiquity of influence has ratcheted up in recent years, it has not fundamentally altered who can be influenced or the means of doing so. Evaluating how these phenomena affect the Joint Force Commander's range of options, and more importantly, strategic paradigms on ways, means, and ends, must include several elements. These include governance, mobilization potential, and narrative landscapes.

Key Words: Governance, Mobilization Potential, Alternative Narratives

The diffusion of influence from traditional elites to broader and more diverse sources has raised challenges for the United States, but not inherent risks by itself. The tools used to mobilize individuals and groups within society have for some time existed across a spectrum of industries, academic disciplines, and ultimately, government actions. These tools are just as readily found in major advertising firms as national news channels. As such, while the ubiquity of influence has ratcheted up in recent years, it has not fundamentally altered who can be influenced or the means of doing so. Evaluating how these phenomena affect the Joint Force Commander's range of options, and more importantly, strategic paradigms on ways, means, and ends, must include several elements.

First, the context for operationalizing the social battlefield resides squarely in **governance**. As the practical application of political will towards social demands, governance sets the stage for expectations, both for elites and the masses. It is therefore the *process* of negotiating and applying pressure to win in an often zero-sum game, even in democratic political systems. Governance is also the *product* of repeated testing of boundaries and relative strength. This includes the exploitation of seams and fissures within and between rivals, as well as the acknowledgement of extant interests that predate and likely endure longer than the current configuration of political power.

Governance is therefore the area of responsibility for all parties, recognizing that political systems vary to the degree and types of issues for which social forces share responsibilities with those in power. Regardless of the nomenclature for the regime, which has become almost universally "democratic" despite the general dearth of real democratic substance in the practice of politics, authoritarian regimes and their more open governmental counterparts must find ways to establish and defend areas of public debate. These borders can be seen as easily in "free-speech" debates, as in strict private-public divides in closed systems. Accordingly, these aspects speak to capacity, autonomy, and legitimacy for governance.

Capacity relates to the ability to accomplish objectives. This may be the easiest to quantify when assessing governance, but remains hardest for states to apply because few resources are unequivocally

fungible—they involve multiple levels of deeply contested processes to secure, manage, and allocate goods and services. *Autonomy* also shares that appearance of certainty, yet also with far greater uncertainty in practice. If autonomous action means the absence of countermanding orders by either internal or external forces, can we say that any political entity has complete autonomy? All are beholden to some degree at different times on various issues. As a result, autonomy, like capacity and legitimacy, fits more on a sliding scale rather than functioning as an established, immutable fact once achieved. *Legitimacy* typifies this transitory nature most clearly given how easy it is to lose, and hard to regain afterwards. Based on elements of cognitive trust, emotional resonance, and behaviors that can span from tacit "staying out of things" to overt demonstrations of support, legitimacy is the constant battleground for influence, yet is also one of the hardest to measure beforehand.

This leads to the second factor for consideration, **mobilization potential**. Considered as the cross over between individual and group dynamics, this potential can be graded with a measure of certainty. To do so requires two approaches, namely trend analysis to gain a sense of trajectories, and comparisons to related cases to indicate flashpoints and likely turns in direction and intensity. Standard social science methodologies allow for both, and can give indications of the following variables.

Primarily, we can look for *windows of vulnerability and opportunity*. Each of these speaks to core aspects of capacity, autonomy, and legitimacy, and how malleable they are to change, either from internal or external forces. When viewed from the lens of mobilization, this translates to the ability to get an individual or group to move from the current status quo first, then followed by the ability to direct that movement in desired ways. Again, much of the analytical framework for these processes is very well established in multiple academic disciplines, which are currently in the service of a variety of economic and political enterprises. The key point is that mobilization potential is a combination of many of the same variables used to measure governance, thereby enabling easier, more consistent assessments when considering influence operations.

Some examples of factors that can go into assessing mobilization potential include: 1) Group Cohesion defined by unifying ideas, common identities, clarity of goals, and actions in the past that either deplete or add to group resources; 2) Factions within organizations evaluated based on the depth of the fissure, its significance to the group's leadership and membership, the duration of unity vs. time spent as rivals or non-participants, and how easily seams are held together or torn asunder; 3) Public Space for Debate must also be defined and maintained by the state, including the types of issues, frequency of usage by social groups/individuals, and how elites engage with that space; and 4) Geography of Movement and Assembly the enable or restrict the physicality of mobilization. It is noteworthy that this brief list is not meant to be exhaustive, but rather to tie into existing DOD evaluation matrices while moving the conceptual framework more towards influence operations specifically.

Finally, **narrative landscapes** vis-à-vis cognitive openings and organizational lifecycles rounds out the core concepts needed for this kind of analysis. Narratives are both abiding stories of meaning and purpose, and adaptive messages that react to, and propel in their own right, the kinds of actions under discussion in this white paper. They contain elements of master narratives that bind adherents across time and communities, as well as individualized variations that can give personalized action plans as well. Narratives also serve as gatekeepers for legitimacy by corralling messages that stray too far from the orthodox view, or ostracizing ones that have left the fold and moved into the hostile category of "other." These relate to *cognitive openings* by setting the stage for both the status quo and the need to assess new, often painful information relative to the individuals understanding of his/her life and place

in the grander scheme of things. These openings are notoriously difficult to predict, instead being more visible after the fact in radicalization or deradicalization, as extreme cases, or more normally when people choose new careers, school programs for their children, spouses, or lifestyles. Cognitive openings are therefore the ways by which certain ends are achieved through the means of populace factors.

The same can be said at the group level regarding *organizational lifecycles*, which track the development stages groups undergo, but not often along linear, predetermined paths. Often, the stages occur in fits and starts, without equal time spent in each phase. Those phases include incubation, securitization, politicization, and finally redefinition/revolution/destruction. Incubation occurs as interests and ideas are articulated by new and existing members, then coalesce after debates within the organization lead to winners/losers, and finally become representative for the members individually and collectively—union workers, Republicans, Shia, etc. Securitization results from the inevitable hostile environment encountered as the new group emerges to claim ideational and physical space, along with the attendant resources to maintain and promote both. Insularity—a defensive identity posture—often results, and core ideas/messages/interests become sine qua non for the group, making any internal revisions dangerous for fear of external losses. If organizations survive this phase, they can move into the politicization arena whereby goals can either moderate to fit the available space or become more extreme in the absence of a viable seat at the governing table; for revolutionary movements like the Bolsheviks and ISIS—the table itself has to be replaced. The final stage occurs as groups either enter into the process of accepting the need for redefinition in light of changing conditions, revolve into something altogether different from its origins, or cease to exist.

As an analytical framework, this brief review of some core scholarly approaches yields several options for the practitioner at the strategic and operational levels. First, they set the stage for more than a Whole of Government approach, that oft-cited, yet never seemingly achieved goal for better policy implementation. Instead, specialization of action is a hallmark of any effective enterprise, so long as it follows core strategic goals and methods for achieving them. The approach listed above gives that commonality to diverse USG entities by ensuring they are looking at similar things, while doing so from different vantage points. The analytical richness that can result will aid in developing nuanced, but coordinated operational plans, whether from DOS, DOD, USAID or others.

The result of this can be an effective alternative narrative to the ones currently on offer from US rivals at the state and non-state levels. Such a message would highlight the things that make the United States a desirable partner in the process of governance and mobilizing populations for beneficial goals. It can also give evidence of what is desirable about the United States as a product of long historical debates—often contentious, sometimes violently so—that have yielded a prosperous society and secure political system. Both of these have "sold" well in the past, and can do so again in the emerging Gray Zone of the human domain. For in the end, despite the increasing volume of information, the ability to process it and in turn, be influenced by it, remains the same.

Chapter 9: Rethinking Control and Influence in the Age of Complex Geopolitical Systems - Dr. Nicholas D. Wright, University of Birmingham, UK

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Abstract

Influence and control are two ways to exert power over others' decisions, where control removes an audience's ability to choose. Influence is critical in conflicts such as those in the Gray Zone, whose limited nature leave adversaries and allies able to choose. What should we rethink about control and influence now? I argue that we should focus on three aspects we need to rethink about how we do influence: First, use new facts about how to influence human audiences. For example, what really motivates audiences? Second, try to focus on areas where cognitive biases make humans operate poorly, despite the fact that they are often activities that seem easy. Third, we need to get smarter about how we operationalize evidence from the science of human decision-making. I illustrate these three areas through an example. I describe how humans are bad at thinking from the audience's perspective (thinking "outside-in") and how this can be mitigated by using a simple checklist for empathy that includes realistic human motivations.

What Are Control and Influence?

I define influence as a means to affect an audience's behavior, perceptions, or attitudes. Influence can be achieved by deterrence, persuasion, 'nudge,' or the use of hard or soft power. A key feature of influence is that audiences can choose, which distinguishes influence from the direct effects of brute force that removes the ability to choose. Removing choice may be termed control. As the late Thomas Schelling wrote in his seminal *Arms and Influence*: "Military force can sometimes be used to achieve an objective forcibly, without persuasion or intimidation; usually, though—throughout history but particularly now—military potential is used to influence other countries, their government or their people."[14] "Deterrence is about intentions—not just estimating enemy intentions but influencing them."[15]

Strategy is fundamentally the same across conflict in many human competitive spheres. Sir Lawrence Freedman's recent book, *Strategy*, illustrates this commonality across three spheres: military, sociopolitical, and business strategy. In all three cases: *"The realm of strategy is one of bargaining and persuasion as well as threats and pressure, psychological as well as physical effects, and words as well as deeds. This is why strategy is the central political art. It is about getting more out of a situation than the starting balance of power would suggest. It is the art of creating power."*[16]

If strategy is the art of creating power, then what aspect of power matters most in the conflicts such as those in the "Gray Zone"? Power can be exerted through influence or control—and given the highly

[14] Thomas C. Schelling, *Arms and Influence* (London: Yale University Press, 1966). p. xiv
[15] Ibid. p. 35
[16] Sir Lawrence Freedman, *Strategy: A History* (Oxford ; New York: OUP USA, 2013).

limited nature of Gray Zone conflict in which audiences are more or less free to choose, influence is the key way to exert power. This is instead of removing their capacity to choose by using brute force in itself. Adversaries can choose whether to act or not (e.g., to be deterred) and whether or not to escalate. Allies can choose whether or not to provide support. Third parties and local populations choose who to back and who to oppose.

Two Things We Should not Need to Rethink about Control and Influence (But about Which it is Good to be Reminded)

Firstly, that the human dimension is important. Leading strategists from Sun Zi (Tsu) to the 21st century stress the human dimension. As the British commander in the successful Malay counterinsurgency campaign of the early 1950s, Sir Gerald Templer noted, "The shooting side of the business is only 25 percent of the trouble and the other 75 percent lies in getting the people of this country behind us," which did not require "pouring more troops into the jungle" but instead in a phrase he made famous the answer lay "in the hearts and minds of the people."[17]

Secondly, that the world is globalized and complex. The world has been globalized and complex for a long time. At the turn of the 20th century, cities like London stood at global crossroads and saw vast waves of migration, trade, investment, and economic integration.

What Do we Need to Rethink about Control and Influence in an Age of Complex Geopolitical Systems?

What we need to rethink relates to features of control and influence that are new. One important advance is our new, more realistic knowledge about human factors from psychology and neuroscience.[18] I describe three ways this needs rethinking.

First, use new facts about how to influence human audiences. We have learned a lot about how humans make decisions—not just mathematical models about how people should make decisions, but how they actually do make decisions. For example, we have learned that people actually typically only think one or two steps ahead, not all the way through.[19] Key human motivations are described in Figure 1 on the next page.

Second, try to focus on areas where cognitive biases make us operate poorly, despite the fact that they are often activities that seem easy. Focusing on trying to do those things better can reap large benefits, because even just doing them adequately may provide a real competitive advantage over adversaries. One example of such a cognitive bias is that most people plan projects too optimistically, because such an "optimism bias" is natural to humans. A simple rule of thumb can minimize such an optimism bias in oneself, which is to ask how long one thinks it would take someone else to do the project.[20] Perhaps the most important bias to counteract for influence or deterrence operations, however, is that humans tend to think from their own egocentric perspective, rather than seeing the world from the audience's point of view. How to overcome this critical bias is the focus of the final section of this chapter.

[17] Ibid. p. 188

[18] Other aspects, such as new technologies are clearly also important, but will be dealt with elsewhere in the whitepaper.

[19] See for example the p-beauty game described in Camerer

[20] Dan Lovallo and Daniel Kahneman, Harvard Business Review, 2003. https://hbr.org/2003/07/delusions-of-success-how-optimism-undermines-executives-decisions

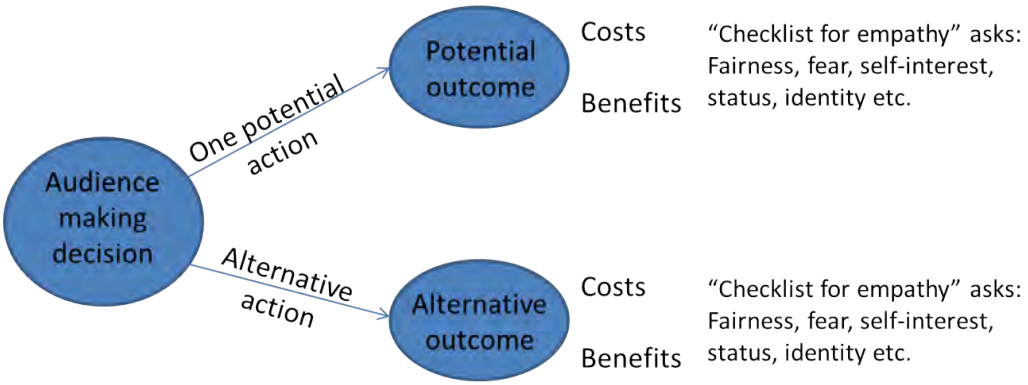

Figure 1 The audience decision process

Third, we need to get smarter about how we operationalize evidence from the science of human decision-making. Surgeons learnt long ago that in emergencies simple checklists or guidelines can be critical decision aids. Furthermore, just giving medical doctors evidence of what works best does not often change their clinical practice in itself. Thus, one way to introduce evidence is to incorporate it into checklists and guidelines to make it useable for operators. One example is the checklist for empathy described below that helps practitioners think "outside-in."

Knowing your Audience—Thinking 'Outside-in'

To influence an Afghan farmer not to grow poppy, the influencer must consider that course of action and its alternatives from *the audience's* perspective.[21] If the aim is to deter a hostile state, i.e., influence it not to act, then the influencer must estimate how the hostile State perceives the costs and benefits of acting—and of not acting.

Embracing an **outside-in** perspective—a mindset that starts with the audience and focuses on creatively delivering something it values—brings benefits relative to an inside-out mindset focused on internal processes that push out products to the audience.[22] In business, this has been a staple of marketing since Harvard Marketing professor Theodore Levitt's 1960 article *Marketing Myopia.*[23] In a more recent study, customer-driven companies doubled the shareholder returns compared to shareholder-driven ones[24] and the advantages are even more marked in the most challenging and turbulent markets.[25] BBC Media Action's development projects in countries such as Afghanistan are critically "audience-

[21] This subsection draws on Wright 2017 From Control to Influence: Cognition in the Grey Zone, Report for the SMA group.
[22] Evidence: Population Strong; State Strong
[23] Levitt, T. 'Marketing Myopia', *Harvard Business Review*, July-August, 1960, p.45
[24] Ellsworth, R. (2002) Leading with Purpose, The New Corporate Realities, Stanford Business Books
[25] Gulati, R. (2009) 'Reorganise for resilience: Putting customers at the centre of your organisation', Harvard Business Press

centered."[26] In international relations, a key recommendation of Joseph Nye's seminal 2004 book on power and influence is, *"To put it bluntly, to communicate more effectively, Americans need to listen."*[27]

Influence aims to shape behavior either immediately or in the future, which requires understanding the audience's decision-making process as shown in Figure 1. The decision the audience faces must be at the heart of planning for influence. Influence is affecting an audience's decision-making process, where that audience can decide between options. The influencer should explicitly estimate that action's perceived costs and benefits and the perceived costs and benefits of alternatives. This includes realistic, conscious and unconscious as well as "irrational" motivations, for example fear, fairness and identity.

Thinking outside-in seems obvious, yet businesses and governments often fail to do it. One important reason for this is the unavoidable force in any bureaucracy to focus internally on process and known routines.[28] Humans are also predisposed to think egocentrically.[29]

A Simple Approach to Thinking Outside-in

Outside-in thinking is very hard. Box 1 shows one simple, practical approach to achieving this. Such practical questions as set out in the checklist below can help to estimate the perceived costs and benefits of an action from an audience's perspective—based on a realistic understanding of human motivation and decision-making, coupled with the specific context.

Box 1: Checklist for Empathy

A set of practical questions can help to estimate the audience's perceived costs and benefits for their potential alternative actions in a given context, i.e., help complete Figure 1. These may include:

- **Self-interest**: *"What material benefits may they gain or lose?"*[30] The importance of self-interest was shown by the switching allegiances of Sunni groups during the 2007 Surge in Iraq, which involved US rewards and threats of punishment.[31]
- **Fairness**: *"How fair will it be seen from the audiences' perspectives?"* Humans typically pay costs to reject unfairness and pursue grievances.[32]
- **Fear**: "Do they fear for their security and why?"[33]

[26] BBC Media action refs
[27] Nye, JS. (2004) Soft Power: The Means to Success in World Politics, Public Affairs
[28] Allison, G. and Zelikow, P. (1999) *Essence of Decision: Explaining the Cuban Missile Crisis*, 2nd ed. Pearson.
[29] Bazerman, M. H. et al (2000) 'Negotiation', *Annual Review of Psychology,* Vol 51, pp279–314, doi:10.1146/annurev.psych.51.1.279.
[30] Paternoster, R. (1995) 'How Much Do We Really Know about Criminal Deterrence?' in *The Journal of Criminal Law and Criminology*, 2010, pp.765–824. Kagel J.H., and Roth, A.E. (1995) *The Handbook of Experimental Economics*, Princeton, NJ.
[31] 'Losing Iraq' July 29th 2014, Frontline, PBS
[32] Colin Camerer 2003 Behavioural Game Theory, Princeton University Press
[33] Posen, BR. (1993) 'The Security Dilemma and Ethnic Conflict' in *Survival*, Vol 35, No 1. pp.27–47, doi:10.1080/00396339308442672; Jervis, R. 'Was the Cold War a Security Dilemma?', *Journal of Cold War Studies* 3, no. 1 (January 2001) pp.36–60, doi:10.1162/15203970151032146.

- **Identity**: *"What are their key identities?"* Humans are driven to form groups ("us," the "in-group") that are contrasted against other groups ("them," the "out-group"). Individuals also often hold multiple overlapping identities.[34]
- **Status**: *"How may this affect the audience's self-perceived status?"* e.g., For key audiences in Afghanistan, joining the Taliban had high status.[35]
- **Expectations**: "*What are their key expectations, and what may violate them?"*[36] The more unexpected a perceived event is, the bigger its psychological impact.[37]
- **Context, opportunity, and capability**: *"What opportunities and capabilities does the audience perceive it has for its potential alternative actions?"* e.g. an intervention to encourage someone to pay taxes who is actively avoiding paying taxes, differs to that for someone who feels unable to use an online system.

Conclusion

Many aspects of influence and control do not need rethinking. However, here we focus on three aspects of influence that do: (1) using more realistic accounts of human motivation; (2) focusing on areas of particular human cognitive bias as a source of low-hanging fruit for performance improvement; and finally (3) using tried and tested tools and techniques from other fields (e.g., medicine) to make evidence available in usable forms for operators.

[34] Sambanis, N., Schulhofer-Wohl, .J, and Shayo, M. (2012) 'Parochialism as a Central Challenge in Counterinsurgency', *Science* 336, no. 6083 pp.805–8, doi:10.1126/science.1222304.
[35] Munoz, A. (2012) *US Military Information Operations in Afghanistan: Effectiveness of Psychological Operations 2001-2010.* Rand Corporation: National Defence Research Institute.
[36] Crombie Schelling, T. (1966) *Arms and Influence*, Yale University Press; Smoke, R. (1977) *War: Controlling Escalation*, Harvard University Press.
[37] Wright, ND. (2015) 'The Biology of Cooperative Decision-Making: Neurobiology to International Relations', in Galluccio, M (ed.) (2015) *Handbook of International Negotiation*, Springer International Publishing, pp.47–58.

Chapter 10: Evidence-based Principles of Influence - Dr. Nicholas Wright, University of Birmingham

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Evidence-based Principles of Influence

When considering how we might operationalize theories related to persuasion and influence, we may begin by asking, "What do we know, and how can we know it?" Robert Jervis said you can find a historical example to back up any contention you want to make in international relations,[38] and it is basically the same case in psychology. Can we be sure enough of the scientific evidence we have now about persuasion?

Three considerations are particularly pertinent. First, we should be aware of the replication crisis in the scientific literature in this area. In only about half of the studies in psychology can the findings of studies be replicated. This makes it very difficult to read the academic literature, and even among academics, people will tend to attribute credibility to the results of a single high-profile study. This is not robust science. Second, in order to accumulate robust scientific knowledge about the factors that influence people, we need to focus on empirical findings that 1) have been tested and replicated and 2) provide sources of corroborating information and convergent evidence. In addition, we should be careful not to simply apply findings from neuroscience laboratories and other settings to the real world without testing. As we try to move toward a science of persuasion and influence, we are going to have to stop referencing individual studies and do what happens in medicine: corroborate and replicate. Third, there is a level-of-analysis problem. To consider influence and persuasion, you have to think about multiple levels simultaneously (e.g., the state level and the level of the populations). The evidence at one level is not the same as, and does not apply to, other levels, so you have to ask yourself about the nature of the evidence that you have.

It is true that we do have a lot of good evidence, so how do we organize it? We can use methods from fields such as medicine or international development, which assess bodies of evidence for a particular intervention or concept, rather than relying on individual or few studies. As in those fields, we should think in terms of classifying the strength of evidence behind each contention—as was done in the recent SMA Gray Zone Cognitive Report. This provides evidence-based recommendations to make the most of current thinking on techniques for influence. It draws on expertise from multiple sectors—including security, psychology, neuroscience, and the commercial world—and assigns a score for the strength of evidence underlying each recommendation it covers. It specifically examines evidence to exert influence at the state level and at the population level, as working at both levels together is a key challenge in the Gray Zone. I reproduce a summary of the key findings of these principles for influence below, which for ease of presentation is divided into three sections that focus on Audiences, Messages, and then Messengers.[39]

[38] Robert Jervis, *Perception and Misperception in International Politics* (Princeton University Press, 1976).
[39] See Wright 2017 From Control to Influence: Cognition in the Grey Zone, Report for the SMA group. Part I contains detailed expansions of all points raised here.

Audiences

Influence efforts must be tailored to the audience to maximize intended effect. Five key concepts are:

*(1) Organizations should adopt an **"outside-in"** mindset, which makes the audience's decision-making process the focus of the influence strategy.* Practical tools can provide the empathy required to put the influencer in the audience's shoes, e.g., to understand their motivations, fears, and identities.

To influence an Afghan farmer not to grow poppy, or if we seek to deter an adversary state, the influencer must consider that course of action and its alternatives from *their* perspective. We must estimate how they perceive the costs and benefits of acting, and of not acting. The influencer must put themselves in their shoes.

Simple, structured approaches should be used to understand the audience's decision-making process. Practical tools can provide the empathy required to put the influencer in the audience's shoes. Many tools are available; the key is to use a structured approach. One such approach is a **"checklist for empathy"** (see Chapter 9 above).

(2) Messages are likely to reach multiple audiences—so it is vital to anticipate potentially divergent influences.

(3) Audiences seldom passively receive messages. Audience analysis often requires understanding the ongoing, interactive relationship with messengers.

(4) Identify groups with propensity for influence and who are more likely to act on the basis of the influence they encounter. Focus on these groups and develop specific strategies for influencing them.

(5) Audience analysis is a key area of competition with potential adversaries.

- The Russians are held to conduct good audience analysis, with which the US must be able to compete.
- The Chinese surprisingly are held to conduct little audience analysis—and thus better understanding audiences is a critical area of potential US advantage.

In addition to the five areas outlined above, the chapter also contains a more detailed discussion of particular factors that influence audience behavior, such as age.

Messages

After developing an in depth understanding of the target audience, successful messages must be developed. This chapter discusses how to fashion messages, the content of messages, and then the context of messages.

*(1) When **fashioning messages**, consider the following*

- The message must be simple while not leaving an incomplete narrative.
- The audience must find the message sufficiently credible.
- Creativity in messaging is often key—manage novelty and unexpectedness, otherwise messages may lack the salience needed to impact on audiences.

(2) ***Content of messages:*** *Messages should address key audience motivations such as identity, fairness, fear, or self-interest (e.g., see checklist for empathy above).*

(3) It is vital to consider the ***communication context****, not the message content alone.* Humans are attuned to evaluate stimuli by comparing stimuli with other stimuli or options, so use **contrast effects** to make the desired option the better option. Timing matters: prepare for influence operations on timescales of minutes (e.g., responding on social media) to years (the Chinese building of Confucius Institutes).

Standing out against noise: The impact of any message is determined partly by the factors set out here and partly by the background volume of all the other information an audience receives. 'Noise' has been used as a strategy. The Russia Today television network is an interesting example. Rather than promulgating one specific positive explanation of an event, such as the MH17 airliner crash over East Ukraine in 2014, the network created noise by circulating many different (and at times contradictory) explanations. This acted to drown out other messages and create doubt, thus creating confusion. Interestingly, this seems in contradiction to the Chinese techniques, where they seek to explain their perspective or narrative, with more focus on being understood. There is no one clear strategy to stand out against noise. It is likely best achieved by audience-centered approaches that use the techniques above to fashion messages, which are delivered by credible messengers.

Counter-messaging should be augmented by longer-term, more **preventative interventions**, e.g., television discussion programs or radio soap operas involving community cohesion. A coherent media strategy should be part of peri-conflict nation- or state-building efforts.

Messengers

Finding and developing the right messengers is vital.

(1) There are three key messenger characteristics: trust, salience, and capability.

> *(a)* ***Trust*** *in messengers is often critical.* Perceived trustworthiness or credibility is in the eye of the audience and is highly context dependent. Multiple factors contribute, including perceived expertise, good intentions, and capability. Liking and "soft power:" Individuals tend to be more influenced by those they like and be less likely to take advice from those they dislike. Similarity of the messenger to an audience increases likely influence. US or allied governments are often not the most appropriate messenger. This can be overcome by developing partnerships with trusted individuals and groups.
>
> *(b) Messengers must also be* ***salient*** *to audience; they need to stand out to be able to impact psychologically on audiences constantly bombarded by information.* Manage messenger salience: A messenger must be salient—stand out—to gain the audience's attention, consciously or subconsciously. Whilst recognizing the factors above, a creative choice of messenger can penetrate audiences constantly bombarded by information. One way to achieve salience is to manage the **unexpectedness of messengers**. Iranian President Rouhani's unexpected use of 2013 Twitter diplomacy changed the political climate and enabled the successful nuclear talks. Repeated exposure to the same messenger can lead audiences to habituate or fatigue. However, **familiarity** with messengers can also increase their influence. Ambiguity and "salami slicing" can help minimize unexpectedness and avoid adverse responses. Using **multiple**

messengers over time enables a campaign to change between them—actively managing unexpectedness helps keep messengers salient.

*(c) Messengers must be **capable** of reaching audiences.* Messengers must have the **capability** to reach target audiences. Television, radio, and social media impact may vary according to audience. **Language** Is a critical factor. A channel may have wide geographical reach but it will be useless if it is not accessible in the language of the intended audience.

*(2) Understanding **networks** can help identify effective messengers.* Face-to-face, family, social media, and other networks can provide key access to audiences. Three issues for the policy maker are: First, what are key social networks amongst the audience? Second, what networks link the audience to the outside? Trust exists in networks, so networks can be good messengers to access an audience. Third, who are key **opinion leaders**?

(3) Competition with other actors: Key State and nonstate actors place influence at the heart of their activities and invest heavily and stress the importance of influence at the highest political and military levels.

(a) Resources and high-level policy support: **State competitors** such as Russia and China have been building powerful, well-resourced messenger capabilities. China is investing $7-10 billion per annum in "overseas publicity work. While the BBC World Service broadcasts in 32 languages on an annual budget of $378 million, Russia Today ran just six language services with an estimated budget of over $300 million in 2014. Adversaries such as Daesh can use cheap **asymmetric strategies**, such as social media. To compete with both, US and allied influence capabilities must have appropriate resources, high-level policy support and cross-government organizational structures that provide strategic level coordination with tactical autonomy, adaptability and responsiveness.

(b) Timescales: Interacting with capable competitors requires preparing for influence on timescales of **minutes,** such as responding to key events on social media and the 24/7 newsfeed. This requires a rapid response set within a strategic plan. At that other end of the scale, is the establishment of institutions such as the BBC, which take **years** to build.

(c) Concepts: The western view of information security fundamentally differs from the Russian and Chinese approaches. Giles and Hagestad (2013) describe this: "Thus the Chinese view 'information space' as a domain, or landscape, for communicating with all of the world's population." This chimes with the Russian view of this space including human information processing, in effect cognitive space. This factor is key to understanding the holistic Russian and Chinese approaches to information security as distinct from pure cybersecurity, a fundamental difference from the western approach to the subject."

(d) Agility: Help keep organizations flexible by adopting an **"outside-in"** perspective discussed in Chapter 9, which starts with an audience and focuses on delivering something of value to it, and drawing on **external partner organizations** to help meet audience needs.

Chapter 11: Neuroscience and Technology as Weapons on the 21st Century World Stage - Dr. James Giordano, Georgetown University

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Abstract

Neuroscience and neurotechnologies (neuroS/T) can be used as (1) "soft" weapons to foster power, which can be leveraged through exertion of effects upon global markets to impact nation states and peoples, and to provide information and tools to more capably affect human psychology in engagements of and between agents and actors; and (2) "hard" (e.g., chemical, biological, and/or technological) weapons: including pharmacological and microbiological agents, organic toxins, devices that alter functions of the nervous system to affect thought, emotion and behaviors, and use of small scale neurotechnologies to remotely control movements of insects and small mammals to create "cyborg drones" for surveillance or infiltration operations. Brain sciences can also be employed to mitigate or prevent aggression, violence, and warfare, by supplementing HUMINT, SIGINT, and COMINT (in an approach termed "neuro-cognitive intel:" NEURINT). Such possible applications generate two core questions: (1) to what extent can these technologies be developed and used to exert power? And, (2) how should research and use of the neurosciences be best engaged, guided, and governed? This chapter addresses: (1) the current capabilities of neuroS/T for operational use in intelligence, military and warfighting operations; (2) potential benefits, burdens, and risks incurred; (3) key ethical issues and questions, and (4) possible paths toward resolution of these questions to enable technically right and ethically sound use toward maintaining international security.

Key Points

- NeuroS/T can and will be increasingly developed employed for military and warfare purposes by both nations and non-state actors.
- Realistic assessment of neuroS/T capabilities and limitations is essential to any approach to gauging operational use(s), and relative benefits, burdens, risks and threats.
- A simple precautionary approach to both research and use is insufficient; rather a stance of technical and ethical preparedness is advocated.
- Key elements of this stance are presented.

Using Neuroscience and Technology to 'Contend Against Others'

The term "weapon" may be defined in two ways: First, as a means of contending against others and, second, as a tool used for inflicting damage and/or harm (Miriam Webster, 2004). In the former sense, we may consider "soft" weapons, namely those that exert either direct or indirect influence without explicit physical damage or harm, to modify or incur others' behaviors in particular ways. In the latter

sense, are those implements of either real or apparent force, which can be used to exert direct physical effect(s). Increasingly, neuroscience and neurotechnologies (neuroS/T) can be used as weapons in either or both of these ways (Giordano and Wurzman, 2011; Wurzman and Giordano, 2015; Giordano, 2016; 2017a,b). For example, as a "soft" weapon, brain science can be used to foster power, which can be variously leveraged: from economic fortitude through exertion of effects upon global markets to impact nation states and peoples, to providing information and tools to more capably affect human psychology in engagements of and between agents and actors. Brain science can also be (dually or directly) developed and utilized as "hard" (e.g., chemical, biological, and/or technological) weapons. These include pharmacological and microbiological agents, organic toxins, and devices capable of altering functions of the nervous system to affect thought, emotion, and behaviors, as well as the (relatively new, still incipient, but iterative) use of small scale neurotechnologies that can interact with the nervous systems of various organisms (e.g., insects, small mammals) to remotely control their movements, so as to create "cyborg drones" that can be used in surveillance or infiltration operations (for overviews, see: Wurzman and Giordano, 2015; Evers, Farisco, Giordano and Salles, 2017).

Of course, brain sciences can also be employed to provide information and tools to mitigate or prevent aggression, violence, and warfare. For example, neural and cognitive sciences can be engaged as adjuncts to human, signal, and communications intelligence (viz., HUMINT, SIGINT, and COMINT, respectively). This approach, which we have termed "neuro-cognitive intel" or NEURINT, can be used to foster deepened understanding and insight to human psychological and social processes in order to develop improved approaches to alter individual and group thought and actions, fortify methods of human terrain, and optimize military information support and psychological operations (viz., MISO and PSYOPS). As well, NEURINT methods (e.g., brain-machine interfaces to improve signal-to-noise discrimination, etc.) can be developed and utilized to optimize operators' capabilities of intelligence acquisition and assessment (Wurzman and Giordano, 2015; Giordano and Wurzman, 2016).

While NEURINT type approaches may be viewed as instrumental to assessing and preventing or lessening bio-psychological factors contributory to violence and warfare, there is nonetheless increasing concern about dual- and direct-military uses of the neural and cognitive sciences, particularly as regards research, and potential employment of more overt forms of weapons (Moreno, 2006; 2012; Dando, 2007; 2014; 2015; Giordano, 2012; 2015; 2016; 2017a,b; Kosal and Huang, 2015). In this light, it will be important to pose and address two important questions. First, to what extent can these technologies be leveraged to exert power in political, military, and warfare domains? And second, given such considerations, how should research and use of the neurosciences be best engaged, guided, and governed?

These questions are ever more pressing, for a number of reasons. In the main, is that brain science is becoming, and is being utilized as, an international enterprise, with recent estimations that non-western countries (e.g., China and India) will assume an ever-more dominant position in both neuroS/T research and the employment of brain science in medical and dual-use applications (Lynch and McCann, 2009; Giordano, Forsythe and Olds, 2011; Giordano, 2012; Chen, Andriola and Giordano, 2017). Moreover, such neuroscientific developments are being achieved internationally in spans of 5-10 years, and dual-use and direct-to-military applications of brain science, inclusive of the weaponization of neuroscientific techniques and technologies, are therefore advancing in years, not decades (NeuroInsights, 2014). Last, but certainly not least, is that these enterprises are being undertaken by several nations including those (e.g., Russia, Iran, North Korea) that do not necessarily share the interests or intents of the United States and its allies (Giordano, Forsythe, Olds, 2010; Giordano; 2015; Tennison, Giordano and Moreno, 2017).

Of additional and growing concern is the potential for the expanding do-it-yourself community of scientists to be infiltrated, supported, and manipulated by national and/or non-state actors to develop viable neuroweapons (Evers, Farisco, Giordano, and Salles, 2017; Giordano, 2017b). The availability of "off-the-shelf" products, such as CRISPR-Cas9-based gene editing kits, to enable manufacture and modification of pharmacological and biological substances (e.g., drugs, toxins, microbes), adds facility—and gravitas—to such enterprises (DiEuliis and Giordano, 2017). Taken together, these trends present clear and present risks to international biosecurity, a view supported by a recent report of the President's Council of Advisors on Science and Technology (PCAST) about emerging capabilities to create novel pathogens, toxins, and insect and plant vectors that can threaten the stability and safety of the public health, environment, and economy.

NeuroS/T as Weapons of Mass Disruption

Neuroweapons should not be regarded as instruments of mass destruction, but rather as weapons of mass disruption (Wurzman and Giordano, 2015; Giordano, 2017a; b). Certainly, greater destructive effect could be incurred by more traditional (e.g., conventional or nuclear) weapons. However, the disruptive power of neuroweapons is significant in both short- and long-war scenarios. In the former case, neurotropic drugs, toxins, and/or microbes can be employed to incur "ripple effects" against group, community, or population scale targets. Such agents could be dispersed at varied geographic sites to produce "sentinel cases" of individuals who exhibit neuro-psychiatric (and other physical) signs and symptoms. Internet attribution as a terrorist action, with (intentional mis)information about key escalating signs and symptoms (such as anxiety, sleeplessness, and paranoia) would tend to amplify reactions among an expanding number of "worried well" members of the group/population. These individuals would seek healthcare, evoke an increasing burden on the public health system (even if only in the short term), and would engage public health officials and organizations with questions and concerns. Subsequent Internet messaging of narratives aimed at denigrating any governmental responses in reaction to the intended "threat" in attempt to assuage such concerns could foster both dissolution of public trust and increase widening social disruption (Giordano, 2017b).

In a more long-war scenario, drugs, toxins, and/or microbes could be employed to incur changes in the development, structure, and/or function of the brain, so as to evoke latent neuro-psychiatric disorders in targeted populations, and thereby produce disruptive effects on individual, group, and community levels. As well, neuroweapons could be used against individual targets to incur amplified effect in both short- or long-war situations. For instance, neurologically-acting chemicals and toxins could be used to incur more morbid or lethal consequences, to debilitate or kill targeted individuals of "sentinel value" to particular groups or publics, as demonstrated by the use of the nerve agent VX to assassinate Kim Jong-nam. Or, neurotropic drugs could be employed to selectively affect the cognitions and/or behavior(s) of political or military leaders, to evoke resulting, albeit perhaps more slowly evolving changes in the sentiments and actions of those they lead. What's more, neuroS/T can be utilized as a "soft power weapon" to manipulate health care and biotechnology sales markets to affect socio-economics, and international relations and exert strategically latent, yet significant and durable influence on the world stage (Giordano, 2017a,b).

Current biological and chemical weapons' conventions (e.g., the Hague Conventions; Geneva Protocol; Biologic, Toxin and Weapons Convention-BTWC; Chemical Weapons Convention-CWC; United Nations' Security Council Resolution 1540; Lisbon Treaty, and 2014 Arms Trade Treaty) constrain research, stockpiling, and trade of certain neurotoxins and microbiological agent (e.g., anthrax; ricin; OPCW, 2014). In the United States, any and all federally funded programs would be subject to oversight in

accordance with dual-use policies, which reflect the general tenor of these conventions. However, as the 2008 National Academy of Sciences report *Emerging Cognitive Neuroscience and Related Technologies* has noted, products intended for the health market can be—and frequently are—studied and developed for possible employment in military applications, and thus a variety of neurobiological substances and technologies—such as neurotropic drugs, bio-regulatory agents (e.g., opioids and other peptides), and neuromodulatory devices—may not be within the scope of extant international rules (National Research Council, 2008). Foreign governments could use medical incentives to either pursue research and development to affect international economic balance, and/or as a veil to engage new dual-use or direct-to-military S/T, and shield their activities either behind commercial norms protecting proprietary interests and intellectual property (Benedikter and Giordano, 2012; Brindley and Giordano, 2014; Chen, Andriola and Giordano, 2017; Palchik, Chen and Giordano, 2017). And nonstate actors (inclusive of neuro-biohackers) may exploit opportunities to engage in research and development of disruptive neuroS/T outside of the specter of institutional oversight.

These trajectories demonstrate and strengthen the view that neuroS/T is being, and increasingly will be, developed and used in ways that impact international security. In light of this, we have argued that a simple precautionary principle will likely be of little utility or value (Giordano, Forsythe and Olds, 2010). Instead, what is necessary is a stance of preparedness, which must be based upon both realistic assessment of (1) the current intent, capabilities, and limitations of various nations and nonstate enterprises' neuroS/T research and development (R/D) efforts, and (2) the capabilities and limitations of the neuroS/T being developed and operationalized (Giordano, 2015). Such assessment will necessitate "deep surveillance" of international neuroS/T R/D, to focus upon (1) university and industrial programs and projects with direct and/or dual-use applications; (2) types and extent of (governmental and private) support of neuroS/T R/D; (3) recruitment of subject matter experts with explicit and tacit knowledge and skills focal to neuroS/T; (4) product and device production and commercialization, (5) present and planned military and intelligence use of neuroS/T, and (6) current and near-future market position and leveraging of current and planned neuroS/T products (Giordano, 2016).

What to Do Next?

This prompts question of what action(s) will be most appropriate in response to current and predicted enterprises in neuroS/T R/D that can be engaged for production of both "soft" and "hard" weaponry. A "wait and see" or laissez-faire approach might create opportunities for both tactical unbalancing, as well as more strategically latent influence of neuroS/T agenda and use (Chen, Andriola, Giordano, 2017; Forsythe and Giordano, 2011; Giordano, Forsythe and Olds, 2010; Giordano, 2015; Giordano, 2016). If, on the other hand, surveillance prompts action, it is certainly possible that a pattern of "brinkmanship" might result, with surveillance-based escalation of testing and development of countering (and/or more effective) neuroS/T products that are usable for both economic leveraging and as "hard" neuroweapons (National Research Council, 2008; 2014; McCreight, 2015). Therefore, a vital first step of the aforementioned preparatory stance entails accurate assessments of the relative benefit-burden-risk-threat likelihood(s) posed by R/D and use of neuroS/T in specified contexts that are relevant to international security. From these evaluations, decisions can be made as to whether and to what extent proactive or countering engagement of R/D and use could be undertaken, what effects would be incurred in the near and intermediate term, and based upon such possible outcomes, if, what and how research and operational activities should be undertaken. In all of these approaches, it is equally important to assess and address the ethico-legal and social issues that will arise. To address these issues,

we have proposed methods of risk-assessment and mitigation (Giordano, 2015; 2017c; Giordano, Casebeer, Sanchez, 2014), and criteria that sought to establish:

1. That emphasis should be upon using neuroS/T to prevent warfare (i.e., *jus contra bellum*)
2. That if utilized, only the least harmful neuroS/T should be employed toward mitigating realistically identified threat(s).
3. That the use of neuroS/T must be admissible under the most stringent, current international legal standards.

Conclusion: Toward a Goal and Path(s) Ahead

Nevertheless, even justifiable use of neuroS/T to prevent warfare raises ethical issues, questions, and concerns, and we believe that any new development or application of neuroscience demands dedication to neuroethico-legal and social issues and guidance. To be sure, such questions and concerns are challenging; the challenge reflects and must address 1) strategic transnational neuroscientific innovation, 2) cross-cultural values, needs, and norms, and 3) the need to negotiate more stable economic, political, and national security relationships.

Moreover, given the novelty—and potential power—of these techniques, existing ethical and legal concepts, while viable to some extent, may require re-examination—and in some cases revision or replacement—so as to account for socio-cultural and political perspectives, needs, and values that are germane to the potential use and/or mis-use of neuroS/T in national security and intelligence operations (Shook and Giordano, 2014; Tractenberg, FitzGerald and Giordano, 2015; Tennison, Giordano, Moreno, 2017). Clearly, any such attempt to develop ethico-legal standards, guidelines and methods of governance will necessitate coordinated efforts of the military and civilian (i.e., political, commercial, and public) sectors—as elements of the 'triple helix' of the scientific estate (Etzkowitz, 2008; Moreno, 2006; 2012; Wurzman 2010). However, public discourse of this nature demands particular stewardship to insure transparent illustration of issues and possible resolutions, and concomitant integrity of (classified) information that is essential to national security (Giordano, Forsythe and Olds, 2010).

Navigating this path will not be easy. NeuroS/T has been seen as a "Big Science" effort to address the "grand challenge" of developing improved capability to understand and affect the brain and its functions of thought, emotion, and behavior. Yet, as President Barack Obama (2016) so eloquently stated, "Technological progress without an equivalent progress in human institutions can doom us. The scientific revolution...requires a moral revolution as well." Hence, it may be that the real "grand challenge" will be dedicating effective investments of time, effort, and funding required to meet the urgent neuroethical demands spawned by current and future iterations of neuroS/T, and as President Obama noted, "...to prevent conflict...and strive to end conflicts after they've begun...as a cause for peaceful cooperation and not violent competition."

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Chapter 12: The Neurocognitive Science of Persuasion – Dr. Christophe Morin, Fielding Graduate University

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Abstract

While ISIS influence has lessened on the ground, it is not clear that it has weakened in the narrative space, especially to recruit teens and young adults. Therefore, it is crucial that we recognize the urgency of using better persuasion models to create and evaluate both propaganda and counter-propaganda campaigns. Also, the dynamic and implicit nature of the effect of media content on adolescent minds highlights the necessity of conducting experiments that reveal the neurophysiological effect of messages on young brains. Subjects cannot competently and objectively report how messages work on their minds. However, new research tools used by neuromarkers can reveal critical insights by safely and ethically monitoring different subsystems in the nervous systems while participants view persuasive messages.

How Neurocognitive Persuasion Models Can Help Us Win the War in the Narrative Space

The war on terror is urging us to rethink the power that messages have on vulnerable minds. Two-thirds of ISIS recruits are less than 25 years old (Bouzar, 2015). The suicide bomber of the recent Manchester blast was only 22. A Pew poll conducted in 2015 among Muslim youths in the West revealed that younger Muslims support suicide bombings more than the older Muslims (Kohut, 2007). Shockingly, the average age of all suicide bombers implicated in 28 attempted suicide attacks inside Israel and the West Bank, and Gaza Strip in 2001 was 21 (Harel, 2001).

I have spent three decades researching how advertising messages affect our brains (Lin, Grewal, Morin, Johnson, & Zak, 2013; Morin, 2014). Most recently, I decided to look at the effect of public health messages and propaganda campaigns on vulnerable minds, i.e., adolescents (Morin, 2015). What I have found first and foremost is that a majority of campaigns do not use credible persuasion models to guide their creative development process. According to a meta-analysis conducted by Randolph, less than one-third of empirical articles on public service announcements (PSA) report using any persuasion theory at all (Randolph & Viswanath, 2004). In my opinion, the parallels between PSA and propaganda campaigns are clear. Because the creative process is not informed by a sound theoretical framework, many counter-propaganda campaigns appeal to logic or morality rather than emotions. Both approaches have very little effect on developing brains (Morin, 2016). This paper argues that the pattern of dismissing sound persuasion theories or, worse, relying on old cognitive models will not allow us to win the battle in the narrative space, especially on adolescents and young adults.

The following are some of the most popular persuasion models used over the last three decades. While a majority of the models do not integrate the recent findings on the neuroscience of adolescents, many have made important contributions to the field of persuasion. The significant differences between the models highlight the challenges faced by researchers to deconstruct the critical processes involved in explaining and predicting the effects of persuasion. While this review explains why there is often confusion and discord among media researchers, I believe emerging neurocognitive models offer the best hope for creating and testing radically more powerful campaigns.

The Elaboration Likelihood Model (ELM) (Petty, Cacioppo, & Heesacker, 1981)

Inspired by the cognitive theoretical movement, this model states that a persuasive message will trigger a logical succession of mental processes that engage either a central or peripheral route, and that both routes represent the levels of thinking performed by recipients to understand the meaning of the information. The central route ensures that the message is considered further (or elaborated), in which case the message has achieved its persuasive intent. However, if a message is processed by the peripheral route, the effect is predicted to be mild. According to ELM, a good message must appeal at a deep and personal level to targets. ELM advocates also argue that an effective campaign must include strong warrants to establish the credibility of the evidence and the claims used in a persuasive message. Despite its wide popularity, the critical flaw of ELM is that it argues that persuasion is only possible if recipients engage cognitively with the content of a message, a fact that is no longer supported by recent advertising research.

Psychological Reactance Theory (PRT) (Brehm & Brehm, 1981)

According to PRT, humans are motivated deeply by the desire to hold themselves accountable and free from other's rules and suggestions. The PRT model predicts that if people believe that their freedom to choose how they want to conduct their life is under attack, they will experience an ardent desire to "react" as a way to remove the pressure. Reactance is believed to be at its peak during adolescence because teens have a strong drive toward independence and form beliefs and attitudes that often compete with those recommended by their parents. The model further predicts that explicit persuasive messages trigger more reactance than implicit attempts. Also, Grandpre (Grandpre, Alvaro, Burgoon, Miller, & Hall, 2003) et al. demonstrated that reactance to persuasive messages increases with age. This may explain why campaigns invoking the role of parents discussing the dangers of smoking are not effective (Farrelly et al., 2002).

Terror Management Theory (TMT) (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989)

Largely based on Freud (1933) and the work of Becker (1973, 1975), TMT is an attempt to explain the core psychological coping mechanism we use to face our mortality. The anxiety we experience by confronting the inevitability of our death is expressed at both a conscious (i.e., proximal) level and unconscious (i.e., distal) level. According to the theory, when we face death consciously, we use self-esteem as a way to suppress anxiety and restore self-confidence. However, this raises a state of denial. Researchers using TMT suggest that smokers who gain self-esteem by smoking tend to smoke more, and therefore, deny that tobacco use is a direct threat to their health (Martin & Kamins, 2007). Advocates of the TMT model would argue that to persuade people who join ISIS; campaigns should increase the salience of mortality to shatter their worldview and draw more cognitive processing to accept the evidence (Veer & Rank, 2012).

The Message Framing Approach (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999)

This model is based on the notion that a persuasive message can be framed in two ways: either *a loss* if recipients fail to correct a risky behavior or *a gain* if recipients agree to adopt a healthy behavior. Loss-framed messages are typically more effective when they promote illness-detecting behaviors, basically raising consciousness on the pathological nature of risky behavior. On the other hand, gain-framed messages can be more effective than loss-framed messages to promote a change in the behavior itself. Other experiments using this approach have demonstrated that loss-framed messages are better to

prevent risky behaviors than to change them (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; Schneider, Salovey, Apanovitch, et al., 2001; Schneider, Salovey, Pallonen, et al., 2001).

The Limited Capacity Model of Mediated Message Processing (LCM) (Lang, 2000)

The LCM is another model inspired by the field of cognitive psychology. It provides a conceptual framework based on a series of empirical studies examining the relative effect of message elements on key cognitive functions such as *encoding*, *storage, retrieval, information processing,* and *limited capacity.* The model suggests that allocation of brain resources may be equally distributed among several cognitive sub-processes leading to inconsistent results in recall and general effect on recipients. Studies using the LCM model indicate that adolescents remember more details from PSAs than college students do and require more speed in narratives to stay engaged. This confirms that key cognitive differences exist between adolescents and young adults and that these differences may alter the sub-processes involved in viewing persuasive campaigns (Lang, Zhou, Schwartz, Bolls, & Potter, 2000).

The Sensation Seeking Targeting (SENTAR) Prevention Approach (Palmgreen, Donohew, Lorch, Hoyle, & Stephenson, 2001)

This approach draws on extensive research performed on the psychophysiology of high-sensation seekers (Lang, Chung, Lee, Schwartz, & Shin, 2005; Stephenson et al., 2002; Zuckerman, 1996). According to the researchers, adolescents use two main adaptive responses in front of any stimulus: *approach* or *withdraw.* The behavioral activation system (BAS) commands the organism to approach attractive rewards and is known to be mediated by the mesolimbic dopamine system. The behavioral inhibition system (BIS) makes us withdraw from aversive stimuli. Based on this model, researchers have found that adolescents who engage in risky behavior tend to display higher than normal sensation-seeking traits, which means that they are more likely to activate their BAS to approach risky but potentially rewarding situations. SENSOR predicts that the effect of sensational messages is greater on adolescents because they score the highest on a sensation-seeking scale.

Fear Appeals and the Extended Parallel Process (EPPM) Model (Dickinson & Holmes, 2008; Hastings, Stead, & Webb, 2004; Witte & Allen, 2000)

Fear has been used extensively for several decades in public health and counter-propaganda campaigns. Fear urges targets to avoid or withdraw from a perceived threat. According to Witte and Allen, fear appeal theories have often changed to reflect the dominant theoretical perspective of a particular period. For instance, in the 1970s and 1980s, fear theories were grounded in cognitive perspectives (Rogers & Smith, 1993). These models insisted that fear processing was controlled rationally in the brain, a fact that is contested today by a majority of affective neuroscientists (Ledoux & Phelps, 2004; Panksepp, 2004). EPPM claims to integrate several classical fear appeal theories, and as such, is especially important to highlight. The EPPM posits that *perceived threats* can predict the degree to which people control their responses, whereas *perceived efficacy* explains the nature of the response. The model predicts that threat appeals work best when the message includes information that can support efficacy. Without it, fear appeals tend to trigger denial or promote the retrieval of old beliefs. Meanwhile, recent studies suggest that social threats have more influence on adolescents than physical threats, presumably because they are more afraid to disrupt their social life than damage their health. Despite heated debates among health advocates regarding the effect of negative versus positive health messages, fear appeals appear to produce more results with adolescents, especially when campaigns need to deliver impact on small budgets (Apollonio & Malone, 2009). Interestingly, campaigns that elicit negative emotions such as fear or disgust also appear to work better on lower socioeconomic

populations (Durkin, Biener, & Wakefield, 2009). A content analysis of 197 antismoking ads produced between 1991 and 1999 revealed that fear was the most common theme (31%), followed by humor (29%), and sociability (26%) (Beaudoin, 2002). Such meta-analyses obviously are helpful, but they fail to provide clarity on which theme is the most effective. A recent neuroimaging study confirmed that persuasiveness involves both affective and executive processes. Performed on 70 teenagers, the study tested thirty 30-second anti-drug PSAs using fMRI. All clips were selected to produce negative valence. The results suggest that effective PSAs must elicit strong arousal activity in the amygdala and the medial PFC (Ramsay, Yzer, Lucian, Vohs, & MacDonald III, 2013).

System 1 and System 2 Dual-process Theory (Stanovich & West, 2000) and NeuroMap (Morin & Renvoise 2002-2017)

Originally introduced by Stanovich and West (2000), the dual processing theory is known as System 1 and 2 and was eventually enhanced by Daniel Kahneman through his seminal book *Thinking Fast and Slow* (2011). The tenets of this approach are both simple and profound. While the research supporting this model was done to study rationality and explain cognitive processes in a multitude of decision-making tasks, the value of the theoretical framework extends far beyond cognitive psychology. In fact, it speaks directly to the nature of our computational biases and how they affect our day to day choices. For Kahneman, we access two cognitive systems that have different if not opposing priorities. System 1 is automatic, unconscious and requires low computational resources. System 2 is more intentional, needs more consciousness and has access to more cognitive resources to establish goals and calculate consequences of our decisions. The table below is a high-level summary of the differences between system 1 and 2 (Figure 2). The illustration shows the respective anatomical borders of each system. The exact location of such borders is the subject of ongoing controversy but has gained wide acceptance among members of the neuromarketing community.

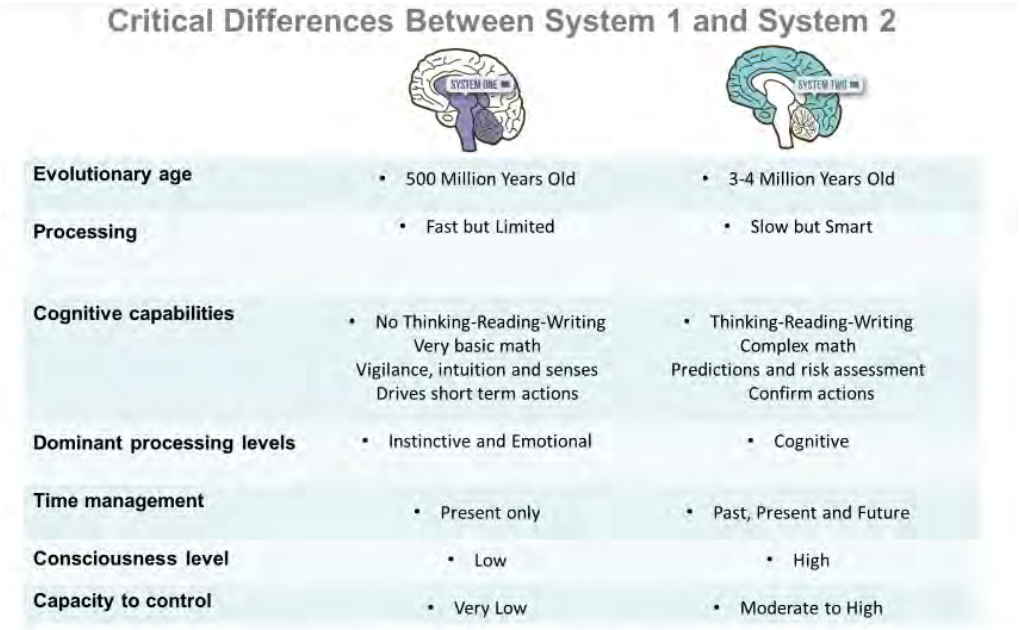

Figure 2: System 1 and System 2. SalesBrain Copyrights 2012-2017

The research I have conducted on the effect of advertising messages on the brain since 2002 reveals that advertising campaigns do not work unless they first and foremost influence the bottom layers of the brain, i.e. System 1 (Morin, 2014). System 1 is in fact controlled largely by the reptilian complex (RC), a system composed of the brain stem and cerebellum. Incidentally, the RC of adolescents responds to six stimuli before triggering a decision. RC is highly egotistic, impatient, social, visual, emotional and resilient. Furthermore, it is important to consider that when a message is System 1-friendly, it quickly radiates to the upper sections of the brain where we process the information in a more logical and rational way (System 2). In short, the persuasion model I developed with my partner Patrick Renvoise called NeuroMap is based on the dual processing model proposed by Kahneman. By applying the model and by using proprietary predictive algorithms, we have convincingly demonstrated that successful persuasive messages *capture* first (System 1) and *convince* second (System 2). Both conditions are necessary for any behavioral change to occur. The benefit of NeuroMap is that it integrates the dual processing model as well as recent findings on the neurocognitive basis of persuasion. That is why it can predict the critical differences that exist between adolescent brains and adult's brains when exposed to advertising stimuli. For instance, adolescent brains rely more on System 1 than adults because their frontal lobes have not finished maturating until they reach the age of 25. These neurodevelopmental limitations also explains why adolescents have heightened sensitivity to rewards, reduced sensitivity to punishments, and inferior cognitive control.

To conclude, a cursory review of some of the most popular persuasion models guiding the creation of a large number of PSAs and propaganda campaigns suggests that NeuroMap may offer a powerful way to integrate recent findings on the neuroscience of advertising and its effect on adolescent's brains. The basis of the model also suggests that the best way to probe the effect of persuasive messages such as counter-propaganda campaigns is to measure their direct effect on the brain. Regrettably, a majority of the research assessing the impact of propaganda campaigns continue to rely on self-reports as the best way to measure the effect on targets. However, we know that emotions and visual responses have strong neurophysiological correlates, which act below our level of consciousness. Consequently, I strongly argue that the best way to improve our understanding of persuasive messages is to conduct more research using neuromarketing techniques. The portability and validity of these techniques have been fully demonstrated over the last two decades. A typical neuromarketing lab can monitor System 1 and System 2 responses by using GRS, eye tracking, ECG, EEG and facial imaging (Figure 3).

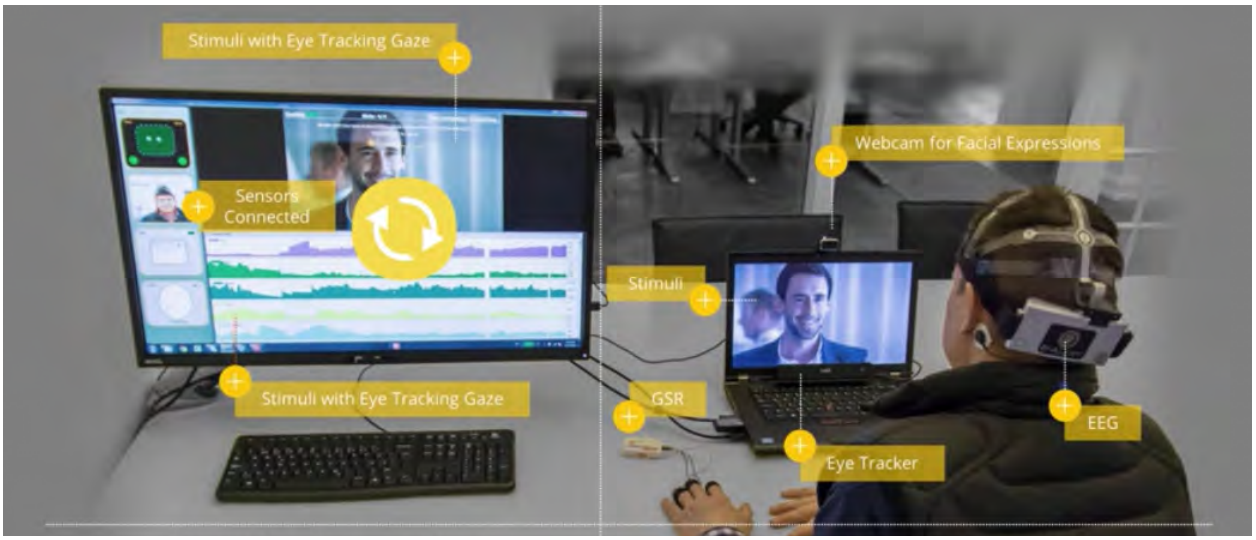

Figure 3: SalesBrain NeuroLab

There are compelling reasons to use stronger neurocognitive theoretical frameworks before creating effective campaigns targeting adolescents. But testing and measuring the direct effect of messages on the brain is the best way to operationalize and succeed in the narrative space. If not now, when?

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Chapter 13: A Scientific Approach to Combating Misinformation and Disinformation Online - Dr. David A. Broniatowski, George Washington University and Dr. Valerie F. Reyna, Cornell University

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Abstract

We argue for a scientific approach to combating online misinformation and disinformation. Such an approach must be grounded in empirically validated theory and is necessarily interdisciplinary, requiring insights from decision science, computer science, the social sciences, and systems integration. Relevant research has been conducted on the psychology of online narratives, providing a foundation for understanding why some messages are compelling and spread through social media networks, but this research must be integrated with research from other disciplines.

The Battle of the Narrative

Online misinformation has long been problematic: counterinsurgency campaigns acknowledge the crucial "battle of the narrative." For example, the US Counterinsurgency Field Manual (FM 3-24) emphasizes the power of narratives to change population behaviors, noting that the "root causes of an insurgency are real or perceived grievances that insurgents use to mobilize a population…As conditions change, insurgent leaders create different narratives to mobilize a population." (p. 4-3). Similarly, military doctrine states:

> *For enduring interventions, there can be a continuing struggle to define the national and international debate/discussion on terms favorable to one side, causing a clash between the competing narratives of the actors involved. This is often what is referred to as the "battle of the narrative." A key component of the narrative is establishing the reasons for and desired outcomes of the conflict, in terms understandable to relevant publics. (pp. ix-x.) Commander's Communication Synchronization Joint Doctrine Note (Joint Doctrine Note 2-13)*

This document notes that social media is an especially effective platform for propagating these narratives, stating that "Social media enables the rapid transmission of information and misinformation to domestic and international publics and communities of interest" (p. II-13).

Lessons from Other Fields

The effects of online narrative are not restricted to the national security space. For example, public health professionals face similar challenges: the journal *Vaccine* devoted an entire special issue to the role social media plays in vaccination decisions (Betsch et al., 2012). Importantly, the consensus article in this special issue emphasizes the role of narratives, stating that "Narratives have inherent advantages over other communication formats…[and] include all of the key elements of memorable messages: They are easy to understand, concrete, credible … and highly emotional. These qualities make this type of information compelling…" (p. 3730).

Similarly, the recent US presidential election highlighted the popularity of "fake news," which although factually inaccurate, may have been shared more widely on Facebook than vetted media sources (Silverman, 2016). Rather than take a partisan approach, we propose that the relationship between the perception of news as fake or genuine can be studied as a scientific problem, and, indeed, there are analogues in the literature (e.g., vaccination) that provide theoretical and empirical insight into the process of social and political influence through social media.

The Unique Role of Social Media

Social media have an especially wide reach. A recent Pew Center study (Perrin, 2015) indicates that more people get their news from social media than from any other source. Among millennials, this trend is even more pronounced: 61% of millennials get more than half of their news from social media. Furthermore, 71% of all online US adults are on Facebook (Anderson & Caumont, 2014), and 30% of the US population gets news primarily from this social media service. Finally, Facebook posts represent 81% of all article shares (Crum, 2015). Thus, social media enable the rapid increase in the speed and scope of narratives may affect behavior change.

The Role of Empirically-Valid Theories of Comprehension: Fuzzy-Trace Theory

Effective messages help readers retain the meaning of the message in memory and facilitate availability of the knowledge at the time of behavior. Fuzzy-Trace Theory (FTT), a leading theory of decision under risk, explains the popularity of online messages because of the search for meaning and the tendency to interpret events despite inadequate knowledge. FTT posits four key factors that drive decisions based on how information is interpreted discussed below (for a formal model see Broniatowski & Reyna, 2017):

1) Mental Representation of Narrative Content

FTT's approach to online communication builds on the core concepts of gist and verbatim mental representations, modified and adapted from the psycholinguistic literature (Kintsch, 1974) in the light of more recent findings (see Reyna, 2012a). According to FTT, meaningful stimuli such as narratives are encoded into memory in two forms: a verbatim representation (the objective stimulus or a decontextualized representation of what actually happened) and a gist representation (the subjective or meaningful interpretation of what happened (Reyna, Corbin, Weldon, & Brainerd, 2016). Verbatim representations encode details, such as exact numbers (e.g., "4.5% of vaccinated individuals became ill"). In contrast, a gist representation encodes the essential meaning of the sentence. Furthermore, there may be multiple gist representations (e.g., "virtually none of those vaccinated became ill," "you can still get sick if you get vaccinated"). Gist representations are subjective and depend on culture, knowledge, beliefs, and other life experiences (Reyna & Adam, 2003). However, in practice, coherent gist representations have been communicated to diverse audiences. Importantly, gist interpretations, rather than verbatim interpretations, tend to guide decisions and behavior. When making sense of text, gist representations form coherent, causal stories. These narratives "connect the dots," to offer a coherent account and are more likely to be accepted. For example, more coherent stories such as those connecting adverse health outcomes (such as autism) to certain behaviors (e.g., vaccination) are more likely to be accepted because they provide an explanation for otherwise mysterious adverse events. We have successfully modeled FTT in the domain of risky decision-making (Broniatowski & Reyna, 2017) and are developing related models for vaccination.

2) Gist Principles and Values

When deciding, subjects must endorse values, or gist principles. For example, a subject who is exposed to a narrative about vaccination may decide about whether to vaccinate themselves or their children

based on how they perceive their options. If, after exposure to a narrative, they erroneously perceive that a vaccine may make them sick and their status quo is "feeling okay" they may choose not to vaccinate because of the gist principle that feeling okay is superior to not feeling okay. Similarly, one who feels that they are at risk from the virus but perceives nil risks from the vaccine would endorse vaccination since not getting the virus is preferred to getting sick. For still others, the gist of the decision to vaccinate boils down to the good of the group, as opposed to the good of the individual (Fehige & Frank, 2010; Reyna & Casillas, 2009) and decisions are made based on relevant values. Cuing social and moral values has also been shown to be effective in changing decisions (especially in concert with gist representations of messages; Reyna & Casillas, 2009; Reyna, Estrada et al., 2011; Reyna & Farley, 2006).

3) Willingness and Ability to Inhibit Biases

Those exposed to narratives vary in the extent to which they are willing and able to derive correct and meaningful causal information from complex information (Linderholm et al., 2000; van den Broek, 2010). For example, skilled readers (defined as those possessing the ability to comprehend, retain, and integrate text information accurately, Oakhill, 1994) are less subject to incorrect inferences from texts lacking clear causal structure (e.g., because events were not arranged in temporal order or because causality was not explicitly indicated). Similarly, numerate individuals (i.e., those possessing mathematical literacy) are more able to recognize when two risky decision options have the same linear expected value, thus leading them to treat these options equally (e.g., Schley & Peters, 2014). Finally, individuals differ in the extent to which they are willing to employ effortful thinking (e.g., Cacioppo et al., 1996) with those who do so less likely to be subject to cognitive biases. Therefore, websites that emphasize decontextualized facts rather (such as many government websites) than a clear causal narrative may not be easily comprehensible to some individuals, potentially leading them to draw incorrect inferences. Thus, subjects differ in the degree to which they rely on categorical gist versus verbatim information. In addition to emphasizing categorical gist, fuzzy-trace theory suggests strategies that rely on emphasizing multiple levels of representation, such as by emphasizing ordinal information.

4) Motivational Factors and Prior Knowledge

In concert with mental representation, narratives are predicted to increase in popularity when cultural norms make certain ideas *plausible* (e.g., that the government would intentionally infect people) coupled with an increased prevalence of poorly understood health conditions (Kata, 2012; Reyna, 2012b). In the absence of prior knowledge, compelling narratives become plausible by providing a causal (though not necessarily accurate) explanation for an otherwise mysterious event. Specifically, studies in psycholinguistics have identified a narrative's *causal coherence* as a key factor driving a story's comprehensibility and long-term retention (van den Broek, 2010). Although several dimensions of narrative coherence have been proposed (Reese et al., 2011; Gernsbacher, 1996), there is a consensus within the literature that coherent narratives often provide a causal structure for the events described (Mandler, 1983; Trabasso & Sperry, 1985; Gernsbacher et al., 1990; Diehl et al., 2006; van den Broek, 2010), therefore conveying the *meaning,* or gist of the story. In contrast, incoherent stories contain a relatively weak causal structure. According to this theory, therefore, websites that produce more coherent and meaningful gist will be more influential (even if they are not factually accurate!). For example, a story describing how children developed symptoms of autism after having gotten vaccinated might allow one to conclude that vaccines cause autism. In fact, the symptoms of autism tend to occur around the same time as the CDC recommends that children receive vaccines. Similar spurious correlations underlie the false claims that exposure to the larvicide pyriproxifen (Vazquez, 2016) or receipt of the DTaP vaccine by pregnant mothers, rather than the Zika virus, causes birth defects (Dredze, Hilyard, & Broniatowski, 2016). Thus, when subjects lack prior knowledge, or when their prior

knowledge makes conspiracy theories plausible to them, narratives that aim to provide a causal explanation for "why" mysterious adverse events occur are consequently more comprehensible, influential, and memorable (Trope & Liberman, 2010; Fukukura et al., 2013).

Testing Hypotheses on Social Media

Social media analytic techniques allow us unprecedented opportunities to test these hypotheses. For example, we (Broniatowski, Hilyard, & Dredze, 2016) examined FTT's predictions in the context of the recent Disneyland Measles Outbreak, which began in December 2014 at Disneyland in California and led to 111 confirmed cases of measles in seven states (as well as Canada and Mexico). Although measles was widely considered eliminated in the United States, reduced vaccination rates in some communities, due to concerns about vaccine toxicity, ultimately called attention to the issue of herd immunity—how slight reductions in vaccination rates can lead to epidemics.

This study was conducted in the context of an ongoing debate: Does including a narrative lead to more effective communication compared to presenting "just the facts" (i.e., statistical data)? In addition to the perceived effectiveness of narratives noted above, public health officials have been hesitant to include stories in their communications due to concerns of appearing biased or paternalistic. In contrast, FTT predicts that the verbatim details of a message (such as "measles can lead to pneumonia, deafness, lifelong brain damage, and even death, and almost 1/3 of children with measles have to be hospitalized") are incorporated separately from, but in parallel to, the gist of the message, (e.g., "not vaccinating means taking a risk that your child could get the measles and suffer serious lifelong health problems or death. Vaccination is the best way to protect your child"). According to FTT, narratives are effective to the extent that they communicate a gist representation of information (e.g., about vaccination or a political ideology) that then better cues motivationally relevant moral and social principles.

Our approach combined decision and computer sciences. We used Amazon's Mechanical Turk service to crowdsource the coding of 4,581 out of a collection of 39,351 outbreak-related articles published from November 2014 to March 2015. We asked coders to indicate whether each article expressed statistics (a verbatim representation) a story, and/or a "bottom line meaning" (a gist). Finally, we measured how frequently these articles were shared on Facebook.

Results were consistent with FTT's predictions—we found that expression of both a gist and verbatim details increased an article's likelihood of being shared at least once. In contrast, stories did not have a significant impact on an article likelihood of being shared after controlling for gist and verbatim, indicating that stories are only effective to the extent that they communicate a gist. Among those articles that were shared at least once, only the expression of a gist was significantly associated with an increased number of Facebook shares (articles with gists were shared 2.4 times more frequently, on average, than articles without gists). Articles expressing a gist that also expressed positive opinions about both pro- and anti-vaccine advocates were shared 57.8 times more often than other articles. This suggests that facts can be effectively shared if they acknowledge the concerns of those on the "opposing" side while still expressing the bottom-line meaning of the data. These results suggest a framework that may be used to communicate effectively: in addition to describing verbatim facts, public communicators should endeavor to link those facts to a clear bottom line meaning (Broniatowski, Hilyard, & Dredze, 2016). Thus, future work should focus on testing these and other theoretically-motivated interventions.

Eliciting Gists on Social Media: Synergies Between Social Media and Survey Techniques

FTT emphasizes the degree to which gists are culturally contingent. To construct effective messages, we must understand how values and motivations vary across audiences. To effectively counter messages that are harmful to national security and public health, officials must tailor their responses to groups' narratives and rationales (Hawkins et al., 2008). Determining how these attitudes and narratives are distributed within the population is a key challenge.

Validated techniques for eliciting group attitudes towards health behaviors rely on surveys, focus groups, and random-digit dialing of telephone landlines. They are therefore time-consuming, costly, and tend to under-sample young people and minorities who often have only mobile phone service. More novel techniques, based on social media data, are widely available in real-time, and easy to access (e.g., Aramaki et al., 2011; Culotta, 2010; Lampos et al., 2010; Signorini et al., 2011; Bandari et al., 2013). Also, young people and minorities are heavy users of social media (Brenner & Smith, 2013; Mislove et al., 2011). Thus, the strengths and weaknesses of social media and survey methods complement one another. We therefore aim to develop, for social media, the research norms and practices that characterize high quality survey research such that we can test hypotheses rapidly with very large samples.

Conclusion

In conclusion, national security and public health practitioners face similar challenges from narratives on social media. Online organized misinformation and/or disinformation campaigns can undermine public health and national security. However, empirically validated scientific theories, such as FTT, make specific predictions for how we may combat misinformation and disinformation online.

We aim to develop new techniques to assess how compelling and influential messages might be. Such techniques must be based on empirically validated theory while taking advantage of synergies between survey methods and social media data. Our approach also recognizes the key role of culture as a determining factor in how individuals attribute meaning to risky events. Thus, a productive research program would achieve a better understanding of the drivers of coherent gist communications in online messages and how these vary across sociodemographic groups. This research agenda requires a systems approach: combining the rigor of scientific psychology with the technological scope and scale of big data. We advocate research into how to implement relevant theories, such as FTT, so that they can be used to fight misinformation and disinformation online.

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Chapter 14: Neural Influence and Behavior Change - Dr. Ian McCulloh, Johns Hopkins University

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Abstract

Military commanders and senior leaders must have a basic understanding of cognitive influence in order to make decisions affecting the Gray Zone and human populations in areas of ongoing military operations. Influence is counter-intuitive. This has led to poor decisions that may have adversely affected the success of US operations. This paper provides a primer of cognitive influence, set in tactical military terms. The neural bases of cognitive influence are further supported by neural imaging conducted in the US and in the Middle East. The intent is to inform commanders and senior leaders to enable them to make better decisions regarding inform-influence operations in support of US objectives.

Influence and Persuasion

The science of influence and persuasion is well understood in science, but counter-intuitive. Western cultural bias prevents many leaders from fully appreciating the effects of social conformity and the ways in which people will interpret messages and actions. A proper understanding of influence and persuasion is essential for US military forces to positively affect the human domain and succeed in the conduct of Gray Zone operations.

People do not typically respond to logic-based arguments [1-18]. They more often respond emotionally and then rationalize their response with facts and logic [1-4,10,16]. When people hear information that diverges from what they already believe, it does not appear credible and they discount the information as false or untrustworthy [1-5,12]. It does not matter whether the information is true. People assess truth based on what can be reasonably integrated within their existing understanding of the world around them [5,9,12].

There are multiple groups, both within and outside government, that spend their time posting factual information in response to misinformation and rumor. They feel that contesting false information is somehow important for shaping views of those without a strong opinion on the given issue. Most often, however, this online argument creates noise that distracts information operations from adversarial narratives that are the real problem [16]. It is the emotion-over-fact cognitive bias that allows misinformation and rumor to perpetuate. Adversaries identify and exploit these cognitive biases. They effectively turn people and groups into conduits that perpetuate their message for them. Arguing against this information with facts is bringing the wrong tools to bear against the problem.

The cognitive terrain of a given target audience can be assessed using the acronym KABIB (knowledge, attitude, belief, intention, behavior) [10]. Knowledge is defined as the information a person knows. This information is not central to the person's identity. Attitudes are the feelings of like or dislike that a person has towards information or viewpoints. Beliefs are things that individuals think to be true, without any supporting evidence. Intention is the motivation for a person to carry out a specific behavior. Behavior is the action that someone conducts.

Modeled intention is the best single predictor of behavior [1-4,16]. Intention is a function of attitudes, social norms, and the control that the person in question has to conduct the behavior. For example, someone may have every intention of eating a salad at lunch, only to find that all the salads in the cafeteria are sold and he cannot eat a salad. They may also plan on eating a salad, but see all of their friends sharing a pizza and invite them to join. In this case, the social norm of pizza eating may moderate the intention. They must also have the attitude of liking the behavior of eating salad…or pizza. Intention is a belief, held by an individual, that they will carry out some behavior. Thus, beliefs and attitude contribute to intention and subsequent behavior.

Military planners must be as deliberate with influence planning as they are with infantry patrolling. When conducting a raid, for example, a patrol leader will locate the objective, conduct reconnaissance, identify obstacles, develop a plan to breach or bypass the obstacles and conduct actions on the objective. In the same way, an influence planner must locate a desired KABIB objective. In their reconnaissance, they must identify obstacles to influence. What might prevent people from receiving a message or interpreting stimulus as intended? Are there incongruent cultural or social norms? Are there competing adversary narratives? Do people lack knowledge? Planners must then select an appropriate model of behavior change to breach or bypass the obstacle to influence. At that point, influence messaging and programs can reach the objective.

An influence objective can span KABIB. It is not necessary to focus on attitude prior to affecting beliefs or intentions. A classic example of this is seat belt usage. Public service announcements showing crash test dummies flying through windshields were aired over many years in an effort to affect knowledge and attitudes regarding seat belt usage. These ads failed to change behavior. The change in law making seat belts required, coupled with the “Click-it or Ticket” campaign and the annoying seat belt chime in vehicles forced a behavior change. The change in behavior led to changes in beliefs and attitudes regarding seat belt usage.

This approach to influence planning intends to serve two key challenges. First, it provides a conceptual bridge for senior leaders. A senior leader may not be an influence domain expert, yet they need enough understanding to properly employ influence as a combat multiplier. Second, it provides a simple system for leaders to verify that their influence experts have, in fact, done their due diligence in planning. A senior leader should be able to ask their influence planner the following questions: 1) What is the (KABIB) objective? 2) What obstacles exist to influence? 3) Which model of behavior change will you employ to breach obstacles? 4) What is your narrative security (counter-adversary message) plan? 5) What are your actions on the objective (what is the influence goal)?

Models of Behavior Change

There are three classic models of behavior change: social judgment theory (SJT) [6,11,15,17-18], cognitive dissonance (CD) [5,9], and the theory of planned behavior (TPB) [1-4,16]. I offer one additional model called the neurocognitive influence model [12]. The three classic models of behavior change are designed to affect attitude, belief, and intention respectively. The neurocognitive influence model integrates the three classic models and includes the neural bases of these cognitive processes.

Social Judgment Theory

For any particular stance that a person has on an issue, they will have a latitude of acceptance [6,11,15,17-18]. This is the range of alternate views that someone else can have on the issue and still be

seen as reasonable. The individual's personal viewpoint is referred to as their anchor. The latitude of acceptance will include those views surrounding the anchor. Someone may have a similar view and be slightly mistaken, but not crazy, while someone with radically different views are seen as unreasonable. Unreasonable views form the latitude of rejection. Any views in this region are immediately rejected.

When facts are presented that fall in someone's latitude of rejection, they do not listen to or respond to those facts[6,11, 18]. They begin to counter-argue those facts. It does not matter whether the facts are true or not. They think of reasons why the facts are wrong and why they should remain committed to their original viewpoint. Often times, this creates a boomerang effect and makes someone more polarized in the opposite direction.

As a model of behavior change, social judgment theory attempts to either widen someone's latitude of acceptance (equivalent to preparing an objective) or offer appeals that fall within the zone of non-commitment. The zone of non-commitment is the range of attitudes between the latitude of acceptance and the latitude of rejection. A likely outcome from this approach is not a radical change in opinion. The goal is simply to create conditions that allow people of differing viewpoints to develop relationships where they can exchange ideas and opinions in a more productive manner. Once they develop a relationship and overcome threats to their identity, they can begin to more objectively evaluate facts and enter into more productive negotiations.

Cognitive Dissonance

Cognitive dissonance describes the mental stress that an individual experiences by maintaining two or more conflicting beliefs [5,9,14]. People will actively avoid situations and information to reduce their level of cognitive dissonance [5,9]. Understanding existing beliefs and how they may be congruent or dissonant from intended messages provides a way to understand how the cognitive terrain may affect a target audience's interpretation of the message. In the same way, manipulating cognitive dissonance provides opportunity to influence a target audience.

Two or more beliefs that people hold may be consonant, dissonant, or irrelevant. Consider the following example:

- Consonant: I don't want to get drunk tonight. I drink water instead of wine.
- Dissonant: I don't want to get drunk tonight. I drink a lot of wine.
- Irrelevant: I don't want to get drunk tonight. I wore an expensive shirt to dinner.

The level of dissonance a person experiences is a function of the personal value they place on an issue and the proportion of consonant to dissonant beliefs. When a person's actions are dissonant with respect to their beliefs, the person tends to change belief.

This is exhibited in a classic experiment [9]. Subjects were recruited and asked to perform a boring and mundane task, where they simply were turning blocks on a board. They were then asked to recruit others for the experiment. Some subjects were given $1, while others were given $20. After the subjects completed their recruiting task, where they essentially lied to others about the task being more interesting than it really was, they were asked about their opinion on the task and whether they'd like to do it again. Those that were given $20 were able to reconcile lying with the financial reward and remained consistent in their opinion that the task was boring. Those that were only paid $1 were

dissonant in their assessment of the task and their willingness to lie to others. They actually changed opinion and volunteered to do the task again.

Cognitive dissonance, as a model of behavior change, attempts to create conditions where behaviors and beliefs are inconsistent with a target belief. The intent is that the target audience will change the target belief to become less dissonant. Understanding the tactics, however, may change the way the military implements incentives, such as a "Rewards for Justice" program. Perhaps increasingly large incentives are not as effective as insufficient incentives for creating behavior change. Additional testing would be required to evaluate effectiveness.

Theory of Planned Behavior

There often exists a discrepancy between attitude and behavior. In other words, social judgment theory may fail. The theory of planned behavior (TPB) attempts to overcome this by directly targeting intention [1-4,16]. Intention is, after all, the best predictor of behavior. Intention is a function of attitude, social norms, and control/efficacy. The attitudes norms and control must be specific to a particular behavior of course and remain stable between the measurement of intention and behavior. As a model for behavior change, TPB attempts to affect either the attitudes, social norms, or level of perceived control a target audience has to change their intention.

Selecting a Model of Behavior Change

Selecting a model of behavior change depends upon the cognitive objective. SJT is effective for changing attitude. CD is effective for changing belief. TPB is effective for changing intention. All three may contribute to changing behavior. These are the cognitive equivalents of raid, recon, ambush in infantry patrolling. Modern Gray Zone conflicts require commanders to become familiar with models of behavior change and they must learn to tactically employ these methods.

Neurocognitive Influence Model

We understand a great deal about neural processes that affect cognition and behavior. Matthew Lieberman and Emily Falk [7-8] have identified brain regions associated with processes such as counter-arguing, affirmation, narrative immersion, and mentalizing (where people make sense of stimuli and their surrounding world). We understand from social psychology and neuroscience alike how these processes interact, supporting and disrupting each other.

Activity in these brain regions can measured in several ways. Most of Emily Falk's [7-8] work has consisted of using functional magnetic resonance imaging (fMRI) to measure the blood-oxygen level dependent (BOLD) signal in the brain during conditions of influence and behavior change. She has found that BOLD signals in key brain regions are more predictive of intention and behavior change than an individual's self-report. In other words, a neural image is more reliable for testing message effectiveness than a focus group or survey.

McCulloh and Lieberman [12] have replicated Falk and Lieberman's work using functional near infrared spectroscopy (fNIRS). fNIRS is a highly portable, lightweight, low cost tool that uses light emitting diodes (LED) to measure BOLD signals in the brain. fNIRS cannot measure as many areas of the brain as fMRI or penetrate to deeper brain regions, however, it can measure most of the brain regions associated with influence and persuasion. fNIRS has greater spatial resolution than electroencephalogram (EEG). This

allows more focused testing to evaluate the effectiveness of messages within the context of different models of behavior change.

McCulloh and Lieberman's most recent work involved using fNIRS to test message effectiveness of public health ads that were aired in Jordan [12]. The Johns Hopkins Center for Communications Program (CCP) develops and airs public health service announcements in many countries around the world to include Jordan. Measures of effectiveness are collected in traditional ways to evaluate message effectiveness. McCulloh and Lieberman selected several of these videos and then recruited Jordanian subjects that were either within or outside of the designated target audiences. They were able to demonstrate stronger neural response among subjects viewing a tailored message. They were also able to test the effectiveness of two CENTCOM attributed counter-DA'ESH videos that had been posted on YouTube.

Conclusion

Success during Gray Zone operations requires commanders to understand influence and employ models of behavior change in the same manner that they understand the elements of patrolling and employ kinetic power. Influence is counter-intuitive, however. It is, therefore, even more important that proper resources are allocated for understanding target audiences and assessing the potential impact of influence messages and programs. Neuroscience in general and fNIRS in particular offers the requisite technology to provide assessment of influence effectiveness. The Department of Defense should increase resourcing for influence related activities due to its growing importance to national security objectives.

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Chapter 15: The Role of Integrative Complexity in Forecasting and Influence - Dr. Peter Suedfeld and Mr. Bradford H. Morrison, University of British Columbia

Introduction

If control is dependent on actual or at least perceived power—political, economic, military, demographic, and other—influence is the product of an even more varied and changing set of variables. The criteria that define the probability of success in exerting or countering influence must include two factors addressed in this paper: accuracy in assessing the possible steps of an adversary and shaping persuasive communications so as to advance one's own position and reduce the power of the opponent's. The former aspect, anticipatory intelligence, has been our major research focus to date; at the end of this discourse, we shall briefly look at what may be a fruitful approach to the latter.

Cognitive Complexity in Forecasting and Decision-Making

A leader in current research on forecasting, Philip E. Tetlock of the University of Pennsylvania, has studied forecasting and prediction for the last 30 years. One of his discoveries came from collecting 28 thousand political and economic forecasts from 284 experts who ranged from government officials to professors, journalists, and who represented a wide range of backgrounds and political allegiances. The result? On average, the forecasts of these experts were only slightly more accurate than chance. But Tetlock also identified a group of "super-forecasters." Super-forecasters have "hit" rates about 30% higher than the others (Tetlock & Gardner, 2015).

Some of the characteristics of super-forecasters are an almost exact replica of the cognitive processes that define high integrative complexity (Suedfeld, Tetlock, & Streufert, 1992). Integrative complexity (IC) is an index of how an individual or group processes information and makes decisions. Like super-forecasting, high integrative complexity is marked by extensive information search and processing, flexible planning that changes with feedback, open-mindedness about one's own and others' conclusions, tolerance for cognitive dissonance, and the ability to understand the arguments and motives of others (including adversaries). However, it is also somewhat slow, may be led astray by attention on irrelevant or trivial information, and may make the individual appear unsure or indecisive, or vacillating.

Integrative Complexity and Decision-Making

Complexity can be measured from texts produced by the individual of interest and turning them into quantitative data through the use of detailed scoring manuals used by qualified scorers and, in the near future, very likely the use of software currently in development (Conway et al., 2014; Suedfeld & Tetlock, 2014). The basic components of IC are differentiation, the ability to identify different dimensions or aspects of an issue or different opinions about it, and integration, recognizing relationships among those differentiated items (Suedfeld, et al., 1992).

Functioning at a high level of complexity imposes a heavy cognitive load: it takes time, attention, and hard thinking to consider and weigh so much information and its possible patterns and implications, to devise and monitor plans, to change them and devise new ones that take new information into account, to develop hierarchies of urgency and importance. Eventually, if a serious issue persists without a solution, the cognitive load becomes too heavy and complexity is likely to drop as mental, physical, and

emotional resources are depleted. This is a stage we refer to as disruptive stress (Suedfeld 1992, 2010). Super-forecasters similarly can lose their edge if their cognitive load is too high for too long (Tetlock & Gardner, 2015).

When it occurs, and the problem still persists, the decision-maker is likely to resort to information processing strategies that require less thinking, time, and energy. These are likely to include cognitive shortcuts and heuristic thinking (Gilovitch, Griffin, & Kahneman, 2002). In international or domestic political conflict, excessive cognitive loads often lead to one of two decision options: a partial or full withdrawal from the field—giving away too much in negotiation just to get an agreement, or actual surrender—or its converse, a drastic escalation that changes the problem and may transfer it to a different context and a different set of decision-makers: a violent solution such as going to war (see also Johnson & Tierney, 2011).

Leader Assessment at a Distance

Our research group measures complexity in studying and forecasting the decisions of national and military leaders. We focus on changes over time as the person makes decisions in the context of competition or confrontation. We have reliably found stable levels or even increases in complexity when negotiations progress well, and when success or the termination of the problem seems to be near; and decreases in IC preceding and accompanying violent outcomes, usually within two or three months prior to the event. This has held in case studies of wars resulting from escalating conflict spirals, such as World War I; major wars against a decades-long background of persistent international rivalry between Israel and the United Arab Republic and between India and Pakistan; and IC drops shown by the eventual attacker in advance of strategic surprise attacks, for example Pearl Harbor (see Suedfeld, 2014).

The great majority of our work in this context has addressed questions of international war or peace. In the past months, we have extended the work to explore whether the IC patterns found in that area also characterize events In the Gray Zone. So far, we have found consistently reduced complexity in speeches by senior Israeli officials correlated with heightened violence by Israeli forces in the Gaza Strip, starting two months before each of two IDF incursions into the Strip. There were also such decreases in advance of significant events damaging the Iranian nuclear program, including assassinations, cyber-attacks, and a large explosion at a missile launch facility. Although the source or sources of these Gray Zone attacks have not been identified, we would hypothesize that the Israeli government probably at least had information that they were being planned.

Most recently, we have looked at events related to Russian Gray Zone activities in the Crimea, which were followed by invasion, occupation, and annexation. The analysis so far has covered the terms of three presidents of Ukraine. In general, we have found that their complexity dropped significantly during periods of major crisis—losing their position, the Russian invasion—and rose when negotiations with Russia were ongoing. Increases in complexity were most likely to occur when negotiations were progressing well, as in establishing a cease-fire or obtaining the resumption of oil and gas deliveries. In these cases, other events were occurring as well, so that the specific cause of IC changes cannot be pinpointed, but the pattern fits our other data and IC theory.

We are currently updating our study of Bashar al-Assad. As we had reported earlier, his complexity level fluctuated with events in the civil war, but was generally not very high (Suedfeld, Morrison, & Cross, 2014). That data collection ended long before the Russian intervention on his side. We are now looking

at 2015, the year that the intervention began, and so far have found a major increase in August and September 2015, leading up to the beginning of Russian air strikes on September 30 of that year. The implication is that he was experiencing a lowered level of stress, presumably related to knowledge that his situation was about to improve.

For IC scoring to be used optimally, it is important for the scorer to have adequate baseline data for the group or individual being scored. Individual differences can be significant: some high-level decision-makers are unusually resistant to disruptive stress (Suedfeld, 2014). Among these are leaders of outstanding stature, such as Napoleon and the Duke of Wellington. When scoring such a person, continued high complexity in the face of stress does not necessarily mean a peaceful outcome.

Although it has limitations, IC scoring is a useful tool in anticipatory intelligence analysis. Given the accessibility of an adequate body of scoreable texts, it can alert the analyst to the increased probability of a drastic course change by another party, although it does not specify what the new course will be; or conversely, it may suggest that no such change is imminent.

It would obviously be desirable to increase the number of super-forecasters. If super-forecasters "naturally" function at a high level of IC, two relevant strategies present themselves. One is to select potential candidates on the basis of their baseline complexity scores. Alternatively, an attempt can be made to train at least some "ordinary" forecasters to a criterion of increased complexity. This has been done with experimental subjects (Hunsberger et al., 2006), and an investment in more such programs focusing on forecasters may be worth the effort in the improvement of our predictive powers.

Communications and IC

One other aspect of IC that merits more exploration is its role in shaping communications and reactions to communications. Compared to the copious research on decision-making complexity, only a few studies have investigated this area. The work of the Yale persuasion group, now a classic in the field, covered the effectiveness of different sources, channels, and contents of persuasive messages (Hovland, Janis, & Kelley, 1953). McGuire (1964; see also, Banas & Rains, 2010) added the concept of attitude inoculation, message presentation that enhances resistance to persuasive attempts by the "other side." Both lines of research have had results implying a role for taking the complexity of messages into serious account. For example, the Yale group made suggestions as to the use of one- vs. two-sided messaging as a function of audience characteristics, which link with research on IC and accountability but also with potential research on other factors that are likely to affect the optimal complexity of messages. Similarly, McGuire's findings on how including arguments opposing the view one is trying to advance can have the paradoxical effect of making one's own message more persuasive show an unexpected impact for communications of relatively high complexity.

IC researchers have found that such characteristics as the perceived views of the audience and the open identification of the source (accountability) affect the complexity level of messages (e.g., Tetlock, 1983). A study of face-to-face negotiations has shown that higher IC messages of one negotiating team can raise the IC level of the other, leading to more progress toward agreement (Liht, Suedfeld, & Krawczyk, 2005). Other ways of applying IC theory to communications remain to be explored.

Last, increasing the IC of a selected audience may be difficult but worth the effort. There have been several successful programs designed to do just that, resulting in less hostile attitudes toward other

groups (Liht & Savage, 2013; Savage, Khan, & Liht, 2014). These experimental studies should be followed up.

In short, besides being a tool for anticipatory intelligence analysis, IC may also be used to help shape persuasive communications as well as responses to adversarial attempts at persuasion. This aspect of the IC construct calls for attention by researchers.

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Appendix A: Author Biographies

Allison Astorino-Courtois

Dr. Allison Astorino-Courtois is Executive Vice President at NSI, Inc. She has also served as co-chair of a National Academy of Sciences study on Strategic Deterrence Military Capabilities in the 21st Century, and as a primary author on a study of the Defense and Protection of US Space Assets. Dr. Astorino-Courtois has served as technical lead on a variety of rapid turn-around, Joint Staff-directed Strategic Multi-layer Assessment (SMA) projects in support of US forces and Combatant Commands. These include assessments of key drivers of political, economic and social instability and areas of resilience in South Asia; development of a methodology for conducting provincial assessments for the ISAF Joint Command; production of a "rich contextual understanding" (RCU) to supplement intelligence reporting for the ISAF J2 and Commander; and projects for USSTRATCOM on deterrence assessment methods.

Previously, Dr. Astorino-Courtois was a Senior Analyst at SAIC (2004-2007) where she served as a STRATCOM liaison to US and international academic and business communities. Prior to SAIC, Dr. Astorino-Courtois was a tenured Associate Professor of International Relations at Texas A&M University in College Station, TX (1994-2003) where her research focused on the cognitive aspects of foreign policy decision making. She has received a number of academic grants and awards and has published articles in multiple peer-reviewed journals. She has also taught at Creighton University and as a visiting instructor at the US Military Academy at West Point. Dr. Astorino-Courtois earned her Ph.D. in International Relations and MA in and Research Methods from New York University. Her BA is in political science from Boston College. Finally, Dr. Astorino-Courtois also has the distinction of having been awarded both a US Navy Meritorious Service Award and a US Army Commander's Award.

David Broniatowski

Dr. Broniatowski is Director of the Decision Making and Systems Architecture Laboratory at The George Washington University, where he is an Assistant Professor in the Department of Engineering Management and Systems Engineering. He conducts research in decision making under risk, group decision making, system architecture, and behavioral epidemiology. This research program draws upon a wide range of techniques including formal mathematical modeling, experimental design, automated text analysis and natural language processing, social and technical network analysis, and big data. Current projects include a text network analysis of transcripts from the US Food and Drug Administration's Circulatory Systems Advisory Panel meetings, a mathematical formalization of Fuzzy Trace Theory --a leading theory of decision-making under risk, derivation of metrics for flexibility and controllability for complex engineered socio-technical systems, and using social media data to study fake news and why it spreads.

Erik Dahl

Erik J. Dahl is Associate Professor of National Security Affairs at the Naval Postgraduate School in Monterey, California. He is Associate Chair for Instruction of the National Security Affairs Department, and he is also on the faculty of the Center for Homeland Defense and Security (CHDS) at NPS. In addition, he is a Research Fellow with the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland. His research focuses on intelligence, terrorism, and international and homeland security, and he is the author of Intelligence and Surprise

Attack: Failure and Success from Pearl Harbor to 9/11 and Beyond (Georgetown University Press, 2013). His work has been published in Political Science Quarterly, Studies in Conflict and Terrorism, Intelligence and National Security, Homeland Security Affairs, The Journal of Strategic Studies, The Naval War College Review, US Naval Institute Proceedings, the Journal of Policing, Intelligence, and Counter Terrorism, and Joint Force Quarterly. Dahl received the Naval Postgraduate School's LCDR David L. Williams Outstanding Professor Award in 2013, and in 2014 he received the Carl E. and Jessie W. Menneken Faculty Award for Excellence in Scientific Research. Before joining the NPS faculty in 2008, Dahl was a pre-doctoral fellow in the International Security Program at the Belfer Center for Science and International Affairs at Harvard's Kennedy School of Government. He received his Ph.D. from The Fletcher School of Tufts University, from which he also received a Master of Arts in Law and Diplomacy. In addition, he holds master's degrees from the Naval War College and the London School of Economics, and received his bachelor's degree from Harvard. Dahl retired from the US Navy in 2002 after serving 21 years as an intelligence officer, including service from 1999 to 2002 on the faculty of the Naval War College in Newport, Rhode Island.

Charles Eassa

COL (R) Charles Eassa is a Senior Research Associate at Georgia Tech Research Institute (GTRI) where he specializes in Information Operations, Special Technical Operations, Operational Assessments, and Gap Analysis. He joined GTRI in 2016 following 30 years of service as an officer in the United States Army.

Following his commissioning after graduating from the Citadel, COL (R) Eassa began his military career as a Field Artilleryman at Fort Sill, Oklahoma. As a lieutenant, he served as a fire direction officer, firing platoon leader, and nuclear cannon assembly team leader before attending the Infantry Officers' Advanced Course at Fort Benning. After graduating, he was assigned to Baumholder, Germany where he served on the Division Fire Support Element and commanded Bravo Battery, 6th Battalion, 29th Field Artillery. Next, he was assigned to Fort Gillem, Georgia where he served as a field artillery advisor to the Georgia National Guard. He was selected to serve as the Aide-de-Camp for the Deputy Commanding General, Third US Army where he deployed to Kuwait for Operational Vigilant Shield. Post deployment, he was assigned to Battle Command Training Program at Fort Leavenworth, Kansas where he served as a Fire Support Observer-Trainer, Deputy Operations Officer, Exercise Controller, and Exercise Planner. His next assignment carried him back to Germany where he served as the V (US) Corps Deputy Chief of Plans and Information Operations Officer during the planning and execution of Operation Iraqi Freedom. Post deployment, he was reassigned as the US Army Information Operations Proponent where he led the expansion of the Army's efforts to deal with the information environment. In 2008, he was assigned to the US European Command in Stuttgart, Germany as the Information Officer in the Plans and Operations Center and participated across numerous joint, combined, and coalition efforts. He was deployed to Afghanistan to serve on NATO's International Joint Command where he served alongside coalition partners from over 60 nations. Upon his return, he was selected to serve on the Joint Staff J39 as the Chief of IO and Strategic Effects. Across his career, COL (R) Eassa has endeavored to bridge the challenges of influence, actions in the information environment, cutting edge technology, the initiation of cyber as a warfighting domain, and the pace of technology.

COL (R) Eassa received a Master of Business Administration from Brenau University, a Master of Military Arts and Science from the School of Advanced Military Studies, a Master of Public Administration from Harvard's Kennedy School of Government, and a Master of Strategic Studies from the US Army War College.

Bill Edwards

Colonel William "Bill" Edwards is the current Director of Intelligence -SOJ2 for Special Operations Command-North. His previous assignments in senior leadership roles include TRADOC Capability Manager-Sensor Processing (DCGS-A) and TRADOC Capability Manager Biometrics, Forensics and Machine Foreign Language Translation. Prior to these positions he attended the United States Naval War College, graduating in July 2013 with a Master of Arts degree in National Security and Strategic Studies. His most recent tactical assignment was successful Command of the 3rd Brigade Troops Battalion during Operation Iraqi Freedom and Operation New Dawn 2009 - 2011.

Colonel Edwards received his commission 20 July 1990 through the US Army Reserve Officers Training Corps at San Diego State University where he received a Bachelor's of Arts degree in English. He also holds a Master of Science degree in Personnel Management/Administration from Central Michigan University. His military education includes the completion of the Armor Officer Basic Course, Military Intelligence Transition and Advance Courses, Military Counterintelligence Course, Military Intelligence Combating Terrorism Course, US Army Command and General Staff College and the United States Naval War College.

In over 27 years Colonel Edwards has served as armor Platoon Leader for Task Force 6-40th Armor (Berlin, Germany), Company Executive Officer and Assistant S3 Operations for V Corps Special Troops Battalion (Frankfurt, Germany). COLONEL Edwards has also served as the Assistant S-3 Operations, 2-34 Armor; 1st Infantry Division G2 Plans Officer, Fort Riley, Kansas; 1-68 Armor Battalion S-2 Intelligence; 3rd Brigade Combat Team S-2 Intelligence; HHC 1-68 Armor Company Commander, 4th Infantry Division, Fort Carson, Colorado; University of Tennessee Army ROTC Training Instructor; Battalion Executive Officer, 165th Military Intelligence Battalion/Long Range Surveillance-Corps (Darmstadt, Germany/Iraq Theater of Operations); US Army Europe Intelligence G2 Plans Officer, as well as US Army Europe Intelligence G2 Executive Officer (Heidelberg, Germany); USNORTHCOM Intelligence J2 Plans Officer, Deputy Division Chief, Intelligence and Operations Division, Commander 3rd Brigade Troops Battalion, 4th Infantry Division (Fort Carson, Colorado/Iraq Theater of Operations) and Deputy Division Chief Mission Integration and Architecture Division USNORTHCOM Intelligence J2, Peterson AFB, Colorado, TRADOC Capability Manager Biometrics and TRADOC Capability Manager-Sensor Processing (DCGS-A), Fort Huachuca, AZ.

Colonel Edwards' decorations include the Bronze Star Medal (One Oak Leaf Cluster), the Legion of Merit, the Defense Meritorious Service Medal (One Oak Leaf Cluster), the Meritorious Service Medal (5 Oak Leaf Clusters), the Army Commendation Medal (3 Oak Leaf Clusters), the Army Achievement Medal (4 Oak Leaf Clusters), The Iraq Campaign Medal (3 Campaign Stars), the Global War on Terrorism Expeditionary Medal, the Global War on Terrorism Service Medal, the Meritorious Unit Commendation (1 Oak Leaf Cluster/Combat Award/Iraq 2003-2004 and 2010 - 2011), the Joint Meritorious Unit Award, National Defense Service Medal (2 Bronze Stars), the Overseas Service Ribbon, and the Army Service Ribbon. He has earned the following Badges: The Combat Action Badge (Al Anbar Province, Iraq) and the Parachutist Badge.

Robert Elder

Lieutenant General Robert Elder (USAF, retired) joined the George Mason University faculty as a research professor with the Volgenau School of Engineering following his retirement from the Air Force as the Commander of 8th Air Force and US Strategic Command's Global Strike Component. He currently conducts research in the areas of integrated command and control, operational resiliency in degraded environments, strategic deterrence, and the use of modeling to support national security decision-making. General Elder served as the Central Command Air Forces Deputy Commander for Operation Enduring Freedom and later as the Air Operations Center Commander and Deputy Air Component Commander for Operation Iraqi Freedom. He was the first commander of Air Force Network Operations and led the development of the cyberspace mission for the Air Force. General Elder also served as Commandant of the Air War College, and holds a doctorate in engineering from the University of Detroit.

James Giordano

James Giordano is Professor in the Departments of Neurology and Biochemistry, Chief of the Neuroethics Studies Program of the Pellegrino Center for Clinical Bioethics, and Co-director of the O'Neill-Pellegrino Program in Brain Science and Global Health Law and Policy at the Georgetown University Medical Center, Washington DC. As well, he is Distinguished Visiting Professor of Brain Science, Health Promotions and Ethics at the Coburg University of Applied Sciences, Coburg, Germany, and was formerly Fulbright Visiting Professor of Neuroscience and Neuroethics at the Ludwig-Maximilians University, Munich, Germany.

Prof. Giordano is a Research Fellow of the European Union Human Brain Project, working as team leader to define specific technical, ethical and policy related issues arising in and from dual-use applications of brain sciences. He currently serves as an appointed member of the Department of Health and Human Services Secretary's Advisory Council for Human Research Protection; and is an appointed member of the Neuroethics, Legal and Social Issues Advisory Panel of the Defense Advanced Research Projects Agency (DARPA).

A neuroscientist and ethicist with over 30 years' experience in basic and translational research, Prof. Giordano is the author of over 250 publications and 7 books in neuroscience and neuroethics, and 12 governmental whitepapers on bioscience, biotechnology and biosecurity. His recent book *Neurotechnology in National Security and Defense: Practical Considerations, Neuroethical Concerns* (CRC Press) is widely used in a number of national defense, security and policy curricula.

Named as a Distinguished Lecturer of both *Sigma Xi – The National Scientific Honor Society*, and the *Institute for Electrical and Electronics Engineers* (IEEE), Prof. Giordano was named a *Presidential Point of Light* by President George H. W. Bush for recognition of his contribution to science and society, and was elected to the European Academy of Science and Arts in acknowledgment of his work in brain science and ethics.

Alexus Grynkewich

Brig. Gen. Alexus G. Grynkewich is the Deputy Director, Global Operations. He serves as the Joint Staff focal point for cyber and electronic warfare operations, information operations, special technical operations and sensitive Department of Defense support to government agencies. General Grynkewich received his commission in 1993 after graduating from the US Air Force Academy. He has served as an instructor pilot, weapons officer and operational test pilot in the F16 Fighting Falcon and F22 Raptor. General Grynkewich has commanded at the squadron and wing levels, and his staff assignments including Air Combat Command, US European Command and Headquarters Air Force. General Grynkewich is a command pilot with more than 2,300 hours in the F16 and F22.

Gia Harrigan

Ms. Gia Harrigan is currently employed by the Department of Homeland Security, Science and Technology Directorate and serves as the Program Manager for the National Center for Risk and Economic Analysis of Terrorism Events (CREATE), National Consortium for the Study of Terrorism and Responses to Terrorism (START), and National Transportation Security Center of Excellence. Ms. Harrigan is on-site at the Naval War College, War Gaming Department and supports Homeland Security/ Homeland Defense activities. Prior to joining DHS Ms. Harrigan served as Science Advisor at the CNO Executive Panel (N00K) in Washington, DC. She began government service at the Naval Undersea Warfare Center Division, Newport, Rhode Island and has led strategic initiatives for organizational transformation, in the areas of Technology Insertion Strategies, Business War Gaming, Balanced Scorecard, and Knowledge Management. Ms. Harrigan has completed an Advanced Studies Program in System Dynamics at the Massachusetts Institute of Technology. She has a Master of Business Administration degree from the University of Rhode Island and an undergraduate degree in Mathematics from Boston College.

Regina Joseph

Valerie Reyna is Professor of Human Development, Director of the Human Neuroscience Institute, Director of the Magnetic Resonance Imaging Facility, and Co-director of the Center for Behavioral Economics and Decision Research at Cornell University. Her research integrates brain and behavioral approaches to understand and improve judgment, decision making, and memory across the life span, with a special focus on decisions involving risk and uncertainty. She is a developer of fuzzy-trace theory, a model of the relation between mental representations and decision making that has been widely applied in law, medicine, and public health. Dr. Reyna has been elected to the National Academy of Medicine and is a Fellow of the Society of Experimental Psychologists. She is also a Fellow of the American Association for the Advancement of Science, the Divisions of Experimental Psychology, Developmental Psychology, Educational Psychology, and Health Psychology of the American Psychological Association, and the Association for Psychological Science. Dr. Reyna has served as a permanent member on study sections of the National Institutes of Health, and on expert panels for the National Science Foundation, MacArthur Foundation, and the National Academy of Sciences.

Gina Ligon

Dr. Gina Ligon is an Associate Professor of Management and Collaboration Science at the University of Nebraska at Omaha. She received her PhD in Industrial and Organizational Psychology with a Minor in Measurement and Statistics from the University of Oklahoma. She is a member of the National Consortium of Studies of Terrorism and Responses to Terrorism (START). Since arriving at UNO, she has been awarded over $3,000,000 in National Security-related grants and contracts. She currently is the

Principal Investigator on a grant from Department of Homeland Security (DHS) examining the leadership and performance of transnational Violent Extremist Organizations (VEOs,) and is the originator of the Leadership of the Extreme and Dangerous for Innovative Results (LEADIR) database. Her research interests include profiling leaders from afar, violent ideological groups, expertise and leadership development, and collaboration management. Prior to joining UNO, she was a faculty member at Villanova University in the Department of Psychology. She also worked in St. Louis as a management consultant with the firm Psychological Associates. She has won the Best Paper award from the Center for Creative Leadership and The Leadership Quarterly Journal, the Dean's Merit for Outstanding Research, and the NSRI Team and Leadership awards. She has published over 50 peer-reviewed publications in the areas of leadership, innovation, and violent groups, and she is the incoming editor to the academic journal Dynamics of Asymmetric Conflict.

Corey Lofdahl

Dr. Corey Lofdahl is a recognized expert in the computer modeling of complex social and engineering systems. At MIT, he specified, quantified, and integrated social science theory using system dynamics (SD) simulation. At the University of Colorado, he used econometrics to specify empirical tests and integrate multiple data sources to examine the relationships between international trade and the global environment, which resulted in an MIT Press monograph. Dr. Lofdahl continued this research for DARPA under the Conflict Modeling, Planning and Outcomes Experimentation (COMPOEX) program by building suites of SD models to support creating whole of government plans for Baghdad. These plan used computation to integrate diplomatic, intelligence, military, and economic (DIME) lines of effort to inform senior military and civilian decision-makers. These results led to an invitation by the Special Operations Command in Afghanistan to apply these analytic techniques in an operational setting. Upon his return, Dr. Lofdahl was the Principal Investigator for the DARPA Agent-based System Produced Emergent Networks (ASPEN) project as well as a range of other projects for multiple government agencies including Army ERDC, AFRL, and ONR. He currently works as a principal engineer for the System of Systems Analysis Corporation (SoSACorp) where he creates complex simulation models to support operational planning and systems development. Dr. Lofdahl holds degrees in electrical engineering, computer science, and international relations from the University of Colorado at Boulder, Brown University, and MIT.

Ian McCulloh

Ian McCulloh holds joint appointments as a Parson's Fellow in the Bloomberg School of Public health, a Senior Lecturer in the Whiting School of Engineering and as chief scientist in the Cyber Warfare Systems Group of the Applied Physics Lab, at Johns Hopkins University. His current research is focused on strategic influence in online networks and understanding the cognitive dimension of the information environment. He is the author of "Social Network Analysis with Applications" (Wiley: 2013), "Networks Over Time" (Oxford: forthcoming) and has published 40 peer-reviewed papers, primarily in the area of social network analysis. He retired as a Lieutenant Colonel from the US Army after 20 years of service in special operations, counter-improvised explosive device (C-IED) forensics and targeting, and weapons of mass destruction (WMD) defense. He founded the West Point Network Science Center and created the Army's Advanced Network Analysis and Targeting (ANAT) program. In his most recent military assignments as a strategist, he led interdisciplinary PhD teams at Special Operations Command Central (SOCCENT) and Central Command (CENTCOM) to conduct social science research in 15 countries across the Middle East and Central Asia to included denied areas, which he used to inform data-driven strategy for countering extremism and irregular warfare, as well as empirically assess the effectiveness of

military operations. He holds a Ph.D. and M.S from Carnegie Mellon University's School of Computer Science, an M.S. in Industrial Engineering, and M.S. in Applied Statistics from the Florida State University, and a B.S. in Industrial Engineering from the University of Washington. He is married with four children and a granddaughter.

Spencer Meredith

Dr. Spencer B. Meredith III, PhD is an Associate Professor in the Joint Special Operations Master of Arts (JSOMA) program for the College of International Security Affairs (CISA) at the National Defense University (NDU). After completing his doctorate in Government and Foreign Affairs at the University of Virginia in 2003, he served as a Fulbright Scholar in the Caucasus in 2007 working on democratic development and conflict resolution, and has focused on related issues in Eastern Europe for several years. He has also served as a subject matter expert for US Department of State public diplomacy programs in South and East Asia dealing with the role of religion and democracy in US foreign policy.

Dr. Meredith has areas of expertise that address "4+1" challenges in the Gray Zone through the frameworks of democratization and conflict resolution. His regional focus has been on Russian, Eastern European and Middle Eastern politics. Accordingly, he has advised US Special Operations Command projects on countering Russian influence operations in Ukraine and the Baltics, US Central Command programs analyzing and supporting effective governance in Iraq and Syria, and other US Army Special Operations efforts in analyzing narratives, deterrence, and a range of violent and non-violent conflicts. He has also worked with partner nations to establish effective governance in Eastern Europe, Central Asia and the Middle East.

Dr. Meredith's publications include his first book on democratic development and international nuclear safety agreements (Nuclear Energy and International Cooperation: Closing the World's Most Dangerous Reactors), as well as articles in scholarly journals ranging from Communist Studies and Transition Politics, Peace and Conflict Studies, to Central European Political Science Review. He has also published in professional journals related to unconventional warfare and the future operating environment, with articles in Small Wars Journal, Inter-Agency Journal, Special Warfare, Foreign Policy Journal, and the peer-reviewed Special Operations Journal.

Christophe Morin

CEO and co-founder, SalesBrain, Media Psychologist. Media Psychology. Adjunct Faculty Fielding Graduate University Lead Faculty for the Media Neuroscience Certificate Program.

With over 30 years of marketing research, advertising, psychology and business development experience, Dr. Morin is passionate about understanding and predicting consumer behavior and media effect using neuroscience. Dr. Morin authored the first book on neuromarketing which is currently available in 11 languages. Prior to founding SalesBrain, he was Chief Marketing Officer of rStar Networks, a public company that developed the largest private network ever deployed in US schools.

Dr. Morin has received multiple awards during his career. In 2011 and 2013, he received prestigious speaking awards from Vistage International, the largest CEO leadership training organization in the world. In 2011, 2014 and 2015, Dr. Morin received Great Mind Research Awards from the Advertising Research Foundation (ARF).

Dr. Morin holds an MBA from Bowling Green State University, an MA and a PhD in Media Psychology from Fielding Graduate University. He is an expert on the effect of advertising on the brains of adolescents and young adults. He is an adjunct faculty member of Fielding Graduate University where he teaches several post graduate courses he created. He actively volunteers his expertise for many non-profit organizations.

Bradford Morrison

Bradford H. Morrison studies psychology in the PhD program at the University of British Columbia, and is a Research Co-ordinator at the UBC REST Lab. He specializes in political psychology, especially the decision-making of political leaders during crises, and the psychology of violent extremist groups. One of his current research foci is the psychology of the Irish Republican Army and Sinn Fein (the movement's political party), in particular with respect to major shifts in the movement's strategy. He is also working on studies of the psychology of Bashar al-Assad, and of the political leadership of the current Chinese and Russian regimes.

Valerie Reyna

Valerie Reyna is Professor of Human Development, Director of the Human Neuroscience Institute, Director of the Magnetic Resonance Imaging Facility, and Co-director of the Center for Behavioral Economics and Decision Research at Cornell University. Her research integrates brain and behavioral approaches to understand and improve judgment, decision making, and memory across the life span, with a special focus on decisions involving risk and uncertainty. She is a developer of fuzzy-trace theory, a model of the relation between mental representations and decision making that has been widely applied in law, medicine, and public health. Dr. Reyna has been elected to the National Academy of Medicine and is a Fellow of the Society of Experimental Psychologists. She is also a Fellow of the American Association for the Advancement of Science, the Divisions of Experimental Psychology, Developmental Psychology, Educational Psychology, and Health Psychology of the American Psychological Association, and the Association for Psychological Science. Dr. Reyna has served as a permanent member on study sections of the National Institutes of Health, and on expert panels for the National Science Foundation, MacArthur Foundation, and the National Academy of Sciences.

Nawar Shora

Nawar Shora is a Senior Advisor with the Department of Homeland Security, Transportation Security Administration Office of Intelligence and Analysis, Counter-Terrorism Team. He works on cultural demystification and Countering Violent Extremism (CVE) efforts on the Office of Intelligence and Analysis, Counter-Terrorism Team. He is also a Syria Expert and conducts briefs to the IC and law enforcement on Syria: Past, Present, and Possible Future.

Nawar is the author of The Arab American Handbook (2nd. Edition 2010, Cune Press – www.ArabAmericanHandbook.com), an easy-to-read, introductory guide to the Arab, Arab-American, and Muslim cultures. The book has received endorsements from FBI, Georgetown University, Helen Thomas, and The Christian Security Network.

Over the past fifteen years, Nawar has delivered in-person trainings to more than 50,000 professionals, including intelligence analysts, law enforcement, university, and corporate groups. Additionally, he has reached hundreds of thousands of others through two federal government training videos about Arabs

and Muslims where he served as a subject matter expert; (The First 3 to 5 Seconds – Arab and Muslim Cultural Awareness Training for Law Enforcement – Community Relations Service, US Department of Justice; and Department of Homeland Security, Office for Civil Rights and Civil Liberties, Introduction to Arab American and Muslim American Cultures Course for DHS Personnel).

Nawar's efforts have been recognized by the FBI with the "Director's Community Leadership Award"-(2009) and the "FBI Exceptional Service in the Public Interest Award" (2005), the Department of Homeland Security's Office for Civil Rights and Civil Liberties Leadership Plaque (2007), Washington, DC Metro Police Department's "Outstanding and Dedicated Service Plaque" (2008) "FBI Community Outreach Training Award" (2009, 2010) and most recently by the DHS "Outstanding American by Choice Award" (2011).

Nawar is a highly sought after public speaker with government agencies, law enforcement, intelligence community, colleges and universities and corporations. He speaks about the history, norms, mores, culture, and current events of Arabs and Muslims. He has also served as a guest lecturer at varied academic institutions, the Federal Law Enforcement Training Center (FLETC) in Glynco, Georgia, the National Targeting Center, and the FBI Academy.

Val Sitterle

Dr. Sitterle is a Senior Researcher at the Georgia Tech Research Institute where she has over 20 years experience in defining, executing, and leading applied science and engineering R&D efforts. Her primary expertise is in engineering science, integrating engineering, natural and physical sciences, and mathematics to design and analyze systems across disciplines. Dr. Sitterle specializes in asymmetrical warfare and systems engineering analysis and design where her work bridges operational complexity, sociotechnical analysis, and complexity theory. She designs and/or analyzes complex defense systems, threat environments, and emergent threats in the asymmetric space in support of various DOD organizations including the US Air Force, US Army, and the Joint Improvised-threat Defeat Organization (JIDO). She also develops analytical methods and frameworks to enable more effective system engineering design and characterization in support of defense acquisitions for both complex defense systems and cyber-physical resilience challenges. In this work she supports both the DOD's Engineered Resilient Systems (ERS) effort and the Systems Engineering Research Center, a DOD University Affiliated Research Center. Dr. Sitterle earned a Ph.D. in Mechanical Engineering at Georgia Tech, a BME and MS in Mechanical Engineering from Auburn University, and an MS in Aerospace Engineering and Engineering Science from the University of Florida.

Peter Suedfeld

Peter Suedfeld is an experimental social psychologist holding an appointment as Dean and Professor, Emeritus, at the University of British Columbia in Vancouver, B.C., Canada. He was educated in Hungary, Austria, and the US (BA, Queens College, MA and PhD, Princeton), and previously taught at the University of Illinois and Rutgers. He is a veteran of the US Army and the US Air Force Reserve, and now has dual citizenship in the US and Canada. His research, described in over 300 publications, deals primarily with adaptation and resilience during and after challenging, dangerous, and/or extreme environments and experiences. These have included high-level political and military decision-making and information processing under stress, survival in genocidal death camps, and work in the two polar regions as well as space. He is a Fellow of the Royal Society (the National Academies) of Canada and

many other scientific societies. Among his awards are the Antarctica Service Medal of the US National Science Foundation, the Canadian Psychological Association Gold Medal for lifetime achievement, and Queen Elizabeth II's Diamond Jubilee Medal.

Scott Thompson

Lieutenant Colonel Scott K. Thomson is an Army Reserve Psychological Operations officer who recently completed a National Security Fellowship at Harvard University's John F. Kennedy School of Government, where he focused his research on the application of behavioral science to counter-insurgency and stability operations. Prior to his fellowship, LTC Thomson commanded of the 17th Psychological Operations Battalion in Austin, TX, from 2013-2015, where he provided Military Information Support Operations support primarily to Army South and Southern Command. From 2011-2013, LTC Thomson attended the US Army Command and General Staff College and the School of Advanced Military Studies from 2011-2013 where he studied operational planning. From 2009-2011, LTC Thomson activated and commanded the 316th Psychological Operations Company at Grissom Air Reserve Base, IN. Activities included manning, equipping, and training the unit to conduct Military Information Support Operations. Prior to company command, LTC Thomson served as the operations officer of the 16th Psychological Operations Battalion in Fort Sheridan, IL from 2007- 2009. LTC Thomson previously served on active duty as an Armor Officer in multiple assignments, including duty in Iraq. He holds a BS in exercise science from Georgia State University, an MA in communications management from Webster University, and a Masters of Military Arts and Sciences in operational art from the Command and General Staff College. His academic interests include the military and diplomatic application of behavioral sciences such as systems thinking, social psychology, and behavioral economics to national security issues.

Robert Toguchi

Dr. Robert M. Toguchi is currently serving as the Chief, Concepts Division, G9 Directorate, in the US Army Special Operations Command at Fort Bragg, North Carolina. He has spent over 30 years on active military duty while serving as a Functional Area 59 strategist for the US Army. His past assignments included a tour as the Director, Strategic Plans and Chief, ARCIC Initiatives Group, TRADOC. In the Pacific region, he spent a tour with the US Pacific Command while serving as the Deputy Director, J8; and the Chief, Strategic Plans, J5 Directorate, USPACOM. Dr. Toguchi was also assigned to Africa in 2005 while serving as the senior US military observer to the U.N. Mission in Liberia. Previously, he served on the faculty and taught military strategy at the US National War College, National Defense University. Additionally, in the Washington D.C. area, Dr. Toguchi gained valuable experiences within the halls of the Pentagon while serving as a strategist in the DAMO-SSP, Strategy and Policy Division, Army G3/5/7; and as a war planner in DAMOSSW, War Plans Division, Army G3/5/7, 1996-1999. Dr. Toguchi received a B.S. degree concentrating in Engineering, from the US Military Academy in 1980; and received a PhD in History from Duke University in 1994.

Nick Wright

Dr. Nicholas Wright is a Senior Research Fellow at the University of Birmingham (UK). He applies insights from neuroscience and psychology to decision-making in international confrontations in ways practically applicable to policy. He has conducted work for the UK Government and Pentagon Joint Staff. He was previously an Associate in the Nuclear Policy Program, Carnegie Endowment for International Peace, Washington DC. Prior to joining Birmingham and Carnegie, he examined decision-making using functional brain imaging at University College London (UCL) and in the Department of Government at

the London School of Economics. He worked clinically as a neurologist in Oxford and at the National Hospital for Neurology in London. He has published academically (e.g. Proceedings of the Royal Society), in general publications such as the Atlantic or National Interest, and with the Joint Staff at the Pentagon (see www.nicholasdwright.com/publications). He has briefed multiple times at the Pentagon, and also at the UK MoD, French MoD, German Foreign Office and elsewhere. He has appeared on the BBC and CNN. Wright received a medical degree from UCL, a BSc in Health Policy from Imperial College London, has Membership of the Royal College of Physicians (UK), has an MSc in Neuroscience and a PhD in Neuroscience both from UCL.

Todd Veazie

CAPT (Ret) Veazie is assigned to the National Counterterrorism Center where he leads a team exploring the future of terrorism and researching and producing whole of government counterterrorism assessments. He was born in Washington D.C. and earned a Bachelor of Science degree in Marine Science from the University of South Carolina and was commissioned in 1986. After commissioning he reported to Basic Underwater Demolition/SEAL training and graduated in Class 140. Veazie is a career Naval Special Warfare (NSW) SEAL officer and has served in east and west coast SEAL Teams and deployed to over fifty countries around the globe leading Naval Special Warfare formations in the execution of combat and peacetime special operations missions in Latin America, Europe, Africa, the Western Pacific and the Middle East. Command tours include SEAL Team SEVEN in San Diego, Naval Special Warfare Unit THREE in Bahrain as well as duty as Commodore, Naval Special Warfare Group FOUR in Virginia Beach. He has served in numerous staff assignments that include the Executive Director of Joining Forces in the Office of the First Lady at the White House, personnel policy at the Bureau of Naval Personnel, the Assistant Chief of Staff for Resources, Requirements, and Assessments for the Commander, Naval Special Warfare Command and in the Operations Directorate (J3) on the Joint Staff at the Pentagon. Decorations include the Legion of Merit (3), the Bronze Star, Defense Meritorious Service Medal (2), Meritorious Service Medal (3), and various other awards. He is also a 2003 Graduate of the National War College earning a Master's Degree in National Security Strategy. Todd has been married to his bride Vanessa for 26 years. They live in Alexandria, VA.